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Contribution of Contraception to Fertility in the Province of the Special Region of Yogyakarta

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Abstract

The condition of the total fertility rate in Yogyakarta Province has tended to increase in the last decade. But there has also been a decline in the use of modern contraception. This study aims to study the determinant trend between fertility in the Province of Special Region (DI) Yogyakarta using the 2002/03 IDHS data and the 2017 IDHS with aggregate data for women of childbearing age 15-49 years. The results show that the pattern of marriage, the use and effectiveness of contraception, and the pattern of infertility during breastfeeding are intermediate determinants of fertility in DI Yogyakarta Province. Patterns of use and effectiveness of contraception are the main determinants of fertility in the two survey periods. The increasing marital index shows that the reproductive period of women in married status is getting longer and can cause them to be exposed to the possibility of giving birth to more children. The role of the use and effectiveness of contraception is still dominant in contributing to fertility decline. Therefore the use of contraception as a birth control still needs to be strengthened either through advocacy to stake holders in the local government.

Introduction

The success of the population control program is shown by the decline in the total fertility rate (TFR) in Indonesia for three decades based on the 1987 Indonesian Prevalence Survey (SPI) and the 1991, 1994, 1997, and 2002/2003 Indonesian Demographic Health Surveys (IDHS). The total fertility rate in Indonesia had stagnated for a decade at 2.6 children per woman during her reproductive period, according to the 2007 IDHS and 2012 IDHS. However, the total fertility rate fell again to 2.4 children according to the 2017 IDHS affecting the pattern of the Indonesian population pyramid from an expansive to a constructive pattern. A constructive pyramid is a pyramid that consists of more productive young age groups than non-productive ones (BPS, BKKBN, Kemenkes 2017).

The total fertility rate for each province varies according to the 2017 IDHS. Some have TFR above and below the national figure. One of the provinces with a TFR below the national figure is DI Yogyakarta Province is 2.2 children per woman. According to Adieotomo and Samosir (2011), varying levels of fertility can depend on several factors such as age structure, education level, age at first marriage, number of marriages, women's employment status, economic status, and use of contraceptives (Adioetomo, S. M., & Samosir 2010). This variation in fertility levels certainly requires population policies that are following the conditions of the fertility levels of each region. Several international and national articles explain that the decline in fertility can be caused by demographic variables such as education, place of residence, age at first marriage, contraceptive use, and others (Alazbih, Tewabe, and Demissie 2017)(Arsyad and Nurhayati 2017; Chola and Michelo 2016; Laelago, Habtu, and Yohannes 2019; Wicaksono and Mahendra 2016).

Several theories put forward by

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demographers explain the factors that influence (determinants) fertility either directly or indirectly (Davis and Blake 1956). Direct determinants that affect fertility, commonly known as intermediate variables or intermediate variables, are stages in the reproductive process, namely sex (intercourse), conception (conception), and pregnancy (gestation), and there are eleven variables in these stages. Bongaarts simplified the eleven variables into eight variables known as proximate determinants, namely exposure factors, fertility control factors in intentional marriages, and natural fertility factors in marriage (Samosir 2019). Bongaarts identified the eight variables into four variables. Namely, the proportion of marriages, the use of methods of contraception, infertility after giving birth or during breastfeeding (duration of postpartum amenorrhea), and experience of abortion (Chola and Michelo 2016; Bongaarts 1978, 2015). The Bongaarts model states four indices as the main determinants that directly vary the fertility rate. The conceptual framework formula developed by Bongaarts to calculate fertility rates uses four indices: TFR = Cm × Cc × Ca × Ci × TF. The explanations are: TFR = total fertility rate (total fertility rate); Cm = marital index; Cc = index of non-contraception; Ca = abortion index; Ci = index of infertility during breastfeeding; TF = total fecundity rate (total fecundity rate). Each index is estimated from zero (0) to 1 (one), with zero indicating a greater effect on inhibiting fertility and one indicating a lower inhibitory effect. Other variables included in the calculation are a). Total marital fertility rate (TMFR); b). Total natural marital fertility rate (TNMFR); c).Total fecundity rate (TF). If we look at the trend of the DI Yogyakarta Province TFR rate slightly increasing according to the 2017 IDHS compared to the previous IDHS period. On the other hand, modern contraceptives use decreased according to the 2017 IDHS compared to the previous IDHS. It raises a question regarding factors related to the increase in fertility rates, especially in DI Yogyakarta.

The determinants of fertility, both directly and indirectly, need to be understood and studied, especially in DI Yogyakarta Province. Studies on the direct determinants of fertility such as marriage patterns, contraception, abortion, and breastfeeding patterns are needed to obtain information that can be used as input for program interventions. This study aims to study the contribution of contraception to fertility in the Province of D.I. Yogyakarta is based on data from the 2002/03 IDHS and the 2017 IDHS.

Method

This study is a secondary data analysis with the data source being the results of the 2002/2003 IDHS and the 2017 IDHS, especially data in the Province of D.I Yogyakarta. The unit of analysis is the aggregate data for women of childbearing age 15-49 years (WUS) in DI Yogyakarta Province. The number of samples taken is the entire sample for Province of DI Yogyakarta for the 2002/2003 IDHS was 367 women and the total sample for the 2017 IDHS was 785 women. The two periods of data used are aimed at studying trends in fertility decomposition or the proximate determinants of direct fertility determinants that occur in the Province of D.I Yogyakarta.

An overview of the determinants of fertility based on the 2017 IDHS has been processed by Samosir, Omas B (2019). The data presented is related to the intermediate determinant variables that have been processed by Samosir, Omas B (2019) based on the results of the 2017 IDHS. The variables for the intermediate determinants in this study include the total fertility rate (TFR) and the total marital birth rate (total fertility rate), marital fertility rate/TMFR), total natural marital fertility rate (TNMFR), total fecundity rate (total fecundity rate/TF), marital index (Cm), non-contraception index (Cc), abortion index (Ca), and the index of infertility during lactation (Ci). Meanwhile, the variables for the indirect factors are: age, place of residence, education, occupation, wealth quintile.

Samosir, Omas B, conducted an analysis of the fertility decomposition using the Bongaarts formula and used the 2017 IDHS data at national and provincial levels. Variables of marriage pattern, the pattern of use and effectiveness of contraception, and the pattern of infertility during breastfeeding are intermediate determinants in Indonesia. The

main determinants of fertility in Indonesia are the pattern of use and the effectiveness of contraception. The same thing was also found in the Province of DI Yogyakarta, where the use of contraception has a strong influence on limiting fertility. Meanwhile, Samosir (1994), using data from the 1991 IDHS, found that contraceptive effectiveness was the main contributor to Indonesia's low TFR.

Results And Discussions

The analysis in this study is divided into three parts. The first part focuses on trends in the fertility decomposition variables from the 2002/03 IDHS to the 2017 IDHS comparison of the fertility decomposition of DI Yogyakarta Province based on the 2002/03 IDHS and the 2017 IDHS results.

The fertility trend in DI Yogyakarta Province is increasing slowly, especially from the results of the 2007 IDHS to the 2017 IDHS. The total birth rate for the province in the 2002/03 IDHS is 1.9 children per woman. It means the average number of children a woman has at the end of her life is her reproductive rate is 1.9 children as long as the woman follows the fertility pattern in a given year. Then the number decreased to 1.8 children according to the 2007 IDHS. Then increased to 2.1 children per woman according to the 2012 IDHS and 2.2 children per woman according to the 2017 IDHS. DI Yogyakarta Province slowly over the span of a decade.

The use of contraceptive methods is one of the intermediate determinant variables. The percentage of use of a family planning tool/method in Yogyakarta Province seems to fluctuate according to the four periods of the IDHS (SDKI). The usage percentage of a family planning method/method decreased to 67% (2007 IDHS) from 76% (02/03 IDHS). However, it increased slightly to 70% and to 76% (2017 IDHS). This picture is also found in the usage percentage of modern family planning tools/methods. From 63% (IDHS 2002/03) decreased to 55% (IDHS 2007), then increased slightly to 60% (IDHS 2012) and decreased again to 57% (IDHS 2017). It is also seen in the traditional family planning tools/methods use, whose trends fluctuate. The use percentage of traditional family planning tools/methods did not change between 2002 and 2007 at 12% (IDHS 2002/03 and IDHS 2007) and then decreased slightly to 10% (IDHS 2012). However, it increased dramatically to 19% (2017 IDHS) (Image 1).

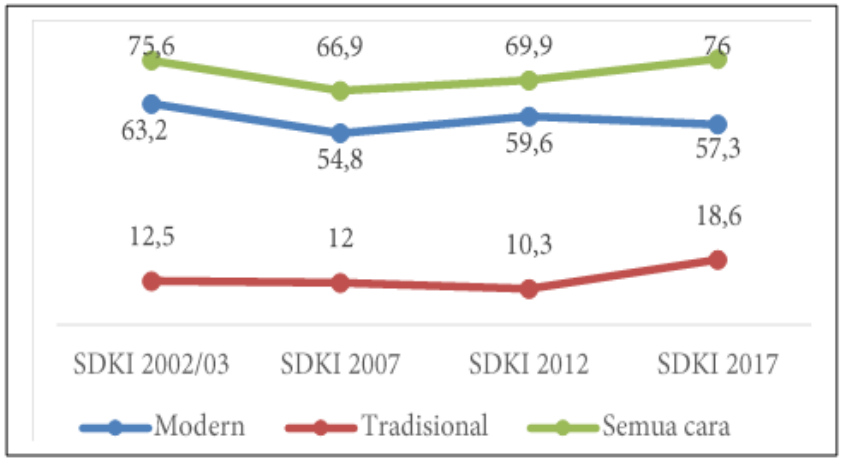


Image 1. Use of Contraceptives in DI Yogyakarta Province

The 2002/03 IDHS show that the fertility rate for Yogyakarta Province is 1.9 children per woman. The results of the calculation of the fertility decomposition (TFR, TMFR, Cm, fy, fm, e, Cc, APK 1999–2002, TNMFR, i, Ci, and TF) in DI Yogyakarta province based on the 2002/03 IDHS are presented in Table 1. The DI Yogyakarta fertility rates in the 2002/03 IDHS is included in the category of areas with low fertility rates, below the national fertility rate of 2.6 children per woman. The estimated TMFR of Yogyakarta D.I Province is 3.24 children per

married woman. This figure means that the marriage pattern in DI Yogyakarta province causes the fertility rate in marriage (TMFR) to be higher at around 1.34 children per woman compared to the overall birth rate (TFR).

The 2002/03 IDHS show that the fertility rate for Yogyakarta Province is 1.9 children per woman. The results of the calculation of the fertility decomposition (TFR, TMFR, Cm, fy, fm, e, Cc, APK 1999–2002, TNMFR, i, Ci, and TF) in DI Yogyakarta province based on the 2002/03 IDHS are presented in Table 1. The DI Yogyakarta fertility rates in the 2002/03 IDHS is an area with low fertility rates, below the national fertility rate of 2.6 children per woman. The estimated TMFR of Yogyakarta D.I Province is 3.24 children per married woman. This figure means that the marriage pattern in DI Yogyakarta province causes the fertility rate in marriage (TMFR) to be higher at around 1.34 children per woman compared to the overall birth rate (TFR). The results of the 2002/03 IDHS also show that the marital index in Yogyakarta Province is 0.59, which means that the overall fertility rate (TFR) is 59 percent lower than the marital fertility rate (TMFR). In other words, it can also be interpreted that women in Yogyakarta D.I Province spend 59 percent of their reproductive period in a marital status which exposes them to the possibility of giving birth to children. So the effect of reducing fertility from the marriage pattern in DI Yogyakarta Province is 59 percent (Table 1).

The 2017 IDHS show that the fertility rate for Yogyakarta Province is 2.19 children per woman. The results of the calculation of the fertility decomposition (TFR, TMFR, Cm, fy, fm, e, Cc, APK 2014–2017, TNMFR, i, Ci, and TF) DI Yogyakarta Province based on the 2017 IDHS results are presented in Table 1. Fertility figures for DI Yogyakarta Province based on the 2017 IDHS is included in the category of areas with low fertility rates (less than 2.3 children per woman), below the national fertility rate of 2.4 children per woman. The data processing shows that the estimated TMFR of the Province of DI Yogyakarta in 2017 was 3.54 children per married woman. It means that the pattern of marriage in the Province of DI Yogyakarta resulted in the fertility rate in marriage (TMFR) being around 1.35 children per woman compared to the total births rate (TFR).

The 2017 IDHS showed that the marriage index in DI Yogyakarta Province is 0.62. It means that the overall fertility rate (TFR) is 62 percent lower than the marital fertility rate (TMFR). So the effect of reducing fertility from the marriage pattern in the Province of D.I Yogyakarta is 62 percent. It also means that women in Yogyakarta D.I Province spend 62 percent of their reproductive life in a marital status which exposes them to the possibility of childbearing. It means that women in Yogyakarta in 2017 married younger than in the 2002/2003 period. The phenomenon of getting married young began to appear in Yogyakarta. Research in Central Java found that women tend to be proud if they get married at a young age and worry if they don't. This condition shows that the age at first marriage is significantly vital in a woman's life (Alazbih et al., 2017; Bambang Budi Raharjo et al, 2019). It is different in Uganda, where women with higher education affect the delay in age at first marriage to be older. It has highly impacted the decline in the birth rate in Uganda (Ariho, Kabagenyi, and Nzabona 2018).

The 12-month contraceptive failure rate in DI Yogyakarta Province, based on the 2002/03 IDHS results, was 4.3. While the monthly contraceptive failure rate was 0.36. Furthermore, the contraceptive effectiveness rate in DI Yogyakarta is 96.38. Based on the contraceptive effectiveness rate, the non-contraceptive index of DI Yogyakarta is 0.16. It means the fertility rate in marriage (TMFR) is 16 percent lower than the fertility rate in marriages without contraception and intentional abortion (TNMFR). Thus, the fertility-lowering effect of the contraceptive pattern (prevalence and effectiveness of contraception) in DI Yogyakarta is 16 percent. It also means that 84 percent of women of reproductive age who are married and fertile are protected by 100 percent effective contraception.

Table 1. Fertility Decomposition Calculation Results of DI Yogyakarta Province

Variable/index	IDHS 2002/03	IDHS 2017	Unit
Total fertility rate/TFR)	1,90	2,19	child per woman
Total marital fertility rate/TMFR	3,24	3,54	child per married woman
Marital Index (C_m)	0,59	0,62	
12-month contraceptive failure rate (f_y)	4.3	2,29	percent per year
monthly contraceptive failure rate (f_m)	0,36	0,19	percent per month
Contraceptive effectiveness (e)	96,4	98,1	percent
Non-contraceptive index (C_c)	0,16	0,21	
Ccontraceptive prevalence rate/CPR	73,8	74,2	percent
(Total natural marital fertility rate/TNMFR	20,09	16,52	child per married woman
Median period of infertility after delivery (i)	2,0	4,73	month
Infertility index during breastfeeding (C_i)	0,98	0,86	
Total fecundity rate/TF	20,60	19,19	child per married woman

Source: IDHS (SDKI).

Based on the non-contraceptive index above, the natural fertility rate (fertility rate in marriages without contraception and non-intentional abortion/TNMFR) in DI Yogyakarta is 20.09 children per married woman. This means that the pattern of prevalence and effectiveness of contraception has resulted in married women in DI Yogyakarta having fewer births, namely 16.85 births (TNMFR - TMFR = 20.09 - 3.24 = 16.85). The effect of reducing fertility in DI Yogyakarta with Cc = 0.16, means that the prevalence and effectiveness of contraception have resulted in a large difference between TMFR and TNMFR, around 16 to 17 children per married woman. In this case, the prevalence and effectiveness of contraception in DI Yogyakarta were able to reduce the fertility rate.

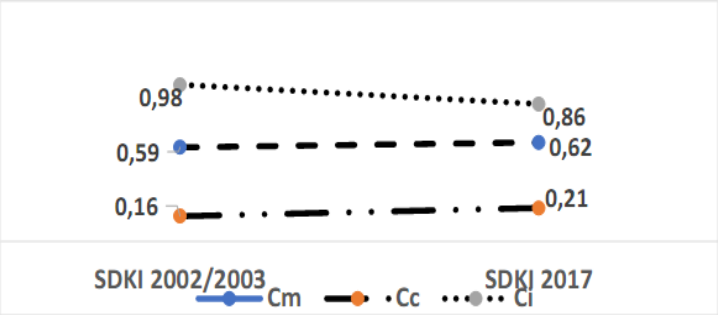
Based on the 2017 IDHS, the 12-month contraceptive failure rate in DI Yogyakar-ta Province is 2.29, and the monthly contra-ceptive failure rate is 0.19. Furthermore, the contraceptive effectiveness rate in DI Yogyakarta is 98.1. Based on the contraceptive effectiveness rate, the non-contraceptive index (Cc) is 0.21. It means that the fertility rate in marriage (TMFR) in D.I Yogyakarta is 21 percent lower than the fertility rate in marriages without contraception and intentional abortion (TNMFR). So, the effect of reducing fertility from the contraceptive pattern (prevalence and effectiveness of contraception) in Yogyakarta Province is 21 percent. It also means that 79 percent of women of reproductive age who are married and fertile are protected by 100 percent effective contraception.

Based on the non-contraceptive index, the natural fertility rate (fertility rate in marriages without contraception and non-intentional abortion/TNMFR) in Yogyakarta Province is 16.5 children per married woman. It means that the pattern of prevalence and effectiveness of contraception has resulted in married women in DI Yogyakarta having fewer births, namely 12.96 births (TNMFR - TMFR = 16.5 - 3.54 = 12.96). The effect of reducing fertility in D.I Yogyakarta with Cc = 0.21 means the prevalence and effectiveness of contraception results a large difference between TMFR and TNMFR, around 12 to 13 children per married woman. In this case, the prevalence and effectiveness of contraception in DI Yogyakarta could reduce the fertility rate in the province. Using the same calculation pattern in Ethiopia, the lower the proximate determinant, the lower the fertility rate, especially long-term contraception. (Lailulo and Sathiya Susuman 2018).

Changes in the values of the marital index, non-contraception index, and breast-feeding index in DI Yogyakarta Province between 2002/2003 and 2017 are presented in Image 2. The figure shows that between 2002/2003 and 2017, the marital index (Cm) and non-contraception index (Cc) increased, while the breastfeeding index (Ci) decreased. They are the effect of limiting fertility from the pattern of marriage, use and effectiveness

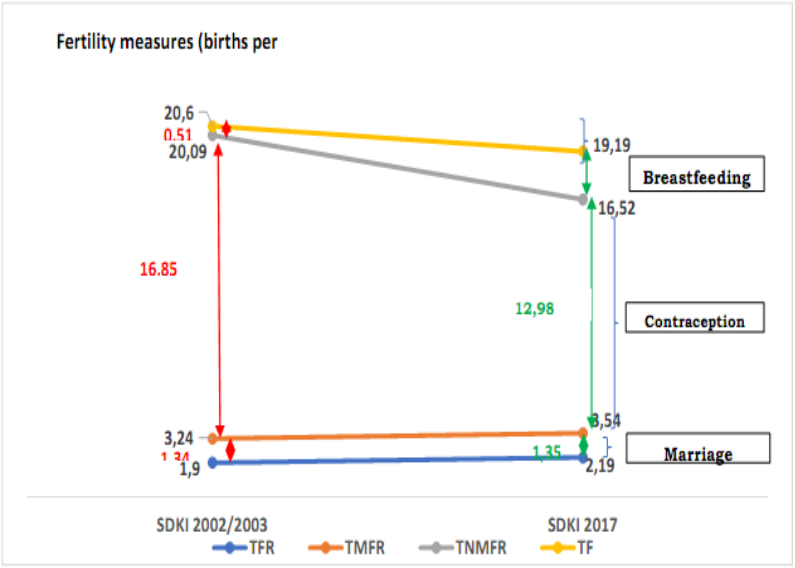
of contraception decreases. While the limiting fertility effect from the pattern of infertility during breastfeeding increases. This finding is different from the conditions in Ethiopia, showing that the contribution of contraception to fertility decline increased from 2000 to 2011. Meanwhile, the marriage pattern in the country tends to remain unchanged, unlike what in Yogyakarta (Alazbih et al., 2017). In line with the conditions in Yogyakarta, the use of contraception is an significant factor affecting fertility in Asian countries (Majumder

Image 2. Value of Marriage Index, Noncontraception Index, and Breastfeeding Index in DI Yogyakarta Province Based on the 2002/2003 and 2017 IDHS (SDKI)



The change in fertility measures between 2002/2003 and 2017 show that the difference between the overall fertility rate (TFR) and the fertility rate in marriage (TMFR) increased from 1.34 births according to the 2002/2003 IDHS to 1.35 births according to the 2017 IDHS. Meanwhile, the difference between marital fertility rates (TMFR) and natural fertility rates (fertility rates in marriages without contraception and intentional abortions/ TNMFR) decreased from 16.85 births according to the 2002/2003 IDHS to 12.98 births according to the 2017 IDHS. Furthermore, the difference between the natural fertility rate (TNMFR) and the natural fertility rate without breastfeeding (TF) increased from 0.51 births according to the 2002/2003 IDHS to 2.67 according to the 2017 IDHS.

Image 3. Changes in fertility measures for DI Yogyakarta Province based on the results of the 2002/03 and the 2017 IDHS (SDKI)



Based on these figures, according to the 2002/2003 IDHS, the marriage pattern succeeded in preventing births of 1.34 births per woman (TMFR-TFR=3.24-1.9). The marriage pattern and the use and effectiveness of contraception succeeded in preventing births as many as 16.85 births per married woman (TNMFR-TMFR= 20.09-3.24). Furthermore, the pattern of marriage, use and effectiveness of contraception, and breastfeeding resulted in 0.51 prevented births (TF-TNMFR=20.6-20.09) per married woman. Meanwhile, based on the 2017 IDHS, the marriage pattern resulted in 1.35 births per woman prevented (TMFR-TFR=3.54-2.19). The marriage pattern and the use and effectiveness of contraception resulted in 12.98 preventable births per married woman (TNMFR-TMFR=16.52-3.54). Meanwhile, the marriage pattern, the use and effectiveness of contraception, and breastfeeding succeeded in preventing births of 2.67 births per married woman (TF-TNMFR = 19.19-16.52).

The following will discuss the preventable births and the relative percentages for each fertility decomposition index (Table 3). The number of prevented births, the highest contribution of the pattern of marriage, use of contraception, and breastfeeding to fertility decline. So it can be determined by calculating the relative percent of each variable. The total prevented births (TF-TFR) in 2002/2003 was 18.7 births, while in 2017 was 17 births. Based on the calculation of the relative percent, in 2002/03, the pattern of contraceptive use had the highest contribution of 90 percent to the TFR rate in the Province of D.I.Yogyakarta during that period (1.9 children). The same thing was found in the 2017 IDHS, where the pattern of contraceptive use contributed 76 percent to the TFR figure in DI Province. Yogyakarta in the same period (2.2 children). In the range of 2002/03 to 2017, the contribution of the contraceptive pattern decreased, but the breastfeeding pattern contribution increased from 3 percent (IDHS 2002/03) to 16 percent (IDHS 2017). The marriage pattern contribution did not change significantly in the period 2002/03 to 2017.

This figure shows that the contribution of the use and effectiveness of contraception is still the largest to the decline in fertility compared to other fertility decomposition indices. The use contribution and the contribution effectiveness according to the 2002/03 IDHS had reached 90 percent providing a TFR rate of 1.9 children per woman during her reproductive period. The contribution of contraceptive use is still dominant even though the percentage has decreased according to the 2017 IDHS. It is in line with conditions in Bangladesh which show that contraceptive use also contributes the most to reducing fertility. According to Rogers and Stephenson (2018), based on the calculation of the proximate determinant of Bongarts, in the regions of Asia, South Africa, Latin America, and the Caribbean, the increase in contraceptive use and delaying the age of marriage are the most influential factors on fertility (Rogers and Stephenson 2018). The decline in fertility in Bangladesh is highly dependent on increasing contraceptive use (Haq 2018). Likewise, in Ethiopia, the contraception use also contributed significantly to the decline in fertility (Laelago et al., 2019). In Eswatini's proximate determinant analysis, the determinant of fertility decline is the use of contraception compared to other factors (Chemhaka and Odimegwu 2019). Research findings in Ethiopia based on the method of determinant analysis developed by Bongarts provide a similar picture. Contraceptive use has been an significant factor in declining fertility for a decade (Ahmed Shallo 2020). According to the Bongarts calculation model, the results of the proximate determinant in Peninsular Malaysia and Pakistan show delays in the age of marriage and the use of contraception as significant factors (Finlay, Mejía-Guevara, and Akachi 2018; Nasir, Jamal Abdul; Hinde, Andrew; Padmadas 2015; Tey NP, Ng ST 2012). Meanwhile in Uganda rural areas, the contraception use is a determining factor in decreasing fertility, in addition to age at first sexual intercourse, gender of the head of the household, and working women (Ariho and Nzabona 2019). The contraceptive use contribution among married women to fertility, was also shown in a study using a surveillance method in the Eastern Ethiopian region. Married women who use contraception are significantly associated with not wanting to have more children (Semahegn et al., 2018).

Another thing found in the countries of sub-Saharan Africa is women who come from the upper wealth index status tend to delay the age at first marriage and use contraception. This condition of women has a main role in contributing to low births (Finlay et al., 2018). Kabir et. al. analysis based on demographic data in Bangladesh strengthens the influence of the role of age at first marriage on fertility. Women who marry young, under the age of 13 years, have many children who have never been born and are supported by not using contraception during their reproductive years. It is because the reproductive period of women is getting longer if they marry at a young age and there is no control in limiting births (Kabir et al., 2001). The decline in fertility in sub-Saharan Africa is very significant due to the use of contraception by reducing unwanted pregnancies and unplanned births (Singh et al., 2017).

Table 2. Prevented Births and Relative Percentages for Each Index in Yogyakarta Province D.I Based on the Results of the 2002/03 and the 2017 IDHS

Index	Prevented births		%relative	
	2002/03	2017	2002/03	2017
Ci, breasfeeding pattern	0,51	2,67	2,7	15,7
Cc, contraception pattern	16,85	12,98	**90,1**	**76,4**
Cm, marriage pattern	1,34	1,35	7,2	7,9
Total (TF-TFR)	18,7	17	100,0	100,0

Source: IDHS and primary data

Conclusions

The results show that the marriage pattern, the use and effectiveness of contraception, and the infertility pattern during breastfeeding are intermediate determinants of fertility in DI Yogyakarta Province. The use pattern and effectiveness of contraception is the significant determinant of fertility compared to the marriage pattern and the pattern of infertility during breastfeeding, eventhough the protection decreases against fertility (2017 IDHS period with 2002/03 IDHS). The decrease in the use and effectiveness of contraception can be explained by a decrease in the use of modern contraception and an increase in traditional contraception in the two survey periods. The marriage index increased in the 2017 IDHS compared to the 2002/03 IDHS. It indicates that their reproductive period in married status is getting longer and can cause them to be exposed to giving birth to more children. Considering the role of the use and effectiveness of contraception is still dominant in contributing to the decline in fertility and the increasing duration of the marriage, it is necessary to 1). Strengthening advocacy to stakeholders in the local government and communication, information, and education (KIE) in the field regarding the use of contraception as birth control; 2). Empowering family planning field officers to optimally implement IEC in field lines that are in direct contact with program targets; 3). Communication, information, and education on the use and effectiveness of contraception are strengthened in the more effective long-term use of modern contraception.

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Implementation of Hospital Occupational Health and Safety Standards at General Hospitals in Kendari City

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Abstract

A hospital is a health service facility with various activities with many potential dangers for hospital human resources and patients or patient companions. Potential hazards in the hospital can be in the form of occupational diseases and infectious diseases. There are also other potential hazards that affect the situation and conditions in the hospital. The specific objective of this research is to see the implementation of the Occupational Health and Safety standards, implemented in 3 (three) General Hospitals in Kendari City, Southeast Sulawesi. This research uses qualitative research methods with an observational approach and in-depth interviews. This research took place in 3 (three) General Hospitals in Kendari City, namely: Hospital A, Hospital B, and Hospital C. The informants in this study are those related to the K3 standard policies implementation in hospitals. The results showed that there are several hospitals that have not carried out all the stages of equipped facilities and infrastructure related to risk management aspects, efforts to manage hazardous and toxic materials (B3) from occupational safety and health aspects, to prevent and control fire as well as efforts to prepare for the face. Emergency or Disaster Conditions. It shows that the K3RS standards implementation in several hospitals has not been implemented optimally. It is recommended for the hospital to continue to refer to the rules governing the K3RS implementation. It includes the lack of infrastructure and facilities. Like always, briefings for all officers before working and evaluation at the end of each working hour.

Introduction

Health services are one determinant of health status. Good health services will ensure good health for the community as well. The development of hospitals as health care facilities in Indonesia has recently been very rapid, both in terms of the number and utilization of medical technology. A hospital as a health service institution for the community is a workplace that has a high risk to the safety and health of the hospital's human resources, patients, patient companions, visitors, and hospital environment. In the framework of managing and controlling risk in a hospital, it is necessary to organize occupational safety and health to create a hospital that is healthy, safe, secure, and comfortable. Occupational safety and health is an effort to provide safety guarantees and improve the health status of workers by preventing Occupational Accidents (KAK) and Occupational Diseases (PAK) through efforts to control hazards in the workplace, health promotion, treatment, and rehabilitation (Menkes, 2016).

Occupational health deals with all aspects of health and safety in the workplace and focus on the primary prevention of hazards. Health has been defined as "A state of complete physical, mental, and socio well-being and not merely the absence of disease or infirmity". Occupational health is a multidisciplinary field of health care concerned with enabling an individual to undertake their occupation in the way that causes the least harm to their health

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(Mazhila and Jothi, 2019). Workplace hazards can be seen as part of workplace challenges that must be identified and a solution must be proffered to promote safety and safe systems of work in an organization, all employers are required to carry out the symmetric and critical assessment of the risks in the work place, and the precautions put in place to protect people from harm. The occupational risk assessment should ensure that significant risks are identified and addressed (Fasoranti and Joseph, 2015). The Indonesian government has issued various written regulations regarding management efforts of occupational safety and health to ensure the safety of workers. One of them is Permenkes RI No. 66/2016 on Occupational Safety and Health Article 3 paragraph 1 states that "Every hospital is obliged to hold K3 in the hospital. The implementation of K3 as referred to in paragraph (1) includes: establishing and developing SMK3 in hospitals and implementing K3 standards in hospitals (Menkes, 2016).

In Lebanon, Fifty-six percent of participating private hospitals were accredited. Accredited hospitals reported statistically better OHS performance than non-accredited hospitals based on the standards outlined in the accreditation manual. However, there was an inconsistent performance on numerous OHS indicators among participating hospitals (Habib et al., 2016). The Occupational safety and health programs cannot run alone without a proper company management system. Work-related accidents, can be caused by various activities in the hospital. The Occupational Safety and Health Administration (OSHA) report in 2013 showed that the incidence of work accidents in hospitals was two times greater than in other industries. Data from the Occupational Safety and Health Administration (OSHA) in 2013, the causes of injury to health workers include fatigue due to movement related to patient handling (48%), sprains or falls (25%), contact with dangerous equipment (13%), acts of violence from patients (9%), exposure to hazardous substances (4%), and other causes (1%) (OSHA, 2013).

The specific purpose of this research is to see the implementation of the Occupational Safety and Health (K3) standard carried out in 3 (three) General Hospitals in Kendari City, Southeast Sulawesi. This research is very important to be funded, given the importance of implementing K3 in hospitals. Therefore, taking into account the many potential dangers for both the Human Resources in the hospital and the patient or patient companion, which can be in the form of occupational Diseases, accidents (explosions, fires, accidents related to electrical installations, and other sources of injury), radiation, hazardous chemicals, anesthetic gases, psychosocial and ergonomic disorders, and so on, researchers feel the need to conduct research related to the implementation of K3 in hospitals.

Method

This study used a qualitative research method with an observational approach and in-depth interviews. Data is obtained from the research informants. The qualitative research intends to describe the implementation of K3 standards in the General Hospital in Kendari City. The variables in this study are Occupational Safety and Health (K3) standards in hospitals, including hospital K3 risk management, B3 management from the K3 aspect, fire prevention and control, and emergency/disaster preparedness. This research took place in 3 (three) General Hospitals in Kendari City, namely: RS A, RS B, and RS C. The population in this study were all General Hospitals in Kendari City in Southeast Sulawesi. The sample of this study was 3 (three) General Hospitals in Kendari City, consisting of RS A, RS B, and RS C.

The informants in this study are those related to the K3 standard policies implementation in hospitals. The selection of informants refers to the principle of suitability and adequacy by finding informants who know what information to study, making it easier for researchers to understand the object under study. The primary informants are two people in each hospital, namely the Head of the K3 Organizing Work Unit and the implementing staff directly involved in monitoring the implementation process of K3 standards in the hospital, who were selected by purposive sampling.

Result and Discussion

In general, all hospitals have implemented K3RS risk management. K3RS risk management includes the preparation of a facility/ environment/work process risk management program, potential hazards identification, risk analysis, risk evaluation, risk control, communication, consultation, monitoring, and review. The interview results show that RS B has carried out all the stages. Meanwhile, RS A and RS C have not carried out one stage, the work environment measurement. Regarding the preparation of a facility/environment/work process risk management program that discusses the management of safety and health risks through the K3RS preparation manual, all hospitals have carried out and documented the program in the manual data form. Program preparation is carried out on average once a year. The hospital also has carried out the identification of potential hazards. When asked about its implementation, all hospital informants stated that the hospital had carried out the potential hazards identification. As for the one who runs it is the unit that is responsible for K3RS. The following is an excerpt from an interview with one of the informants at RS C:

"There is an identification. After we compile the program, then every year we identify it from the existing reports. Conducted in the form of surveillance. From this surveillance, we then determine the potential risk ".

Related to periodic inspections and monitoring of safety and industrial hygiene aspects, all hospitals also have implemented them, but the periodization varies. The following is an excerpt from an interview with one of the informants at RS C:

"For monitoring we do it every day. Then it is evaluated, and there is a monthly report ".

As for RS A and RS B, are held once every six months.

The health examination also varies per hospital. RS B and RS C are scheduled once a year, and when there are new employees, in this case, carry out a Medical Check Up. The following is an excerpt from an interview with one of the informants at RS B:

"Often done, once a year".

One of the informants at RS C conveyed the same information, along with the excerpt:

"Yes, there is a health check. Scheduled every year ".

Different information was conveyed by one of the informants at RS A, along with the excerpt:

"Rarely. Only if there are complaints, or if the employee is sick. Routine checks not available. It will be implemented after the Covid-19 ".

As for the measurement in the work environment area, only RS A did not do this because the tools were not available. The following are excerpts from the interview:

"Measurement of the work environment was not carried out because there were no tools"

Hospital is a service industry that is labor-intensive, expert-intensive, capital-intensive, and technology-intensive, so the risk of occupational diseases (PAK) and occupational accidents (KAK) is very high. Therefore OSH efforts are a must. Occupational safety and health are among the aspects of labor protection by applying technology to control all aspects that have the potential to endanger workers. Control is aimed at sources that have the potential to cause occupational disease, accident prevention, and alignment of work equipment both machines and the characteristics of the people who carry out the work. By applying occupational safety and health control technology, it is hoped that workers will achieve high physical endurance, work power, and health.

The physical conditions of the workplace environment in which workers carry out their daily activities contain many dangers, directly or indirectly to workers. These hazards can be classified as vibration, chemical, radiation, lighting, and noise hazards (Redjeki, 2016). To manage risk, hazards must first be identified, and then the risk should be evaluated and determined whether to be tolerated or not. The earlier in the life cycle that effective risk analysis is performed, the more cost-effective the future safe operation of the process or activity is likely to be. The risk understanding developed from these studies forms the basis for establishing most of the other process safety management activities undertaken by the facility. An incorrect perception of risk, at any point, could lead to either inefficient use of limited resources or unknowing acceptance of risks exceeding the true tolerance of the company or the community (Purohit et al., 2018).

The concept of risk management in the hospital had its beginning in the 1970s in the USA, following court decisions established the corporate liability of the hospital for the quality of care and held medical staff liable for the quality of care. The formal program of risk management is a necessity in all health care facilities in the USA and a prerequisite for accreditation of hospitals. Progressive hospitals in developing countries with western trained physicians are initiating the process of risk management as a safeguard against becoming defendants in major medico-legal lawsuits by making risk management an integral component of hospital management (Singh and Ghatala, 2012).

K3RS risk management aims to minimize safety and health risks in the hospital so that it does not harm on the safety and health of hospital human resources, patients, patient companions, and visitors. K3RS risk management must be carried out in a comprehensive manner, which includes: preparation/determination of the context of the activities to be, risk management, identification of potential hazards, risk analysis, risk evaluation, risk control, communication and consultation, and monitoring and review (Menkes, 2016).

In general, all the hospitals studied had implemented K3RS risk management. Moreover, the hospital has implemented accreditation. Where it is known that the implementation of K3RS is one of the parameters in the hospital accreditation assessment. Although, several phase that have not been carried out optimally in several hospitals. The same thing happened at a hospital in Depok. The statistical results of this study showed that not all of the emergency department, operating room, and ICU nurses implemented OSH well (only 43.8%). Based on the interviews, Hospital X planned OSH work procedures and activities, but shortcomings remained in the OSH practice, one of which was in the use of personal protective equipment (Mutifasari et al., 2018).

Risk management must be taken seriously because it can have fatal consequences for both the patient, the patient's family, hospital staff, and even health workers at the hospital concerned. Risk management has become an integral part of hospital accreditation in most hospitals in Southeast Sulawesi. Chemical, ergonomic, psychological, physical (electrical shock, fire and explosion, fall and slip, and radiation), and biological hazard risk assessment confirmed an unacceptable condition of hazard risk that needed changes in shortly. Risk management's role in the qualitative development of care services and provision of a safe environment for the personnel and patients is undeniable. In addition, it is vital to program education and supervision measures for risk management in hospitals (Saranjam et al., 2020).

After identifying all the risks, a likeli-hood and risk impact level is measured. Risk measurement is carried out after consi-dering existing risk controls. After it is measu-red, the level of likelihood and impact, a priority order of risk is arranged from the highest to the lowest. When it is not in can be accepted/ tolerated category must be treated immediately. Risks that can not be accepted/tolerated immediately formulate an action plan to minimize the possible impact of the risk and the personnel responsible for implementing the action plan. Each identified risk is monitored, and the changes are communicated/reported to interested parties in each unit of the hospital concerned.

Risk management is also related to safety climate. A study in Taiwan explains this. Regar-ding total effects on the preventive action and safety satisfaction results, safety climate ranked first and directly, or indirectly, influenced safety satisfaction by preventive action. It showed the importance and relevance of safety climate. In other studies, safety climate was also an antecedent variable of crucial indicators of other safety performance factors such as occupational injuries. Therefore, management must not passively wait for an occupational injury to realize the importance of safety climate. Managers must constantly modify and improve the safety climate and encourage and reward safe behaviors and preventive actions. Moreover, they should avoid punishment and criticism of unsafe behavior; only in this way can proactive behavior occur to reduce occupational injuries and increase safety satisfaction. For medical institutions, relevant institutional safety reporting mechanisms and protocols should be resorted to when a patient safety

incident occurs. Subsequently, improvement strategies should be proposed, and managers should adopt a positive and proactive attitude toward discussing occupational safety concerns and incidents (Huang et al., 2019).

Most hospitals have managed Hazardous and Toxic Materials (B3), but a small proportion has not applied or prepared some elements. The form of B3 material management includes the identification and inventory of B3 materials, preparing and having a Material Safety Data Sheet, preparing B3 material safety facilities, making Guidelines and SOPs for safe B3 material management, and carrying out emergency handling of B3 materials.

In general, all stages have been carried out by all hospitals. However, there are several things, such as safety facilities for Hazardous and Toxic Materials (B3), are still lacking in some hospitals. All Hospitals carry out the Identification and Inventory of Hazardous and Toxic Materials (B3). The results of this identification are then made into a monthly report. All Hospitals also prepare and have Material Safety Data Sheets on the materials and tools used in each work unit. As for the availability of safety facilities for Hazardous and Toxic Materials (B3), some hospitals have not completed yet. For example, RS C does not yet have a body wash. While RS A does not yet have eyewash (eye washer). Related to Guidelines and Standard Operational Procedures for the safe Management of Hazardous and Toxic Materials (B3), all hospitals have made SOP. The following is an excerpt from an interview with one of the informants at RS B:

"There is an SOP, documented and printed".

Related to training and simulation of hazardous and toxic (B3) spills, all hospitals have been applying it. It's just that RS A has just implemented it before the accreditation. The following is an excerpt from an interview with one of the informants at RS A:

"Later, before the implementation of the accreditation, there will be training and simulations. However, the implementation is planned for once a year ".

Generally, training and simulation of hazardous and toxic (B3) spills is held once a year. As implemented by 2 (two) other hospitals.

The following is an excerpt from an interview with one of the informants at RS B:

"Yes, it is carried out once a year".

One of the informants at RS C conveyed the following information:

"Implemented. We usually give training to the cleaners, as well as for new officers. Mandatory training to all officers.

As for the reporting and investigation (inventory) mechanism for spills and exposure to hazardous and toxic materials (B3), all hospitals apply monthly reporting. So every finding is documented in the form of a report. Management of Hazardous and Toxic Materials (B3) from the aspect of occupational safety and health aims to protect hospital human resources, patients, patient companions, visitors, and the hospital environment from exposure and waste of hazardous and toxic materials (B3). Safety facilities for Hazardous and Toxic Materials (B3) at least include: Hazardous and Toxic Materials (B3) cupboards, body wash, eye wash (eye washer), Personal Protective Equipment (PPE), signs and symbols of Hazardous and Toxic Materials (B3) and a spill kit (Menkes, 2016).

In general, all stages have been carried out by all hospitals. However, several things, such as safety facilities for Hazardous and Toxic Materials (B3), are still lacking in some hospitals. All Hospitals also carry out the Identification and Inventory of Hazardous and Toxic Materials (B3). The results of this identification are then made into a monthly report. Identifying potential hazards from a work activity is the core of all accident prevention activities. However, hazards identification is not an exact science but is a subjective activity in which the size of the identified hazard will differ from person to person, depending on each other's experiences, attitudes in dealing with risks/hazards, familiarity with the process concerned and so on (Redjeki, 2016).

Whatever hazard findings are obtained during monitoring or inspection, the findings should be recorded and reported. Then follow up in the form of improvements. Evaluation is also needed to know the extent to which efforts to improve are successful or are not. If it is successful, it needs to be maintained and developed. If not, then it needs better and maximum repairs. Hazard identification

is needed to find which operations have a potential hazard, wherein a risk assessment is carried out. Risk assessment is a way companies use to properly manage the risks faced by their workers and ensure that their health and safety are not exposed to risks while working. Potential hazards in hospitals caused by biological factors (viruses, bacteria, and fungi); chemical factors (antiseptics, anesthetic gases, etc.); ergonomic factors (wrong way of working, etc.); physical factors (temperature, light, noise, electricity, vibration, radiation, etc.); Psychosocial factors (rotating work, relationships among workers/ superiors, etc.) can result in illness and accidents due to work.

Occupational Diseases in hospitals are generally related to biological factors (pathogens that come mainly from patients); chemical factors (exposure in small continuous doses such as antiseptics to the skin, anesthetic gases to the liver); ergonomic factors (wrong way to sit, wrong way to lift the patient); physical factors (heat on the skin, high stress in the reproductive system, radiation to the blood cell production system); psychological factors (tension in the operating room, admission of emergency patients, mental illness wards, etc (Redjeki, 2016). Most hospitals have implemented fire prevention and control efforts, but a small proportion has not done so. Fire prevention and control efforts consist of identification and mapping of fire and explosion risk areas, reduction of fire and explosion hazards, fire control, and fire simulations.

In general, all stages have been carried out by all hospitals. However, some things such as fire control tools are still lacking in some hospitals. For example, Smoke and Fire Detection and Smoke Control are not owned by all hospitals. Fire alarm systems and automatic sprinklers are only available at RS C. Manual water spray (Hydrant) is only available at RS C. It's just that the tool doesn't work. The following is an excerpt from an interview with one of the informants at RS C:

"The hydrant is there but not functioning".

Regarding the safe meeting point, all hospitals have them in the front and back yard of the hospital. When the fire point is in front of the hospital building, a safe gathering point is in the backyard. The opposite applies, if the fire point is at the back of the building, then the safe gathering point is in the front yard of the hospital. Related to the formation of a fire fighting team, all hospitals have formed a fire fighting team. A fire fighting team is formed from each work unit or room with a scheduled time.

Fire prevention and control aim to ensure hospital human resources, patients, patient companions, visitors, and hospital assets are safe from the dangers of fire, smoke, and other hazards. Fire control is carried out with the minimum fulfillment, including light fire extinguishers, smoke and fire detection, fire alarm systems, automatic sprinklers, emergency doors, evacuation routes, emergency stairs, smoke controllers, safe collection points, and manual water sprayers. (hydrant), the formation of a fire fighting team and training and outreach (Menkes, 2016). Most hospitals have implemented fire prevention and control efforts in the hospital. A small proportion has not done it, and several infrastructure facilities have not been fulfilled.

The availability of fire-fighting facilities and infrastructure in hospitals regulated in such a manner should be a reference for every hospital. However, it was realized that some of the infrastructures were expensive, so the Hospital only provided a few standard tools. The most important thing is that fire control efforts are pursued as early as possible. Coordination with related parties such as the Damkar (Fire Department) must also be strengthened so that if a hotspot occurs, the Damkar can immediately attend to assist. Regardless of whether the hospital can control or extinguish the fire itself, with the presence of the Damkar, it is presumably able to evaluate what happened. It is also a hazard finding that must be recorded, even if it has been addressed.

Findings indicated that to improve the level of fire risk in high-rise hospitals, required measures, especially in the area of fire extinguishment and containment, including buildings design for automatic sprinkler systems and standardization of fire controls (Rahman and Salem, 2018). A study found that though Ponorogo Regional Hospital had obtained complete accreditation, there are still units (rooms) with a high fire risk (18.5%). It

can be caused by hazard potential does not properly managed. Like, fire protection system does not comply with the standard. The patient is the vulnerable group that should obtain more attention, particularty during fire emergencies (Phuspa et al., 2019).

Zhang (2018) said that improper chemical management is the cause of many explotions and fire incidents. Clear, accurate, monitoring, and comprehensive evaluation of risk assessment in the Material Safety Data Sheet (MSDS) can reduce the potential of fire incidents caused by chemical substances (Phuspa et al., 2019). A similar case occurred in Malaysia Government Hospital. The result of observation, reviewing the documents, and interviews with authorities, hospital management, and maintenance contractors to achieve this purpose. It was found that the hospitals encountered problems in fire safety management. Like documentation problems, combustible materials, lack of installation of fire measures or outdated fire safety technology, locked doors due to the security reasons, lack of training of hospital staff, and blocking of fire safety systems (Ong and Suleiman, 2015).

An investigation focuses on minor data significant to fire accidents in hospitals globally. A survey over mishaps in hospitals fires till the present scenario was done through rereading the internet, articles, newspapers, investigation, and other reports. In the history of fire building, heterogeneous fire incidents were perceived. A detailed study on fire incidents of 13 hospital buildings was used here. All the incident cases were constructed on some norms to be designated (Shastri et al., 2018). Considering all the 13 incidents, administrations of these hospitals took similar erroneous actions in fire safety management. A total of eight mistakes were excerpted by reviewing these fire accidents. The mistakes include thefollowing:1) Absence of mechanized fire fighting systems, 2) Non-compliance of law enforcement, 3) Myopic planning, 4) Maintenance and management of fire fighting appliances, 5) Incompetency of hospital staff regarding safety issues, 6) Combustible materials used and stored in the building, 7) Poor accident management methodology, 8) Legal and administrative bottlenecks regarding security and safety systems, 9) Insufficient or non-availability of mechanical aids for patients during an emergency evacuation, and 10) Inability of patients to evacuate the building (Shastri et al., 2018).

The successful use of any fire equipment type depends upon the elements such as equipment, maintenance, and training. An occupier must ensure its employees are trained for and understand the requirements during a fire incident. It was observed that lack of knowledge in the fire area and inadequate training in emergency drills delay the fire-fighting operations. Probably adequate fire safety training and periodic emergency drills can make the emergency response more effective (Kulkarni et al., 2016). While planning the layout, care should be taken to design the building, like the sufficient open space around it, to minimize fire spread possibilities from or to neighboring structures. Also, there should be enough space for movement and parking of fire fighting vehicles, ambulances, etc on the premises. The design & construction of every building structure should incorporate features of prevention of fire & fire loss: Considering the type & density of occupancy, lobbies, staircases, aisles, etc should be sufficiently wide to ensure easy movement of traffic at all times and at the same time to permit easy and orderly evacuation during emergencies (Mankar, 2019).

Most hospitals have made emergency or disaster preparedness efforts. Only one hospital has not carried out one stage, namely RS B has not carried out an emergency or disaster risk mapping. These preparedness efforts include identification and risk mapping of emergencies or disasters, risk assessment of disaster vulnerability, control of emergency or disaster conditions, and simulations of emergency or disaster conditions. All Hospitals have carried out risk identification for emergencies or disasters. All of them are documented in the form of a report. Hospitals also carry out simulations of emergency or disaster conditions. The following is an excerpt from an interview with one of the informants at RS B:

> *"Conducted every year. We also make videos, so every time we have a meeting we show the video ".*

As for RS C explained that the simulation

implementation was coupled with the fire simulation. The following are excerpts from the interview:

"The simulation is still carried out in a package with fire training. Employees are included with a shift system, for example 100 people per day ".

Meanwhile, one of the informants at RS A said that before the new accreditation, simulations were carried out, along with fire control training. The following is an excerpt from the interview:

"The simulation is carried out before accreditation"

Most of the hospitals studied had made emergency or disaster preparedness efforts. However, there are still those who have not carried out one stage, namely mapping the risk of an emergency or disaster. Whereas with mapping, it will be easier for us to identify and anticipate events in an emergency or disaster. Another case is in Tehran. Generally, preparation against the crisis in Tehran's selected hospitalsis in at a weak and very weak level. The degrees declare a high rate of measures established in all of the studied hospitals about implementing accreditation standards and crisis management measures in Tehran's selected hospitals. These results suggest that the accreditation standards for crisis management implementation in the current situation, does not help employee increase their preparation for a crisis. For proper management of emergencies, systematic planning of crisis management is recommended, the necessary coordination within and outside the organization during crises, reinforcement with good organization and provide proper training and periodic exercises and changes in accreditation inspections, moving towards operating action not just on paper and to collect documents on the current style in hospitals (Zarei, 2016).

Critical facilities, such as hospital, play a crucial role in the socio-economic and psychological recovery of the population after a disaster. Hospitals are considered vital due to their role in saving lives in the affected community and must be able to withstand hazards and remain functioning during and after a disaster. This article assesses earthquake preparedness of hospitals in eight Japanese cities using a questionnaire survey. The questionnaire consists of six parameters and 21 indicators from the "four pillars of hospital preparedness" including structural, nonstructural, functional, and human resources. The results show that the majority of the respondent hospitals fulfill the functional preparedness, which is helpful during the emergency period of a disaster, while the other three pillars-structural, nonstructural, and human resources need to be strengthened (Mulyasari et al., 2013).

Hospitals as health service providers to the community are needed. Even in disaster conditions, the hospital is the only place expected to be able to save disaster victims. Therefore, the hospital must carry out all preparedness procedures in the face of the worst conditions of an emergency or disaster. Things that must be considered to prepare the hospital for these conditions include logistics, planning, human resources, triage, communication, command and control, structural and nonstructural preparedness, training, evacuation, recovery after a disaster, coordination, transportation, surge capacity, and safety. The results from 15 publications are presented. Fifteen articles fulfilled the criteria of relevance and considered at least 1 of the 14 predetermined themes. None of the evaluated checklists and tools included all dimensions required for an appropriate hospital preparedness evaluation. The results of the current systematic review could be used as a basis for designing an evaluation tool for hospital disaster preparedness (Mulyasari et al., 2013). Other studies also suggested moderate levels of knowledge and performance and good attitudes associated with preparedness in disasters in the Iranian nurses. These parameters can be therefore improved to desirable levels, and the overall preparedness for coping with disasters boosted in nurses by training nurses and performing hospital drills (Yousefi et al., 2019).

Conclusion

In K3RS risk management, RS B has carried out all stages. Meanwhile, RS A and RS C have not carried out one stage, namely the work environment measurement. With regard to the Management of Hazardous and Toxic Materials (B3) from the Aspect of Occupational Safety and Health, all stages have been carried out.

However, several things, such as safety facilities for Hazardous and Toxic Materials (B3), are still lacking in some hospitals. With regard to Fire Prevention and Control, all stages have also been carried out by all Hospitals. However, some things, such as fire control tools, are still lacking in some hospitals. For example, Smoke and Fire Detection and Smoke Control are not owned by all hospitals. Fire alarm systems and automatic sprinklers are only available at RS C. As for Emergency or Disaster Preparedness, only one hospital has not carried out the risk mapping stage for an emergency or disaster, namely RS B. It is recommended to still refer to the rules governing the implementation of K3RS. It includes the lack of facilities and infrastructure, and always carrying out briefings for all officers before working and evaluating at the end of each working hour.

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Effects of Dietary Antioxidant Intake on Lung Functions in Construction Workers in Surabaya

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Abstract

Oxidative stress is a condition where the imbalance between oxidants and antioxidants in the body. Vitamins A, C, and E are antioxidants that can inhibit the activity of antioxidant compounds so that these levels become balanced. The research purpose is to know the difference in intake of antioxidants in the diet and the intake effect on lung function in mason who suffer from respiratory and who do not suffer from respiratory. The study design was observational methods Retrospective with purposive and consecutive sampling. Measured variables such as vitamin A, C, and E to Recall 24h and conditions of lung function. Namely % FEV1 and FVC% with a handheld spirometer. The study sample consisted of 79 people who suffer from respiratory and 79 without respiratory distress. The results showed no significant difference between antioxidant intake in the group of interference and without interference (p=<0.05). Artifacts relationship between antioxidant intake with lung function (sig.>0,05). Intake of vitamin A on lung function has a value of p = 0.05, which means associated with lung function but are very weak correlation (correlation coefficient value -0.036) while vitamin C and E have a value of p=1.000, which means there is a relationship and is a very weak correlation (correlation coefficient value of -0.036). The results showed no significant difference between antioxidant intake in the group of interference and without interference (p = <0.05). Artifacts relationship between antioxidant intake with lung function (sig.> 0,05). Intake of vitamin A on lung function has a value of p=0.05, which means associated with lung function but are very weak correlation (correlation coefficient value -0.036) while vitamin C and E have a value of p = 1.00, which means there is a relationship and is a very weak correlation (correlation coefficient value of -0.036). The results showed no significant difference between antioxidant intake in the group of interference and without interference (p=<0.05). Artifacts relationship between antioxidant intake with lung function (sig.>0,05). Intake of vitamin A on lung function has a value of p=0.05, which means associated with lung function but are very weak correlation (correlation coefficient value -0.036) while vitamin C and E has a value of p=1.00, which means there is a relationship and is a very weak correlation (correlation coefficient value of -0.036).

Introduction

The process of building physical infrastructure and social institutions produces various kinds of pollutants, such as pollution and fine dust, which will have a negative impact, especially on the health of the construction workers. The pollutions and fine dust generated by the construction of infrastructure and social institutions usually come from concrete, stone, cement, and wood, which will have an impact in the long term. The dust particles in construction are classified as very small particles, less than 10 microns and cannot be seen directly or are classified as PM10. The high exposure received by construction workers can increase the risk of respiratory problems such as asthma (Schulze et al., 2017), and chronic obstructive pulmonary disease (COPD) (GOLD, 2018; Zhu et al., 2013), and lung cancer (Consonni et al., 2018). Exposure to indoor and

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outdoor air pollution, dust, and smoke received by workers, namely construction workers, is a risk factor for respiratory problems (Jiang et al., 2016). Workplace pollution such as organic dust (vegetable dust and bacteria or toxins from the textile industry (dust from cotton) and industrial environments (mining, iron and steel industry, wood industry, building construction), chemical paint factories, inks, etc. are estimated at 19% (Oemiati, 2013).

Apart from pollution, respiratory problems are also exacerbated by several risk factors. Namely cigarette smoke, air pollution, oxidative stress, genes, lung growth and development, and economic status. Oxidative stress causes damage to the lungs and also causes molecular activity to initiate pulmonary inflammation. So, the imbalance between oxidants and antioxidants plays a vital role in COPD pathogenesis (Domej et al., 2014). Cigarette smoke is one of the largest sources of exogenous free radicals. Free radicals are reactive oxygen compounds which are compounds with unpaired electrons. The compound or atom tries to reach a stable state by attracting other electrons to form new radicals (Phaniendra et al., 2015). Molecules that contain one or more unpaired electrons and thus give reactivity to molecules are called free radicals. When two free radicals share unpaired electrons, they form a nonradical form (Lobo et al., 2010). Neutrophils and macrophages that enter the lung tissue are key roles in reactive oxygen species (ROS) production to increase the induced nitric oxide (NO). Later, ROS causes oxidative damage to protein, lipid, DNA, and carbohydrate cells. Shifting the balance between oxidants and antioxidants in favor of oxidants is called oxidative stress. Oxidative stress contributes to various pathological conditions and diseases, including cancer, neurological disorders, atherosclerosis, hypertension, ischemia or perfusion, diabetes, acute respiratory distress syndrome, idiopathic pulmonary fibrosis, chronic obstructive pulmonary disease, and asthma (Birben et al., 2012). Oxidative stress contributes to permanent damage to both parenchyma and airway walls and activates molecular mechanisms that initiate lung and systemic inflammation and also to atherosclerosis (Pizzino et al., 2017). Antioxidants can stop cell damage by giving electrons to free radicals. Antioxidants will neutralize free radicals so that they no longer can take electrons from cells and DNA (Lobo et al., 2010). Apart from supplements, intake of foods containing antioxidants, such as consumption of fruits and vegetables, can also provide benefits for acute and chronic respiratory conditions because fruits and vegetables contain antioxidants, minerals, vitamins, flavonoids, and fiber (Slavin and Lloyd, 2012; Berthon and Wood, 2015).

This study compares the intake of antioxidants in food among construction workers in Surabaya who already have respiratory problems and those who don't. The assessment of respiratory disorders was derived from the value of lung function. The pulmonary function can be measured with a spirometer on the spirometry method and peak flow meter (GOLD, 2018). Spirometry is the most objective method and can be done repeatedly in measuring airflow limits. Spirometry measures the air volume forcibly exhaled from the point of maximum inspiration (forced vital capacity, FVC), the volume of air exhaled during the first one second (forced expiratory volume in one second, FEV1), and the FEV1/FVC ratio (GOLD, 2018; Lorensia et al, 2018). Food can affect lung function health (Indraswari et al., 2018).

Antioxidant intake in the diet can be measured by a 24-hour recall method. The 24-hour recall method is carried out to determine food consumption quantitatively by examining it several times or several days to provide a picture of the actual consumption. The 24-hour recall method is used because this method is relatively easy to do, has a minimal burden on respondents, and only requires a relatively short time for one interview, namely 20-30 minutes (Shim et al., 2014). Research conducted by Pratiwi et al. (2018) in analyzing the level of antioxidant intake in the form of vitamins C and E. The vitamins are also widely contained in foods and can affect lung function in smokers and non-smokers. There were differences in vitamin C and E intake, the lung function of a smoker and non-smoker, and the effect of Vitamin C and E intake on lung function. Based on the background and problem formulations

above, the aim of this study was to determine the relationship between antioxidant intake (vitamins A, C, and E) in food and lung function in construction workers in Surabaya.

Method

This study is an observational study using a retrospective study design to detect the risk of chronic obstructive pulmonary disease due to oxidative stress as seen from the intake of antioxidants from food with a 24-hour recall of construction workers. The research location used in this study is in the Surabaya area. This research was conducted in March-June 2019, with ethical approval no. 005-OL/KE/V/2019 in Universitas Surabaya

The variable in this study was impaired respiratory function, while the dependent variable is the intake of foods containing antioxidants (vitamin A, C, and E). The construction worker referred to in this research was a person who works by relying on his physical strength and has the skills in handwork (with certain tools or materials) in making residential buildings and buildings in general (such as buildings). Construction workers in this study included excavators, masons, blacksmiths, carpenters, painters, and helpers.

Food intake was the amount or amount of food individually or in various types consumed by a person or group of people to meet physiological, psychological, and sociological needs. The method of measuring antioxidant intake was by using the 24-hour recall method. Classification of Nutritional Adequacy Rate (Tingkat Angka Kecukupan Gizi), namely: Good (>100% nutritional adequacy rate); Moderate (80 - 99% nutritional adequacy rate); Less (70 - 80% nutritional adequacy rate); and Deficit (<70% nutritional adequacy rate). The nutritional adequacy rate for vitamins A, C, and E uses the guidelines from PERMENKES R1 (2013).

Lung function disorders are diseases and disorders occurred in the respiratory tract and lungs that affect human respiration. Lung function disorders in this study were conditions in which the FEV1 value is <70% in the lung function measurement by spirometry. A person's lung condition can be known through spirometric measurements. If it shows the results of the FEV1/FVC value <0.7, it can be impaired (GOLD, 2018).

The population used in this study was construction workers in the Surabaya area. Affordable population, namely construction workers who were working on the project. The desired sample to participate in this research is construction workers in Surabaya who meet the following criteria: smoking, 18-60 years old, minimum length of work of 5 years. The sampling technique used is a sampling that does not provide an equal opportunity or opportunity for each member of the population to be selected as a sample (non-probability sampling), with purposive sampling and consecutive sampling methods. The number of samples taken in this study uses the Lemeshow formula because the population size is unknown or infinite. The following was Lemeshow's formula, namely:

$$n = \frac{Z^2 1-\frac{\alpha}{2} P(1-P)}{d^2}$$

n : Number of samples
$z^2 1-\alpha/2$: Normal standard value (if α=0.05, then z=1,96)
P(1-p) : estimated population proportion (if P=0.5, then P(1-p)=0.25)
d : tolerable deviation (10%)

Based on the results of the above calculations, the sample size set in this study was 62 respondents, so the researcher had to collect at least 62 respondents.

This study used a structured interview method, where the first 10 respondents were given guidance by a nutritionist in data collection. The data collection work steps were as follows: 1) Collect research subjects.; 2) The pulmonary function test of respondents using the spirometry method was carried out. The respondents would later be divided into two groups, namely "without lung function disorders group" and "with lung function disorders group". In this study, a validated handheld spirometer was used with the brand Contec Handheld SP10 Spirometer. When using a handheld spirometer, age, gender, weight, and height, including smokers or non-smokers.

The respondent was asked to stand or sit upright. Then the respondent took a deep breath through the mouth while covering the nose. The tube contained in the spirometer was inserted into the mouth, make sure the lips were tightly closed against the tube wall, and

the tongue did not cover the tube opening, then breathe exhaled as hard and as fast as possible in one second until there was no air left in the lungs (GOLD, 2018; Lorensia et al., 2018).; 3) Measurement of antioxidant intake (1st, 2nd, and 3rd). Data collection of antioxidant intake in food was carried out using the 24-hour recall method as an interview guide for measuring food consumption in preparing interview questions.

The 24-hour recall method was used to determine the food and drink consumed during the previous 24 hours, examining it for several times or several days to provide an overview of the actual consumption of the examined respondents. The 24-hour recall method was carried out three times but not consecutive times, namely two times on weekdays and one holiday because this scheme can describe the variability of calorie and nutrient intake. The first meeting took place on a weeknight. The second meeting was on the following working day with an interval of at least two days from the first meeting. The third meeting was on Sundays or holidays, at least two days apart from the second meeting. In the 24-hour recall method, was questioned about all food and drinks consumed in the past 24 hours, including portion sizes, with the help of a photo of household sizes, such as spoons, plates, cups, or other sizes commonly used daily as shown in the Food Photo Book (PERMENKES RI, 2013). Then the results were equalized to the average daily intake. The data obtained in this study were primary data obtained directly from research subjects through direct dialogue (interviews).

The steps for data collection using the 24-hour recall method were as follows: Respondents were asked what time they last consumed food or drinks during the recall; Then the respondents were asked about the food and drink they consumed during the previous 24 hours from the last time they consumed food and drinks at the time of the recall; The Food Photo Book (PERMENKES RI, 2013) was shown to respondents to ask about the portions of food and drinks consumed.; 4) The data collected is in the form of household sizes would be processed to obtain data in the form of calorie intake using the program Nutrisurvey. Nutrisurvey was a powerful software for analyzing food nutrients from a menu or consumption survey. For example, to find the antioxidant intake obtained when consuming chili sauce, namely by opening the Nutrisurvey software, entering the word "sambal" and then entering the amount in grams asked during the interview.

The data on antioxidant intake in the form of vitamins A, C, and E will appear. After the antioxidant intake data were collected and inputted into the SPSS version 24 program, statistical analysis was carried out. 5) The ordinal scale data was tested using the chi-square test and the ratio with the Kolmogorov-Smirnov normality test. Then followed by an independent t-test to see differences in calorie intake from food in the "without lung function disorders group" and "with lung function disorders group" in construction workers in Surabaya. The Chi-square test was significantly different if the p-value was <0.05. The data were also tested with the Spearman test to see the relationship between calorie intake from food and lung function in construction workers in Surabaya.

The steps for 24-hour recall data processing are: A direct interview uses a 24-hour recall form. Food and drinks consumed one day or 24-hours earlier were asked using the 24 hour recall form. For example, the respondent said he had previously consumed one spoon of sambal eat. Next is to record the food (chili sauce) and the portion (one tablespoon) on the 24-hour recall form, then the Food Photo Book is shown to the respondent to ask what kind of tablespoon is consumed. After showing which portion of one tablespoon is, the amount of chili sauce in grams is obtained; After the amount in grams is obtained, an analysis of the number of antioxidants in the consumed sauce is carried out using the Nutrisurvey application. In the Nutrisurvey application, enter the word sambal in the "food" column, then the amount in grams in the "amount" column, then the nutritional value will appear in the next columns. The number of antioxidants the white rice contained can be seen in the "vitamins" section of the "total analysis" column.

Result And Discussion

This research was conducted in May -July 2019 by direct questions and answers (interviews) with respondents using a questionnaire about respiratory disorders to determine the knowledge profile of risk factors, symptoms, and treatment and therapy for respiratory disorders on lung function in construction workers in East Surabaya. Respondent data obtained in this study were 158 masons. They were 79 people with lung function disorders and 79 people without lung function disorders. There were 20 respondents who refused to fill out the questionnaire where 16 people did not want their rest time to be disturbed, and four people did not meet the inclusion criteria.

Respondents in this study were divided into two groups, namely group with impaired lung function and group without lung function disorders. Respondents used in both groups were 158 respondents, with 79 respondents in each group. Respondents' characteristics based on spirometric values α to see lung function in groups with respiratory disorders, will be classified based on GOLD (2018) into 2, namely mild and worsening. The spirometric value obtained from each respondent will be calculated as the predictive value. We compare the spirometric value of each respondent with the standard FEV1 value of 3.2 liters. Then get the predicted value of each respondent and classify it. In this characteristic, the chi-square test could not be carried out because data was not obtained in the group without lung function disorders. So it could not be compared between the group without lung function disorders and the group with lung function disorders (Table 1). The spirometry value in the group with and without lung function disorders is in Table 2. The average in the group without lung function was 77.51% and in the group with impaired lung function was 63.42%.

Decreased lung function in active smokers was thought to be due to exposure to cigarette smoke. It is exogenous free radicals that can trigger inflammation of the bronchi along the respiratory tract, pulmonary parenchyma, and pulmonary vascular system, affecting limited airflow, thus reducing lung function conditions (Rovina et al., 2013). Another mechanism is thought to occur due to an imbalance between oxidants and antioxidants. Cigarettes are a source of exogenous oxidants, while endogenous oxidants are from cellular aerobic metabolism in the form of mitochondrial respiration and nicotinamide adenine dinucleotide phosphate (NADPH). The lungs can to neutralize excess ROS levels through cellular antioxidant defense mechanisms. Including superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GSH). Increased levels of free radicals that exceed the ability of cellular antioxidant defenses in the lungs cause oxidative stress, which directly or indirectly causes changes in the structure and function of the airways and lung parenchyma (Kirkham dan Rahman, 2006; Domej et al., 2014). Oxidative stress directly causes the oxidation of deoxyribonucleic acid (DNA), fat, and airway and lung cell membrane proteins.

DNA oxidation results in lung damage and increases the risk of developing lung cancer. Oxidative stress indirectly causes an increased inflammatory response, protease activation and antiprotease inactivation, and cell apoptosis. This process is caused by the activation of redox-sensitive transcription factors and signals transcription, including NfκB, activator protein1 (AP1), mitogen-activated protein kinases (MAPK), and phosphoinositide 3-kinases (PI3Ks) which regulate several gene transcriptions (Cavalcante and Bruin, 2009; Valavanidis et al., 2013; Rahal et al., 2014). The decrease in lung function of active smokers is thought to be due to the presence of airway remodeling, namely inflammation, fibrosis, and exudate in the small airway lumen with a diameter of <2mm. A decrease in% FEV1 is one of the hallmarks of pulmonary obstruction. Patients with COPD experienced a decrease in the value of% FEV1 by 50-60 mL/year (Cavalcante dan Bruin, 2009).

Several previous studies have suggested that cigarette smoke can inhibit mucociliary clearance. Under normal conditions, the cilia and mucus in the bronchi protect against irritant inhalation, that is, by capturing and expelling them. Continuous exposure to irritants from cigarette smoke over-responds to these defenses. Factors that cause the failure of mucociliary clearance are the proliferation

of goblet cells and the exchange of ciliated and non-ciliated epithelium. Hyperplasia and hypertrophy of the mucus-producing glands cause mucus hypersecretion in the airways. The irritation of cigarette smoke also causes inflammation of the bronchioles (bronchiolitis) and alveoli (alveolitis), as a result of which macrophages and neutrophils filter into the epithelium and amplify the degree of epithelial damage. The inflammation occurring in chronic bronchitis with mucus excretion and narrowing of the lumen is also followed by fibrosis and irregularity of the small airways, which further narrows the airways. An autopsy showed that patients with chronic bronchitis had an airway diameter of less than 0.4 mm (Sze et al., 2014).

Table 1. Frequency Distribution of Characteristics of Respondents

Characteristics		Number of Respondents (n: 158)				P-Value*
		Without Lung Function Disorders Groups (n: 79)		With Lung Function Disorders Groups (n: 79)		
		Frequency	Percentage (%)	Frequency	Percentage (%)	
Age (years)	Late adolescence (17-25)	20	25.32	15	18.99	0,113
	Early adulthood (26-35)	33	41.77	45	56.96	
	Late adulthood (36-45)	13	16.46	15	18.99	
	Early elderly (46-55)	10	12.66	3	3.79	
	Late elderly (56-65)	3	3.79	1	1.26	
BMI (kg/m²)	Thin (<18.5)	7	8.86	6	7.59	0,485
	Normal (18.5-25.0)	59	74.68	66	83.54	
	Overweight (25.0-27.0)	8	10.13	5	6.33	
	Obesity (≥27.0)	5	6.33	2	2.53	
Spirometric Value (GOLD, 2018)	Mild (FEV1> 80% Predicted)	0	0	66	83.54	
	Worsening (50% <FEV1 <80% predicted)	0	0	13	16.46	

*) P value of Chi-Square test was >0.05, means that there was no difference between without and with lung function disorders groups

Table 2. Average Value, Highest Value, Lowest Value and Standard Deviation of Spirometric Value

	Spirometric Value (%)	
	Without Lung Function Disorders Groups (n: 79)	Without Lung Function Disorders Groups (n: 79)
Average Value	77.51	63.42
Highest Value	117.00	69.00
Lowest Value	70.00	37.00
Standard Deviation	7.19	6.32

Table 3. Profile of 10 Most Types of Foods Containing Vitamin A, Vitamin C, and Vitamin E

Food material	Number of Respondents (n: 158)					
	Without Lung Function Disorders Groups (n: 79)			Without Lung Function Disorders Groups (n: 79)		
	Vitamin A	Vitamin C	Vitamin E	Vitamin A	Vitamin C	Vitamin E
Fried egg/ omelet	20462.3	0	232.4	16941.6	0	187.2
Spinach	6844.8	92.9	13.5	4607.7	56.0	10.9
Sambal	1286.1	307.5	0	707.5	162.7	0
Sauté the kangkong	1159.6	133.2	9.6	2256	187.2	15.7
Vegetable soup	3830.6	24.3	8.1	7897.6	45.3	23.3
Lodeh **soup**	1164.0	184.3	29.1	2937.6	549.7	86.1
Fried rice	645.0	0	61.5	650.0	0	65.0
Fried chicken	589.7	0	0	590.4	0	0
Stir-fry the mustard greens	555.6	75.1	4.3	526.4	44.6	4.7
Ote-ote	486.4	0	0	540.3	0	0

Table 4. Profile of Nutritional Adequacy Rate of Vitamin A, C, and E

Antioxidant classification (Vitamin A, C, and E) Without Lung Function Disorders Groups (n: 79)		Number of Respondents (n: 158) Without Lung Function Disorders Groups (n: 79)		P Value*
Nutritional Adequacy Rate of **Vitamin A**	Enough (>600 mcg/day)	3	3	0.889
	Less (<600 mcg/day)	76	76	
Nutritional Adequacy Rate of **Vitamin C**	Enough (>90 mg/day)	0	1	0.987
	Less (<90 mg/day)	79	78	
Nutritional Adequacy Rate of **Vitamin E**	Enough (>15 mg/day)	1	1	0.987
	Less (<15 mg/day)	78	78	

*) P value of Chi-Square test was >0.05, means that there was no difference between without and with respiratory disorders groups

In this study, different tests were carried out for the intake of vitamins A, C, and E in the respiratory distress group with the no respiratory disorder group with the chi-square test because the data were ordinal scale. Based on table 4.14, the results obtained on the chi-square test, namely the p-value of 0.889, 0.987, and 0.987. So with a p value> 0.05. It means, no significant difference in the intake of antioxidants in the form of vitamins A, C, and E in the diet in the respiratory disorders group and the group without respiratory disorders. It is per research conducted by Tsiligiani and Molen (2010), where there was no difference in vitamin intake in the impaired and non-impaired groups. This study is similar to that conducted by Pratiwi et al. (2018) shows that test results showed lung function and vitamin C intake were significantly different (p=0,00), while vitamin E (p=0,29) intake did not differ significantly between active smokers and non-smokers. The results showed the influence Vitamin C (p=0,00; r=0,63) and Vitamin E (p=0,015; r=0,22) intake towards the lung function. There are differences in vitamin C and E intake, the lung function of a smoker and non-smoker; and the influence of Vitamin C and E intake on the lung function.

The correlation test in this study was conducted to look at the relationship between vitamins A, C, and E intake levels and lung function. A correlation test was performed with the Spearman test. The Spearman test was used because the two variables studied had an ordinal scale. We found that the significance value for the intake of vitamins A, C, and E was below

>0.05, which means that H0 is accepted. For the relationship between vitamin A intake and lung function, the correlation value obtained was -0.036. It means that vitamin A and lung function have a deeply weak correlation and are inversely proportional. The relationship between vitamins C and E got a correlation value of 0.000, meaning that the intake of vitamins C and E had no relationship or correlation. It is contrary to research conducted by Tsiligiani and Molen (2010), where vitamins A, C, and E are directly proportional to lung function.

The food intake patterns in the two groups were largely the same. The highest vitamin A in the two groups came from fried eggs. These foods are also high in vitamin E but do not contain vitamin C. Meanwhile, the most consumed food containing vitamin C in both groups was lodeh (Table 3). Most of the respondents experienced deficiencies in vitamins A, C, and E in both groups (Table 4). In this study, most of the respondents did not meet the adequate intake of vitamin A (76 of 79). These results indicate the source of vitamin A comes from the foodstuffs group, oil, animal side dishes, vegetables, and chili sauce. Vitamin A from this food was only seen in the content of the raw ingredients. But it has not been observed how much vitamin A is in these food dishes. The highest intake of vitamin A in this study came from cooking oil. It could be related to a government policy that launched a program that requires cooking oil to be fortified with vitamin A.Vitamin A contained in cooking oil will degrade during the frying process. The results showed that after the third frying will lose more than one-third of the vitamin A content. The frying method used by the Indonesian people is the usual method that allows cooking oil to be exposed to light and oxygen. In addition, repeated frying using the same oil is often done by the public (Martianto and Marliyati, 2009).

The strength of the relationship between vitamin A intake and% FEV1 and% FVC is in the very weak category. It was presumably because the vitamin A content of food ingredients is lost/damaged during processing. Most of the intake of vitamin A in this research comes from cooking oil absorbed in food ingredients. The oil absorption in fried food ingredients ranges from 10.73%– 23.02%. The frying method used by the Indonesian people is a usual frying method that allows cooking oil to be exposed to light and oxygen. Besides, frying done repeatedly using the same oil is often done by the community. The results showed that after the third frying, more than a third of the vitamin A content was lost (Martianto and Marliyati, 2009). Vitamin A will be mobilized from the liver when it is needed by the body in the form of retinol transported by Retinol-Binding Protein (RBP) synthesized in the liver. Retinol uptake by various body cells depends on receptors on the membrane surface specified for RBP. Then it is transported through the cell membrane to bind to Cellular Retinol Binding-Protein (CRBP), and RBP is then released (Park et al., 2016). In smokers, there will generally be a decrease in appetite, causing malnutrition (Benowutz, 2009). This malnutrition condition will cause disruption in the formation of RBP, thought to be one of the causes of the weak effect of vitamin A intake on lung function.

The test for differences in vitamin C intake between the two groups showed no significant difference. The results of the meta-analysis conducted by Dallongeville et al. (1998) showed that active smokers are significantly higher in consuming energy, total fat, saturated fat, cholesterol, and alcohol and lower in consuming polyunsaturated fat, fiber, vitamin C, vitamin E, and beta carotene than nonsmokers. Smokers have the habit of eating sources of Vitamin C, namely fruits and vegetables which are significantly lower than smokers. Dietary changes associated with smoking are due to nicotine causing decreased appetite and decreased perception of taste and smell, which may make fruits and vegetables less appetizing (Komiyama et al., 2013).

Vitamin C is an antioxidant because it has an electron donor group in the form of an enediol group, located on the C2 and C3 atoms allowing vitamin C to be able to capture hydroxyl radicals. The electron donated by vitamin C can prevent the formation of other compounds from the oxidation process by releasing a one-carbon chain. But after giving electrons to free radicals, vitamin C will be oxidized to relatively stable semi dehydroascorbic acid or ascorbyl radical. This property may make it an antioxidant. In

other words, ascorbic acid can react with free radicals, and this reaction can reduce reactive free radicals to be unreactive. Free radicals that have been reduced from being reactive to being unreactive are called scavengers or sequencing (Park et al., 2016). The antioxidant properties of vitamin C can be attributed to its ability to neutralize free radicals caused by cigarette smoke in the lungs. Vitamin C is also thought to help repair lung tissue by synthesizing collagen and preventing free radical-induced lipid peroxidation, and restoring the level of vascular endothelial growth factors and alveolar cell proliferation in the lungs (Benowutz, 2009; Batra et al., 2016).

Vitamin E as an antioxidant works by stopping the free radical chain reaction. It donates one hydrogen atom from the 6-hydroxyl in the chroman ring, which can change the peroxyl radical (the result of lipid peroxidation) into tocopherol. It is less reactive, so it will not damage the fatty acid chain. Tocopherol radicals can be regenerated by the presence of glutathione or vitamin C (Komiyama et al., 2013). The highest sources of Vitamin E consumed in this study came from palm oil, eggs, and soybean tempeh. The weak relationship between vitamin E intake on lung function can also be suspected. Because when processing ingredients containing vitamin E are processed at high temperatures repeatedly. It will reduce the concentration of vitamin E content and change the form of fatty acids, thus reducing the antioxidant effects of vitamin E (Jaarin and Kamsiah, 2012; Yuniati and Almasyhuri, 2012; Leong et al., 2015). Vitamin E is a fat-soluble vitamin and works on the lipid phase of cells. Smokers generally experience weight loss caused by the hormone leptin, which limits fat reserves in the body. The low-fat reserves in the body are thought to inhibit vitamin E activity (Audrain-McGovern and Benowitz, 2011). The weak relationship between vitamin E intake and lung function may also be due to the respondents' low vitamin E intake, below the RDA, and other factors that can affect lung function. Namely physical exercise, levels of exposure to pollutants, stress, and genetics (Puente -Maestu and Stringer 2018). The weak correlation relationship may also cause by other nutrients from the food that affect lung function but were not studied in this study, such as flavonoids. Previous research conducted by Garcia-Laersen et al. (2017) showed that individuals who consumed more anthocyanin-type flavonoids had lower FEV1 and FVC decreases than individuals who consumed fewer anthocyanins.

Conclusion

There was no significant difference in the intake of antioxidants in the form of vitamins A (p-Value = 0.889), C (p-Value = 0.987), and E (p-Value = 0.987) in the food group with respiratory disorders and groups without respiratory problems. And there is no relationship or correlation between the intake of vitamin A (p-Value = 0.652), C (p-Value = 1,000), and E (p-value = 1,000) in food with lung function in the respiratory distress group and without interference.

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The Expression Change of Mmp-8 and Collagen Type-2 Intracell in Lung Tissue Due to Electronic Smoke Exposure

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Abstract

The number of electronic smokers has increased annually. Exposure to an electronic cigarette will increase free radicals in the body and result in oxidative stress causing lung tissue damage. The severity degree of lung tissue damage caused by electronic smoke exposure depends on the duration of electronic cigarette smoke exposure, and will affect Matrix Metalloproteinase-8 and collagen type-2 in the cells. The study aims to understand the change degree of Matrix Metalloproteinase-8 and collagen type-2in lung tissue due to electronic cigarette smoke exposure. This study applied the experimental method with a post control group design. The male Wistar rats were used as the animal models in this research to assess cell damage through the Matrix Metalloproteinase-8 expression and collagen type-2 in the lung tissue using immunohistochemical staining. Exposure to electronic smoke cigarettes was given to each group of animal models with the difference in amount and time duration. The expression of Matrix Metalloproteinase-8 indicated a significant increase due to electronic smoke exposure (ANOVA, p=0.000). Meanwhile the expression of collagen type-2 showed a significant decrease because of electronic smoke exposure (ANOVA, p=0.000). Besides, MMP-8 and collagen type-2 manifested relationship existence and strong impact (r=0.948, p=0.000). The negative impact of exposure to electric cigarette smoke causes increased expression of Matrix Metalloproteinase-8 and decreased expression of type-2 collagen in lung tissue.

Introduction

In recent years, the number of electronic cigarette smokers has significantly increased. It is caused by a lack of knowledge about the long-term effects caused by the electronic cigarette as well as a limited amount of research data indicating the negative impacts of long-term use of electronic cigarettes. Moreover, the rule regulating electronic cigarette use has become a growing controversy. (Cherng, Tam, Christine, & Meza, 2016. Most people assume electronic cigarettes as one of the ways to reduce addiction to tobacco cigarettes, and the electronic cigarette is considered safer because it only contains nicotine (Vardavas, Filippidis, & Agaku, 2015). However, for most people, the electronic cigarette is assumed as a way to legalize smokers to smoke in public and working places, and it can negatively affect teenagers smoking (Martínez-Sánchez et al., 2015). People's perception of electronic cigarette use also influences the increasing number of smokers. The electronic cigarette, considered safe by some people, can influence teenagers to start smoking the electronic cigarettes (Amrock, Lee, & Weitzman, 2016). It has become more popular in society through a massive marketing system via several media such as television, print publication, radio, and the internet. The promotion budget of electronic cigarettes in the United States in 2012 had increased almost double the same budget in 2011. In the second quarter of 2013, it increased more than eight times compared to the second quarter of 2012 (Xu, Guo, Liu, Liu, & Wang, 2016).

The increasing number of electronic

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cigarette smokers does not only happen in several developing countries but also in developed countries. In 2011, the prevalence of electronic cigarettes in young adults (18-28 years old) was the highest compared to the other age groups, reaching 4.9%-7%, with all age groups were 0.6% to 6.2%. The user prevalence of electronic cigarettes in the United States in the adult age group also increased 2 to 4 times higher in 2012 (Jaber et al., 2018). Meanwhile, among senior high school students, the use of electronic cigarettes was approximately 1.5% which later consistently increased in 2014 was 13.4%. New Zealand also experienced an increasing number of electronic cigarettes among teenagers (14-15 years old), almost three times higher than 7% in 2012 to 20% in 2014 (Thrasher et al., 2016). In recent years, Australia also demonstrated an increase in electronic cigarette smokers. The adult age group reached twice, from 4% in 2013 to 9% in 2016. The scores were obtained from two groups which were active smokers had an increase from 18% to 31%, while the non-smokers had an increase from 2% to 5%. However, this is inversely proportional to the use of cigarettes which decreases every year (Jongenelis, Kameron, Rudaizky, & Pettigrew, 2019). Policies on tobacco control such as an increase in cigarette taxes, smoke-free laws, limiting cigarette advertisements, and normalizing the behavior of smokers in active smokers are the most influential factors in reducing the number of smokers. But all these things have not been applied to users of e-cigarettes (Voigt, 2015).

The increase in the use of e-cigarettes does not only occur in high-income countries but also countries with medium and low incomes. In developing countries, electronic cigarette has been used, both individually and in pairs, along with tobacco cigarette (Palipudi et al., 2016). In Greece and Qatar, more than 60% of electronic cigarette smokers also use tobacco cigarettes concurrently, while the electronic cigarette smokers originating from non-smokers have reached 35.6% in Greece and 15% in Qatar (Palipudi et al., 2016).

Electronic cigarettes are battery-powered cigarettes operating through the heating process of an element (metal coil) by evaporating propylene glycol solvent, vegetable glycerin, and flavoring, which sometimes contain nicotine (Grana, Benowitz, & Glantz, 2014). Electronic cigarettes are considered to have fewer side effects on health than tobacco cigarettes. Besides, more modern packaging and better marketing strategies have made electronic cigarettes a lifestyle choice for smokers and teenagers (Canistro et al., 2017) .The electronic cigarette is always claimed as one of the effective ways to stop smoking or as a substitute for cigarette because it does not contain tar, carbon monoxide, and other chemical compounds. This has led to an annual increasing rate of electronic cigarette smokers (Polosa et al., 2011).

Cigarette smoke contains several types of a high number of free radicals, estimated to reach more than 1016 for every inhalation, including Reactive Oxygen Species (ROS) and Reactive Nitrogen Species (RNS) (Dellinger, Khachatryan, Masko, & Lomnicki, 2011). Reactive Oxygen Species (ROS) consist of superoxide anion (O2•-), hydrogen peroxide (H2O2), and hydroxyl radical (OH•) as regular products of oxygen molecule reduction. Radical oxygen is not only produced by mitochondria but neutrophils and macrophages can also produce ROS through the plasma membrane (Reuter, Gupta, Chaturvedi, & Aggarwal, 2010),(Herlina, Riyanto, Martono, & Rohman, 2018). In Hypoxic conditions, mitochondria produce Nitric Oxide (NO), producing other Reactive Nitrogen Species (RNS), for example, aldehydes-malondialdehyde and 4-hydroxinonenal (Arulselvan et al., 2016) .In a normal condition and with a balance between free radicals and antioxidants, the free radicals serve as the body's defense mechanism (Ravipati et al., 2012). A significant increase in the number of free radicals due to electronic cigarette smoke exposure can cause the occurrence of oxidative stress in lung tissue (Zhang et al., 2018). Oxidative stress is triggered by an imbalance between the number of free radicals entering the lung tissue and antioxidants in the body resulting in injury in all cellular components such as lipid, protein, and DNA causing cells' death (R. V. Suryadinata, Wirjatmadi, & Adriani, 2017),(Sagor, Reza, Tabassum, Rahman, & Alam, 2017). Some diseases can also be caused by cigarettes, such

as cancer, cardiovascular diseases, and Chronic Obstructive Pulmonary Disease (COPD) (Goel et al., 2015).

The number and size of particles generated from electronic cigarettes are the same as the ones produced by tobacco cigarettes. Even some electronic cigarettes can produce more particles compared to tobacco cigarettes (Grana et al., 2014). Particles produced from e-cigarettes irritate of the airways, so mucous hypersecretion occurs in the bronchi (R. V. Suryadinata, Wirjatmadi, & Adriani, 2016). The number increase of free radical particles can trigger inflammation reaction in the lung tissue (Pratiwi, Lorensia, & Suryadinata, 2018). Inflammation reaction is a lung defense mechanism against dangerous stimuli such as pathogens, cell damage, and harmful chemical compounds. Moreover, acute inflammation response can minimize injury or infection caused in the lung tissue. The inflammatory process changes blood vessel permeability, leukocyte movement, and the release of inflammatory mediators (Chen et al., 2018).

However, a prolonging inflammation process in airways can result in lung cell damage. It can cause cell lysis occurrence impacting deteriorating lung cell function (Levy & Serhan, 2014). In a pathological condition or cell damage, there is an increase in productivity and activity of Matrix Metalloproteinase-8, while collagen type-2 will experience an intracellular decrease (Asano et al., 2010). The change of Matrix Metalloproteinase-8 and collagen type-2 can trigger fibrosis formation in the lung. (McKleroy, Lee, & Atabai, 2013)

An electronic cigarette is always considered to contain fewer chemical compounds than tobacco cigarettes. The fact is that electronic cigarettes safety has not yet been proven, and the side effects of their long-term use on the lung tissue have not yet been known (Jensen et al., 2015; Suryadinata & Wirjatmadi, 2020). Thus verification of histology aspects of the levels of Matriks Metalloprotein-8 and collagen type 2 as a parameter of lung tissue damage due to the use of electronic cigarettes in male Wistar rat models is required. These parameters can provide a direct picture of lung tissue damage compared to the use of malondialdehyde levels (Wirjatmadi & Suryadinata, 2020).

Methods

This study is an experimental research using a post-test control group design. The sample used is male Wistar rats (Rattus novergicus). This research was divided into six groups with different time duration of administration treatment of electronic cigarette smoke exposure for each. The smoke exposure was done for 5 minutes during each intervention administration. The differing aspect of each group was the total amount of administration per day and the time duration per week. The first group was the negative control group which was not exposed to electronic cigarettes and compared to treatment groups. While the rest, in each group, there was the exposure to electronic cigarette smoke for several times duration and an observation of lung tissue using immunohistochemical staining (HIS) was conducted to see the tissue damage.

Samples of experimental animals Wistar rats (Rattus novergicus) aged 2-3 months with a weight of 200-250 grams, move actively, macroscopically found no abnormalities and have never been the object of research. Before the treatment is carried out, all animals try to do the adaptation process first for 5-7 days. The study was conducted at the Laboratory of the Faculty of Medicine, Airlangga University, based on the 3R principle (Replacement, Reduce, and Refinement). Experimental animals were placed in cages measuring 800 cm2 per 5 animals with ventilation and room temperature around 25oC. Cleaning the cage and providing drinking water are done periodically, and food is about 20-30 grams/day. Each group will be given exposure to electric cigarette smoke that is different in time, amount, and duration of administration following research procedures.

Sample replication using is used to compare between treatment groups

$$n = \left\{ \frac{(Z_{1-\alpha} + Z_{1-\beta}).\sigma}{\mu_1 - \mu_0} \right\}^2$$

Based on the calculation, the minimum sample in this study is 5 male Wistar rats in each group. The solution of the electric cigarette used in this study contained 6 mg of nicotine. The room size where the exposure to electric cigarette smoke measured is 50 cm x 40 cm x 20 cm. The room is passed through by a pipe, flowing e-cigarette smoke. Provision of exposure to cigarette smoke is adjusted to the length of administration planned in the study.

Samples were assessed semiquantitatively according to the modified Remmele method, where the Remmele scale index (Immuno Reactive Score / IRS) is the result of multiplying the percentage score of immunoreactive cells with the color intensity score on immunoreactive cells. The data for each sample is the average value of the IRS observed in 5 (five) Field View (LP) different at 1000x magnification. All of these examinations use a light microscope.

The male Wistar rats were divided into six groups, including negative control and treatment groups. The first as the negative control group was a group given no intervention for four weeks. In the second or treatment group I got the e-cigarette smoke intervention once every five minutes per day for a week. The third or the treatment group II got e-cigarette smoke exposure intervention twice every five minutes per day for a week. Treatment group III got the intervention of e-cigarette smoke exposure once every five minutes per day for two weeks. The treatment group IV got e-cigarette smoke exposure twice every five minutes per day for two weeks. The last control group was given the intervention of e-cigarette smoke exposure once every five minutes per day for three weeks.

The data collected performed statistical tests using ANOVA test analysis with SPSS version 20 to see the difference between Metalloprotein 8 matrix and collagen type 2 in lung tissue in all groups. Then the Least Significant Differences (LSD) test is performed to compare between groups. In addition, a trial was conducted to see the existence of a relationship between the two groups. Data will be presented in average numbers from the Immuno Reactive Score (IRS)

Results And Discussion

The study were carried out by comparing the Metalloprotein 8 (MMP-8) matrix and the collagen type 2 average in each group per 5 visual fields. Based on Figure 1, the average value and Standard Deviation of the Metalloprotein 8 (MMP-8) matrix can be seen in each group. These results show the increasing Metalloprotein 8 (MMP-8) matrix in each group directly proportional to the length of exposure time to cigarette smoke. In group I, the mean value of the Metalloprotein 8 (MMP-8) matrix reached 2.00 ± 0.17, which is the lowest mean value in all groups. While the highest mean value was obtained in group VI, reaching 7.48 ± 0.34.

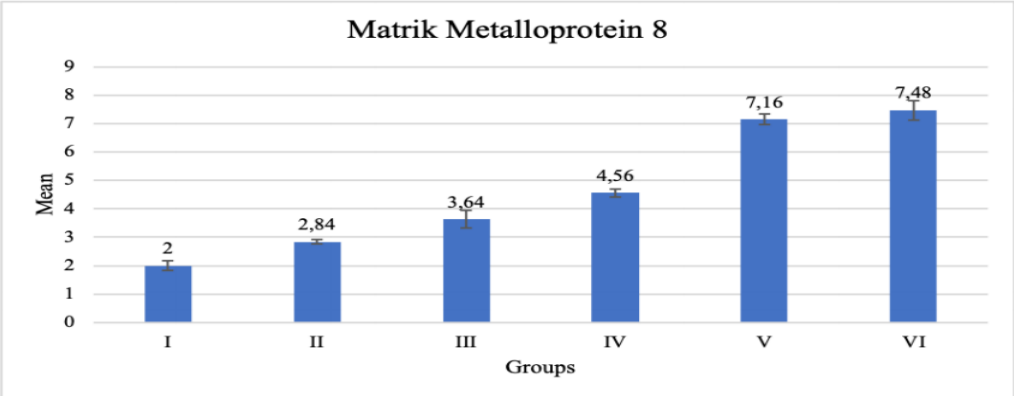

Figure 1. The Mean Value of Matrik Metalloprotein 8 (MMP-8) in Each Group

ANOVA analysis of the Metalloprotein 8 (MMP-8) matrix shows the difference in the Metalloprotein 8 (MMP-8) matrix in various groups (p = 0,000), then analyzed using Least Significance Different (LSD) to see the difference in Metalloprotein 8 (MMP-8) -8) between groups (Table 1). Based on Table 1, there was a significant difference (p <0.05) in the average Metalloprotein 8 (MMP-8) matrix between all groups, except group 5 and group 6 which showed no difference (p> 0.05).

Tabel 1. Least Significant Difference (LSD) test on Matrik Metalloprotein 8 (MMP-8) in Each Group

Groups	I	II	III	IV	V	VI
I	-	-	-	-	-	-
II	0,014	-	-	-	-	-
III	0,000	0,019	-	-	-	-
IV	0,000	0,000	0,008	-	-	-
V	0,000	0,000	0,000	0,000	-	-
VI	0,000	0,000	0,000	0,000	0,322	-

Based on picture 2, Shows the mean value of collagen type 2 is inversely proportional to the duration of exposure to cigarette smoke. In group VI, type 2 collagen reached the lowest value of 2.84 ± 0.15. The highest value was in the group I, namely 10.04 ± 0.75.

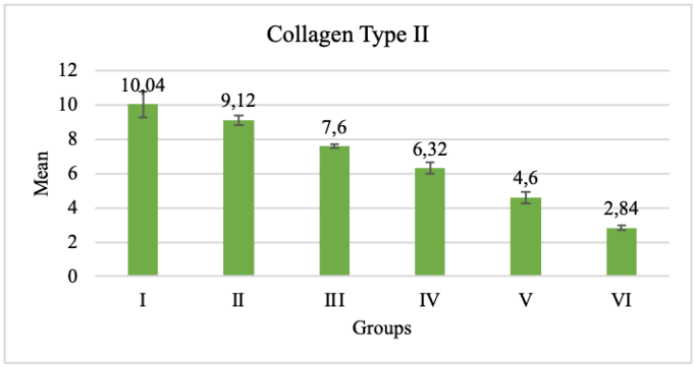

Figure 2. The Mean Value of Collagen Type 2 in Each Group

ANOVA analysis results on collagen type 2 showed differences in average collagen type 2 in various groups (p = 0,000), then analyzed using the least significance difference (LSD) to see differences in collagen type 2 between groups (Table 4). Based on Table 2, there was a significant difference (p <0.005) in collagen type 2 between the negative control group, and all treatment groups

Table 2. Least Significant Difference (LSD) Test Results on Collagen Type 2 in Each Group

Groups	I	II	III	IV	V	VI
I	-	-	-	-	-	-
II	0,012	-	-	-	-	-
III	0,000	0,003	-	-	-	-
IV	0,000	0,000	0,001	-	-	-
V	0,000	0,000	0,000	0,000	-	-
VI	0,000	0,000	0,000	0,000	0,000	-

The results of the correlation test analysis showed a strong relationship between Metalloprotein 8 matrix and collagen type 2 (r = 0.948). In addition, the two groups had a significant relationship (p <0.05) (Table 3).

This research indicates that the administration of electronic cigarette exposure will result in lung tissue damage. The group without administration of electronic cigarette smoke exposure does not show any lung tissue damage marked by the expression of a low level of Matrix Metalloproteinase-8 and a high level of collagen type-2. Meanwhile, the most severe lung tissue damage is exhibited in the group receiving 3-week exposure to cigarette smoke, where there is an increase of Matrix Metalloproteinase-8 and a decrease of collagen type-2.

Lung inflammation occurs because electronic cigarette exposure contains several harmful compounds entering the airways and can result in a free radicals increase in the body (R. V. Suryadinata, Lorensia, & Sari, 2017). The number increase of free radicals entering the body can cause antioxidant imbalance problems in the body. It can trigger the occurrence of lipid peroxidation, causing cells to undergo oxidative stress. The content of cigarette smoke can be divided into free radicals and non-radical oxidants. The free radical type that plays the most role in cigarette smoke is the superoxide anion (O2•-). These free radicals can be directly neutralized by enzymatic antioxidants, the Superoxide Dismutase. The result is hydrogen peroxide (H2O2) which is a non-radical oxidant. Furthermore, the radical Hydrogen peroxide (H2O2) will be neutralized by enzymatic antioxidants Gluthation peroxidase (GSH-Px) and catalase to be converted into water (H2O) and oxygen (O2) (Karmaker, Lira, Das, Kumar, & Rouf, 2017). Radicals Hydrogen peroxide (H2O2) can also react again with superoxide anion (O2•-) to hydroxyl radicals (OH-) called the Haber-Weiss reaction. In addition, if the Hydrogen Peroxide Radical (H2O2) reacts with pheton (Fe2+) or known as the pheton reaction, it can also produce hydroxyl radicals (OH-). Increased hydroxyl radicals (OH-) in the body will aggravate the occurrence of lipid peroxidation. Malondialdehyde (MDA) is the final result most widely used to measure the increase in free radicals in the body (Marrocco, Altieri, & Peluso, 2017).

Lipid peroxidase undergone by the cells will cause cell rupture or necrosis, often called Damage-associated molecular patterns (DAMPs) or more commonly known as cell debris (Virlando Suryadinata, 2018). Cell debris exiting the cell can disrupt the microenvironment and is regarded as a foreign object by the body. The reaction will improve macrophage activities to reach the cell debris and do the phagocytosis process, becomes one of the macrophage's roles as a non-specific immune system.

The phagocytosis process is carried out by macrophages with the help of lysosomes or better known as phagolysosomes. In the body, macrophages do not only act as a non-specific immune system. In addition, macrophages like Antigen Presenting Cells (APC) which can present a major histocompatibility complex (MHC) class1 or class II and play a vital role in the adaptive immune system. The class I major histocompatibility complex (MHC) will be identified by cytotoxic CD 8+ T cells. The class II major histocompatibility complex (MHC) will be recognized by CD 4+ T cells (Wieczorek et al., 2017).

The phagocytosis of cell debris conducted by macrophages will trigger seve-ral types of inflammation mediators such as Interleukin 1 (IL-1), interleukin-6 (IL-6), interleukin-8 (IL-8), and Tumor Necrosis Factor-α (TNF-α) (Wojdasiewicz, Poniatowski, & Szukiewicz, 2014). Interleukin-8 has the role of stimulating neutrophil movement or more commonly known as Neutrophil Chemotactic Factor (NFC) to fight against a pathogen or foreign objects through recognition of several receptors (de Oliveira et al., 2013).

The Neutrophil increase will damage Matrix Metalloproteinase (MMPs). It is because Matrix Metalloproteinase (MMPs) is responsible for the maintenance of extracellular matrix (ECM) protein surrounding endothelial in the whole body. Besides, Matrix Metalloproteinase also has a role in the inflammation process, which will increase more inflammation process in the tissue. Moreover, matrix metalloproteinase (MMPs) serves to balance the homeostasis of several collagen types. One type of matrix metalloproteinase which is in the airways and has a role during inflammation in the lung tissue is matrix metalloproteinase-8 (MMP-8) (Basu, Donaworth, Siroky, Devarajan, & Wong, 2015).

Matrix Metalloproteinase-8 is initially called Neutrophil Collagenase because there were specific grains obtained in the neutrophil and is also expressed in epithelial cells, fibroblast, macrophage, and endothelial. Several studies also show the existence of MMP-8 activities in tumors and metastasis (Thirkettle et al., 2013). But later on, MMP-8 is linked with the inflammation process and fibrosis in the lung. It is because Matrix Metalloproteinase-8 directly impacts on collagen type-2 existing in the lung tissue. The expression of MMP-8 occurring due to inflammation reaction is influenced by the secretion of Interleukin 6 and Interleukin 8 as proinflammation cytokines (Rathnayake, Gieselmann, Heikkinen, Tervahartiala, & Sorsa, 2017).

Collage is the primary part of the extracellular matrix and contains a high protein level. Collagen in tissues also serves as a mechanical defense and organism. Besides, collagen can also serve as a signaling molecule for cellular shape and behavior. The body has 16 types of collagen. But the most prominent are collagen types I, II, and III. Collagen is produced by cells according to their morphology, distribution, function, and pathogenesis (Deshmukh, Dive, Moharil, & Munde, 2016). The type of collagen existing in the lung tissue is collagen type-2 and plays a role in fibrosis formation in the lung tissue. Damage to collagen type-2 in the lung tissue will result in cell damage as well as cell death. The content of collagen type-2 in the lung tissue influenced by MMP-8 will show a relationship exists that an increase of MMP-8 will cause a decrease of collagen type-2, hence causing lung tissue damage, further triggering fibrosis tissue formation in the lung (Pardo, Cabrera, Maldonado, & Selman, 2016).

Lung fibrosis is a pathological syndrome as a result of lung injury. The pathobiological mechanism of pulmonary fibrosis produces a different remodeling response in the lungs. Lung fibrosis is a chronic, progressive, and severe lung disease. It is because disruption of the Extracellular Matrix (ECM), which is irregular. The smoke of electronic cigarettes is one of the main factors of lung fibrosis occurrence. Besides, the reason of lung fibrosis is caused by job exposure, dust, and smoke in motor vehicles (Awadalla, Hegazy, Elmetwally, & Wahby, 2012). Lung fibrosis disease is often associated with environmental disturbance (Chilosi, Poletti, & Rossi, 2012).

Conclusion

According to conducted research, it can directly provide some information related to the negative impacts caused by electronic cigarettes. Some misconceptions popular among people related to the safety of electronic cigarettes must be addressed properly as soon as possible. Perceptions viewing electronic cigarettes are safer than the tobacco cigarettes in reducing addiction to tobacco cigarette of active smokers must be reconsidered. This study has shown that the negative impacts of free radicals caused by electronic cigarette smoke exposure have directly influenced the intracellular lung tissue. The inflammation process contributes to lung tissue through some inflammation mediators. It will result in an intracell increase of Matrix Metalloproteinase-8, which later will reduce the collagen type-2 in the lung tissue.

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Family Planning and Mother's Practice In Children's Feeding In Bengkulu Province, Indonesia

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Abstract

Family planning will affect the mother's ability in parenting which will affect the children's growth and development. This study aims to determine the relationship between family planning and the practice of child feeding (PCF). The study used Indonesian Demographic and Health Survey 2017 data with a cross-sectional approach. Family planning is measured by variables age at first marriage, the distance between births, parity, number of children under five, and pregnancy desired. The PCF is based on the variable composite of Early Initiation of Breastfeeding, Exclusive Breastfeeding, Infant and Child Feeding, and Consumption of food sources of vitamin A. The sample size is 97 children aged 6-23 months. Data analysis using multivariate logistic regression. The study results that almost part of the mother did not PCF well (45.4%). Most (69.1%) mothers were not good at family planning. Family planning related to poor PCF was age at first marriage less than 18 years (p = 0.003) primiparous parity (p = 0.017), 2-5 years birth spacing (p = 0.033) and the number of children under five (p = 0.025). There need to be more educational efforts, outreach and family planning movements so that people, especially teenagers, understand the importance of family planning.

Introduction

Infants and children must get proper food intake to achieve optimal growth and development, especially in the first 1000 days of life. Improper feeding practices can lead to malnutrition, such as stunted and severely stunted (IDAI, 2015). One report said that two-thirds of children under five died due to an improper diet. As a result of children not getting exclusive breastfeeding, getting solid food too early, and, or too late, the composition of nutrients was incomplete, unbalanced, and not hygienic (WHO, 2017). Global policies and national strategies for child feeding include the provision of Early Initiation of Breastfeeding (IMD) immediately 30 minutes to 1 hour after birth, exclusive breastfeeding for six months, and continuing until the age of two. Then interspersed with complementary feeding (MP ASI). In society, the practice of Child Feeding is still problematic which will impact child growth (Gyampoh, Otoo, & Aryeetey, 2014, Kuchenbecker et al., 2015) and child morbidity (Patel et al., 2015).

Child Feeding (PMA/Pemberian Makan Anak) start from the Early Initiation of Breastfeeding (EIBF) to Infant and Young Child Feeding (IYCF/PMBA/Pemberian Makan Bayi dan Anak) practice, showing global and national problems. National figures show that only 45% of children aged 6-23 months practice IDD and comply with the recommendations. In the low percentage of infants who received an IMD, half of the babies had received prelactational food within three days after birth. The median exclusive breastfeeding was only up to 4.2 months, found that 40% of children consumed food groups that were not in

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accordance with the recommendations, and the practice of PMBA did not comply with it. In Bengkulu Province, most children (97.3%) had been breastfed. Only 50% of children within 1 hour after birth, and 51% received pre-lactation food within three days. It increases the failure of exclusive breastfeeding. The median duration of breastfeeding was 20.8 months. Exclusive breastfeeding was only up to 4.2 months. 60% of children consume food groups according to the recommendations, and 74% of children get FDI practices according to the recommendations (BKKBN et al., 2017).

The failure of exclusive breastfeeding and child feeding practices is influenced by various maternal factors, including education, knowledge, occupation, and maternal age (Maonga, Mahande, Damian, & Msuya, 2016; Prakash, Singh, Pathak, & Parasuraman, 2011; Asare, Preko, Baafi, & Dwumfour-Asare, 2018; Ahmed, Page, Arora, & Ogbo, 2019; Barir, Murti, & Pamungkasari, 2019) and family factors (Vieira et al., 2014;Patel et al., 2015). Giving practice of Infant under two feeding is strongly influenced by the culture of the community (IDAI, 2015). A study in Ghana found that maternal age played an important role in predicting stunting. Mothers who give birth at a young age tend to have children with low birth weight. Mothers aged 25–34 years were less likely to have stunted children compared to mothers aged 15–24 years. It can happen because young mothers still need adequate nutrition for their growth into adult women, so there is competition between mothers and children and mothers in meeting their nutritional needs (Darteh, Acquah and Kumi-Kyereme, 2014). Children born to mothers who marry at a young age have a low chance of living and are more at risk of experiencing nutritional problems in their children such as short, thin, and poor nutrition (Prakash et al., 2011). Conditions in Bengkulu Province show high levels of family planning problems, such as teenage marriage, unwanted pregnancies, and short birth spacing (BKKBN et al., 2017). There are still limited research results that prove the relationship between family planning and mother's behavior in feeding children, so it is necessary to conduct further studies on the relationship between family planning and mother's practice in feeding children in the first 1000 days of life in Bengkulu Province.

Method

The study used data from the 2017 IDHS with a cross-sectional research design. Image 1 describes the sample selection stage. The research population is women of child-bearing age (WCBA, 15-49 years old) in Bengkulu Province gave birth to children within five years before the 2017 IDHS research was conducted and recorded in the 2017 IDHS survey as many as 250 FFA. IDHS sampling design 2017 used a stratified two-stage sampling, namely selecting some census blocks in a systematic probability proportional to size (PPS) manner and selecting 25 ordinary households in each selected block systematically. The research sample was 97 WCBA that met the inclusion criteria. Namely, WCBA had their last child aged 6-23 months, biological child and lived with the family, and complete data. The unit of analysis is all children born alive from all live births from WCBA (15-49 years old) who have been married and have experienced it, then the sample of the last child is taken and weighed at birth. The data collection instrument used the IDHS questionnaire, which had been tested using the interview method. The data collectors are trained enumerators. Data processing begins with editing the data to ensure that the data obtained is clean. It is filled in completely, consistent, relevant, and can be read properly. Missing data is excluded from the analysis. Next, recording is carried out according to the needs of data analysis. Data analysis uses univariate analysis to describe the proportions of each variable. Bivariate analysis is applied to test the homogeneity of variance of the independent variables and variable selection for multivariate analysis. Multivariate analysis used the logistic regression test.

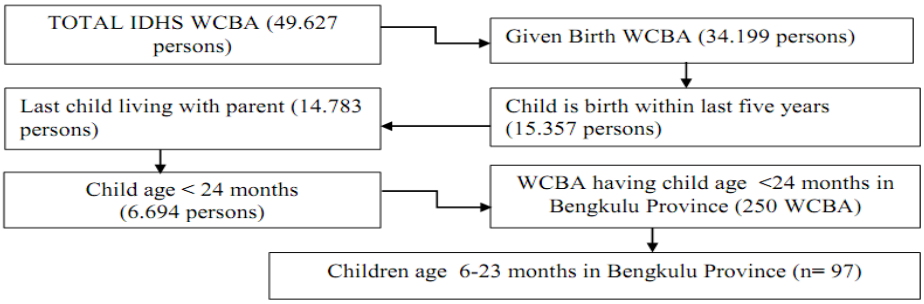

Image 1. Sample Determination Steps

Results And Discussion

Table 1 shows that only 49.5% of mothers did Early Initiation of Breastfeeding (EIB/IMD), 57.7% of mothers exclusively breastfed, 33% of children consumed food sources of vitamin A and only 43.3% of mothers did IYCF according to the recommendations.

Table 1. Mother's Practice in Child Feeding in Bengkulu Province

Feeding Practices	n=97	%
Early Initiation of Breastfeeding (EIB)		
EIB	48	49,5
Not EIB	49	50,5
Exclusive Breastfeeding		
Yes	56	57,7
No	41	42,3
Consuming food sources of vitamin A		
Yes	32	33,0
No	65	67,0
IYCF		
As Recommended	42	43,3
Not as Recommended	55	56,7

Source: 2017 ISDH Data

Table 2. Characteristics of Family Planning in Bengkulu Province

Family Planning	Not Good Child Feeding		Good Child Feeding		Total		p-value
	N	%	N	%	n	%	
Age of First Marriage							
Under Age	42	95,5	40	75,5	82	84,5	0,015
Legal Age	2	4,5	13	24,5	15	15,5	
Marital Status							
No Spouse	0	0	4	7,5	4	4,1	0,173
Spouse	44	100,0	49	92,5	93	95,9	
Parity							
1 child	20	45,5	12	22,6	32	33,0	0,031
>1 child	24	54,5	41	77,4	65	67,0	
Mother's Age When Giving Birth							
<20 years	5	11,4	3	5,7	8	8,2	0,518
≥20 years	39	88,6	50	94,6	89	91,8	
Pregnancy Planning							
Unwanted Pregnancy	8	18,2	14	26,4	22	22,7	0,471
Wanted Pregnancy	36	81,8	39	73,6	75	77,3	
Birth Interval							
First Child	21	47,7	12	22,6	33	34,0	0,02
< 2 years and > 5 years	12	27,3	27	50,9	39	40,2	
≥2-5 years	11	25,0	14	26,4	25	25,8	
Number of Toddler in the Family							
2-4 Toddlers	12	27,3	18	34,0	30	30,9	0,625
1 Toddler	32	72,7	35	66,0	67	69,1	

Source: 2017 ISDH Data

The results in table 2 show no difference in the Child Feeding practice based on marital status, maternal age at delivery, pregnancy planning, and the number of children under five in the family. Child Feeding practices differed according to age at first marriage (p=0.015), maternal parity (p=0031), and births interval (p=0.02). Almost all Child Feeding practices are not good for women who marry at underage (95.5%). More than half occur in women with more than one child parity (54.5%) and their first child (47.7%).

The Child Feeding practices are 54.6% good (early initiation of breastfeeding, exclusive breastfeeding, Vitamin A, IYCF practice), and 69.1% of WCBA who have children 6-23 months including not plan a family well (family married status, Number of children (1-2 children), pregnancy is wanted, pregnancy interval (2-5 years), age at pregnancy (20-35 years old) and Age of First Marriage > 18 years).

Table 3 shows no differences in Child Feeding practice based on mother's education, mother's occupation, antenatal care workers, quality of ANC, birth attendant, sex of a child, child's birth weight, family residence, family socio-economic status, health condition of the family environment, and the number of family members. The not good practice of Child Feeding is more common in mothers with low education, working mothers, antenatal care workers, and birth attendants are health workers and the quality of ANC is good, girls and children born with low birth weight, families living in villages, socio-economic lower middle class, environmental health is not good and in large families.

Table 3. Characteristics of Families, Women of Childbearing Age, and Children in Bengkulu Province

Characteristics	Not Good Child Feeding		Good Child Feeding		Total		p-value
	n	%	n	%	n	%	
Residential							
Rural	27	61,4	30	56,6	57	58,8	0,79
Urban	17	38,6	23	43,4	40	41,2	
Socio-economic status							
Middle-Low	34	77,3	37	69,8	71	73,2	0,551
Middle-Up	10	38,5	16	61,5	26	26,8	
Residential Health							
Poor	38	86,4	43	81,1	81	83,5	0,677
Good	6	13,6	10	18,9	16	16,5	
Number of Family Member							
Large Family (> 4 persons)	28	63,6	38	71,7	66	68,0	0,529
Small Family (≤ 4 persons)	16	36,4	15	28,3	31	32,0	
Mothers' Education							
Low	38	86,4	43	81,1	81	83,5	0,677
High	6	13,6	10	18,9	16	16,5	
Mothers' Occupation							
Work	26	59,1	22	41,5	48	49,5	0,128
Does not Work	18	40,9	31	58,5	49	50,5	
Birth Attendant							
Non Birth Attendant	7	16,3	12	22,6	19	19,8	0,603
Birth Attendant	36	83,7	41	77,4	77	80,2	
ANC Quality							
Not Good	12	27,9	12	22,6	24	25,0	0,722
Good	31	72,1	41	77,4	72	75,0	
Birth Attendant							
Non Health Worker	12	27,3	14	26,4	26	26,8	0,924
Health Worker	32	72,7	39	73,6	71	73,2	
Gender							
Female	24	54,5	25	47,2	49	50,5	0,604
Male	20	45,5	28	52,8	48	49,5	
Child's Birth Weight							
LBW(<=3000 grams) Normal	23	52,3	21	39,6	44	45,4	0,298
(>3000 grams)	21	47,7	32	60,4	53	54,6	

Source: 2017 ISDH Data

Table 4. Relationship of Family Planning and Child Feeding Practice

Variable	B	p-value	OR (95% CI)
First Marriage Age			
Under Age	2,839	0,003	17,10 (2,58-113,43)
Legal Age			1
Parity			
1 child	1,532	0,017	4,62 (1,32-16,25)
>1 child			1
Birth Interval			
≥ 2-5 years and first child < 2 years and > 5 years	1,203	0,033	3,3 (1,1-11,11)
			1
Number of Toddler in the Family			
1 toddler	1,284	0,025	3,61 (1,17-11,12)
2-4 toddlers			1
Mothers' Occupation			
Work	0,654	0,166	1,92 (0,76-4,85)
Does not work			

Source: 2017 ISDH Data

Table 4 shows the final model of the relationship between Family Planning and Child Feeding Practice. Family planning variables related to the Child Feeding Practice are age at first marriage, parity, birth interval, and the number of children under five in the family after controlling for maternal employment factors. WCBA with age at first pregnancy less than 18 years are at risk of 17 times the practice of Child Feeding is not good compared to WCBA with first giving birth age more than 18 years. Mothers with primiparous parity are at risk of 4.6 times bad Child Feeding practices compared to multipara-grande parity women. WCBA with a birth interval of fewer than two years and more than five years as a protection factor from the Child Feeding Practice is not good, meaning that mothers who give birth 2-5 years apart and their first child is at risk of 3.3 times the practice of Child Feeding is not good compared to WCBA who give birth at an interval of fewer than two years and more than five years. WCBA having one toddler has a risk of 3.61 times the Child Feeding practices is not good compared to WCBA who has more than one.

The results found that in Bengkulu Province still facing problems in the practice of PMA, only 54.6% of the practice of PMA was in a good category. Improper FDI practices are the cause of nutritional disorders in infants and toddlers. The literature review found that child feeding practices are associated with the risk of stunting in Indonesia. It is due to the poor quality of children's food, inadequate feeding practices, and safety of the food and water. Low intake of energy, animal protein, and micronutrient content in complementary feeding, low dietary diversity and antinutrient content, inadequate supplementary feeding and infrequent amounts, types, and frequency, inadequate feeding during and after illness, watery food consistency, including unsafe food storage and preparation (Beal et al., 2018).

The problems with Child Feeding practice are that only 49.5% of mothers did Early Initiation of Breastfeeding (EIBF), 42.3% did not give exclusive breastfeeding, 33% of children consumed food sources of vitamin A, and only 43.3% of mothers did Child Feeding as recommended. The low practice of EIBF will affect the success of subsequent breastfeeding. EIBF immediately after birth will be associated with exclusive breastfeeding and prevent infant mortality (Permatasari & Syafruddin, 2016;Biks et al., 2015). Babies who are breastfed after 24 hours of birth are four times more likely to die than babies who are breastfed immediately. While babies who have not been exclusively breastfed have a risk of 7.86 times dying compared to those who are exclusively breastfed (Biks et al., 2015). The causes of EIBF failure are due to geographic, socioeconomic, individual, and maternal and child health factors (Sharma & Byrne, 2016). Mothers living in rural with low education, low access to health

facilities, and insufficient and poor quality of antenatal care are at risk of delaying EIBF practice (Senanayake et al., 2019). Mother's age at early marriage, parity of first child, working mother, close birth interval, daughter gender, a large number of family members, low access to mass media and health services, mother's involvement in decision making, perception of insufficient breastfeeding, low family support, the health condition of the mother is problematic (unconscious after giving birth, unable to sit, hypertension, fatigue and common illnesses experienced after giving birth) and the health of LBW children, premature, weak and sick at birth (Sharma & Byrne, 2016). Of the various factors of EIBF failure, it is necessary to intervene in mothers and health workers to increase the coverage of EIBF and exclusive breastfeeding.

Young mothers have a high risk of maternal health and pregnancy outcomes (Sharma, 2013) which also affects the mother's ability to care for children. Teenage mothers are at risk of having stunting toddlers (Prendergast and Humphrey, 2014). It is related to the mothers' ability to care for children. The study proves that good family planning is related to the mothers' ability to take care of children's food consisting of breastfeeding and providing food other than breast milk for children. The results of a systematic literature review found that the ability of a mother's parenting will have an impact on child feeding practices (Mcphie et al., 2014). Child care patterns and child feeding practices are affected by socio-economic conditions, family income, mother's education, family and community habits, mother's diet, and maternal nutritional status (Mcphie et al., 2014;Loppies & Nurrokhmah, 2020).

The final model shows that WCBA who married at the age of children, primiparous mothers, birth spacing, and mothers who had one toddler in the family were associated with poor Child Feeding practice after controlling for maternal work factors. The research in Bengkulu Utara Regency found that mothers who married in their teens had poor knowledge and attitudes about family planning (Simbolon et al., 2020). Mothers married at a young age have less understanding of marriage, fertility, and reproductive health problems (Erulkar, 2013). WCBA marrying young has a significant impact on life and parenting in the family, whereas WCBA lacks knowledge about their duties and roles as mothers. So WCBA is less able to apply good and responsible family parenting patterns (Loppies and Nurrokhmah, 2020). Mother's knowledge will influence child feeding practice. The study in the Tamale metropolis found that 70.5% of mothers had heard of exclusive breastfeeding, but only 39.4% of mothers who did EIBF (Kitano et al., 2016) and 27.7% gave exclusive breastfeeding (Nukpezah et al., 2018).

Parity is related to Chid Feeding practice because mothers with more than one parity are experienced in breastfeeding skills. The study found that WCBA with parity of one child had a risk of 4.6 times that the practice of Child Feeding was not good compared to WCBA who had more than one child (multipara-grande). In line with the results of a study in Japan, it was found that there was a parity relationship with exclusive breastfeeding. The success of exclusive breastfeeding interacts between parity and maternal age. The success of breastfeeding in mothers aged over 35 years for the first child is by 69.4%, and for multiparous children by 73.5%. In mothers aged less than 35 years, the success of exclusive breastfeeding was 74.3% in primiparous children and 82.3% in multiparous children (Kitano et al., 2016). The results indicate that exclusive breastfeeding in primiparous children is lower than in multiparous children. Mothers of multiparous parity and grandemultipara have better knowledge to breastfeed properly than primiparous postpartum. The parity amount is related to the experience of the mother's parenting. In general, the higher a person's parity, the more experience, and knowledge he has, including information obtained from other people, including health workers. Mothers who have previous breastfeeding experience will support their current breastfeeding skills, and breastfeeding failures in the past will affect her to be better. So the multigravida mothers' knowledge is more than primigravida because of experience and knowledge factors.

The birth interval is related to the practice of Child Feeding. The study found that WCBA with a birth interval of fewer than two

years and more than five years is a protection factor against poor Child Feeding practices. It means mothers who gave birth at 2-5 years intervals and their first child were at risk of 3.3 times in poor Child Feeding practice compared to WCBA who gave birth less than two years apart. WCBA who has only one child under five and their first child and birth spacing of 2-5 years are associated with poor Child Feeding practices. It is related to the mother's experience in parenting. Birth spacing that is too close and too far is a factor that can affect children's health (Class et al., 2017). A too-close birth interval can also increase the risk of infant mortality because mothers who give birth at shorter intervals result in their physical condition not fully recovering from the previous pregnancy. It will cause less than optimal fetal development and a higher risk of death. A close birth interval can result in competition between siblings in fulfilling nutritional needs (Molitoris, Barclay and Kolk, 2019). The mechanism of the relationship between birth spacing and child feeding practices still needs to be studied more deeply.

Conclusions

The practice of feeding children in the first 1000 days of life periods is still not optimal. Most (69.1%) of WCBA did not plan their family well. Good Family Planning is related to good Child Feeding practice. Family planning variables related to Child Feeding practice are age at first marriage, parity, birth spacing, and the number of children under five in the family after controlling for maternal occupation. It is necessary to improve education, socialization, and family planning movements so that the community, especially teenagers, understands the importance of family planning regarding the age of first marriage, age at pregnancy, number of children, planning for desired pregnancies, and proper pregnancy interval.

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The Causes Analysis of Pulmonary Function Disorders at Semen X Company

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Abstract

Abstract. The cement industry is the largest manufacturing industry, vital for sustainable development, and very risky for workers to be exposed to dust in various processes, including production. Continuous exposure to dust can cause pulmonary function disorders. This study aimed to analyze the relationship between dust exposure, age, length of work, working period, use of PPE (masks), smoking habits, and pulmonary function disorders in labor. This research used an observational method with a cross-sectional approach. The research sample was a total population of 38 male workers at Semen X company, engaged in the cement bagging industry as business activities. Data collection was by interviewing respondents, measuring the level of inhaled dust with a personal dust sampler, and checking the lung capacity with a spirometer. Data analysis was performed bivariate with the chi-square test. The results showed that there was a relationship between the use of PPE (mask) (p = 0.006) with pulmonary function disorders.

Introduction

The industrial sector rapidly grows and changes the pattern of disease in society, including among workers. Many workers spend their time daily at work and have health risks and occupational diseases from work exposures and activities (Sunaryo, 2020). An occupational disease is a disease caused by the effect of activities in the work environment and caused by physical, biological, psychosocial, and biological risk factors (Salawati, 2015). Respiratory disease caused by work activities is a global disease that is a health problem that contributes to as much as 30% of occupational diseases. In addition, 10-20% of death, are caused by respiratory matters (Gizaw et al., 2016). According to (Habybabady et al., 2018), when carrying out work activities, workers are vulnerable to being exposed to hazards or risks.

One of the hazards or risks that can affect the health of workers is dust. When dust enters the human body through the respiratory tract, it will cause harmful effects, especially it can cause health problems (Oktaviani & Prasasti, 2015). Dust is a small solid particle having a diameter of about 1 to 100 μm suspended in the air resulting from drilling, sifting, crushing, grinding, and blasting activities (WHO, 2014). There are various types of dust. After all, cotton dust, asbestos, wood, cement, coal, and others. The dust has the property of being able to settle because it is influenced by the force of gravity, forming lumps because the surface is constantly wet due to being coated with water and can catch the opposite particles (Tureková et al., 2019). Long-term dust exposure causes respiratory health problems (Fallahian, 2019). According to (WHO, 2017), the number three cause of death related to work is a respiratory disease, which is 21%.

The health risks caused by inhaled dust particles are affected by the exposure time and the biological response caused by the dust particles (Yang et al., 2020). The cement industry sector is the largest manufacturing industry required for sustainable development.

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In addition, the cement industry sector also causes environmental pollution at all stages of the process, including production. The environmental pollution generated from the cement industry sector is air pollution in the form of gases, noise, vibrations, and dust. The cement industry is related to dust exposure which contributes to silicosis, bronchitis, and pulmonary function disorders (Sana et al., 2013). Lung function disorders are occupational respiratory disorders that often occur in workers exposed to dust in the industrial sector, including the cement industry (Zeleke et al., 2010). In addition to disturbances in the respiratory system, dust pollution can cause cardiovascular disorders (Manisalidis et al., 2020). This study aims to analyze the relationship between dust exposure, age, work duration, length of service, use of PPE (masks), smoking habits, and pulmonary function disorders in labor.

Method

The research design was cross-sectional, measuring exposure to cement dust, age, length of work, working period, use of PPE, smoking habits, and associated pulmonary function disorders. Where these variables are examined at the same time to determine the relationship between these variables. This research took place at the Semen X Company, Mempawah Regency, West Kalimantan Province. It was engaged in the Cement Packaging industry as a business activity. The impact of cement bagging production activities was air pollution from cement dust. The types of activities carried out were receiving materials from the docks and shelters, as well as the process of packaging/bagging cement powder in bags and distributing them to distributors. The results of field observations in the factory area were visible flying dust, not only seen in the cement bagging production area but also in the raw material storage area, the factory machine area, and the road where factory vehicles pass. Cement dust particles have the highest level of toxicity compared to other air pollutants, so they are the most dangerous for health. The bagged cement production capacity was 600,000 tons/year. The raw material comes from the parent company of the cement factory in Tabalong Regency, South Kalimantan. Production materials are transported to Pontianak by cement Bulk ship, cement bag packaging was 40 kg and 50 kg by refer to market developments.

There were 38 workers in the cement packing/packing production division. The characteristics of male workers, aged 20 to 54 years (most of them are 20-30 years old), working hours start at 8 am – 4 pm (8 hours), maximum working hours were three years (the new company operating in 2017). Workers used PPE in the form of cloth masks. Most of the workers have smoking behavior. The research sample was the total population, which was 38 male workers. Data collection in this study was by interviewing about age, length of work, working period, use of PPE, smoking habits, and data on workers' lung function measured using a spirometer. Measurement of the inhaled dust level using a personal dust sampler. Then the data from observations, measurements, and research interviews were analyzed bivariate with statistical tests using the chi-square test at the 95% confidence level to find the relationship between the research variables. The test was at the significance level ($\alpha = 5\%$). If $p \leq 0.05$, the test results were significant. This research was conducted under the Helsinki declaration guidelines. The research design was explained to the participating workers. Written consent was obtained from all workers who participated in the study.

Result and Discussion

The Semen X company was engaged in the cement industry. The activities are receiving, holding, and the packing or packing cement powder into bags to be distributed to the distributor. It was founded in 2017 and started production activities in 2018. Its type and production capacity is divided into two products. Namely cement in bags and bulk cement. The number of workers is 38 men, with the age range of 20-40 years. The standard working hour schedule starts from 8 am- 4 pm, working time is 8 hours/day and 40 hours/week.

TABLE 1. The Variable Frequency Distribution for Workers of *Semen* X Company, Mempawah Regency in 2020

Variable	Category	N	(%)
Dust inhaled	>1,0 mg/m^3	10	26,3
	≤ 1,0 mg/m^3	28	73,7
Age	20-40 years	33	86,8
	>40 years	5	13,2
Length of Working	> 8 hour/day	22	57,9
	≤ 8 hour/day	16	42,1
Working Period	2-3 years	35	92,1
	≤1 year	3	7,9
Use of PPE	Do not use PPE	14	36,8
	Use PPE	24	63,2
Smoking Habit	Smoking	32	84,2
	Do not smoking	6	15,8
Pulmonary Function Disorders	Distraction	9	23,7
	Normal	29	76,3

Source: Primary Data, 2020

Table 1 shows that inhaled dust levels > 1.0 mg/m3 were experienced by 26.3% of workers. Workers aged > 40 years are (13.2%). Length of working hours, 57.9% is > 8 hours/day. Most of the workers (92.1%) have worked 2-3 years. 36.8% of workers do not use PPE. Workers who have a smoking habit are 84.2%. Workers who experience lung function disorders are 23.7%.

TABLE 2. The Analysis of Inhaled Dust Levels (Respirable) with Pulmonary Function Disorders in Workers at *Semen X* Company Mempawah Regency in 2020

No	Dust Inhaled	Pulmonary Function Disorders				Total		*p value*[a]	OR
		Distraction		Normal		N	%		
		n	%	n	%				
1	**>1,0 mg/m^3**	4	40,0	6	60,0	10	26,3		
2	**≤ 1,0 mg/m^3**	5	17,9	23	82,1	28	73,7	0,205*	3,067
Total		9	23,7	29	76,3	38	100		

Source: Primary Data, 2020

[a] Chi Square, α = 5%; *Significance p ≤ 0.05

Based on statistical test results between the variable levels of inhaled dust and pulmonary function disorders, obtained p value = 0.205, it can be concluded that there was no significant relationship between inhaled dust levels and pulmonary function disorders among workers. However, workers with inhaled dust levels > 1.0 mg/m3 tend to have a greater risk of experiencing lung function disorders 3.067 times greater than workers with dust levels <1.0 mg/m3. The inhaled dust level was one of the causes of pulmonary dysfunction, as cement dust was inhaled and enters through the nose, throat, and lungs. Dust build-up in the lungs can occur when inhaled with a size of 1-3 μ (respirable dust). If the respiratory dust accumulates in the lungs and exceeds the threshold value, it can cause pneumoconiosis (Nafisa et al., 2016). To minimize lung dysfunction due to inhaled cement dust, workers must undergo periodic medical examinations and regular work rotation changes (Shanshal & Al-Qazaz, 2020).

TABLE 3. Analysis of Age, Working Period and Length of Work with Pulmonary Function Disorders in Workers at *Semen* X Company, Mempawah Regency in 2020

Variable	Category	Pulmonary Function Disorders				Total		p value [a]	OR
		Distraction		Normal		N	%		
		n	%	n	%				
Age	>40 years	1	20	4	80	5	13,2		
	20-30 years	8	24,4	25	75,8	33	86,8	1,000*	0,781
Total		9	23,7	29	76,3	38	100		
Working	>8 hours/day	4	18,2	18	81,8	22	57,9		
Length/day	≤ 8 hours/day	5	31,3	11	68,8	16	42,1	0,450*	0,489
Total		9	23,7	29	76,3	38	100		
Working	2-3 years	9	25,7	26	74,3	35	92,1		
Period	≤1 year	0	0	3	100	3	7,9	1,000*	0
Total		9	23,7	29	76,3	38	100,0		

Source: Primary Data,2020

[a] Chi Square, α = 5%; *Significance p ≤ 0.05

Based on the statistical test results between the variable age and lung function disorders, the results obtained a p-value = 1,000. So there is no significant relationship between age and lung function disorders. It was in line with research (Qian et al., 2016), because age was not a crucial factor that can cause pulmonary function disorders in workers. But age can also be a risk factor for decreased lung function leading to function disorder (Meo et al., 2013). Pulmonary Function Disorders of workers were affected by age factors because the older a person was, the more susceptible to health risks (Hasan & Maranatha, 2019). The age factor was a factor that can also affect the condition of a person's lungs. The older a person was, the performance and function of body organs decrease, which causes changes in bone tissue, muscles, nervous system, and organs including the lungs, causing a decrease in the immune system and susceptibility to disease (Pinugroho & Kusumawati, 2017). Decreased lung function can cause lung function disorders caused by damage to the elastic tissue of the lung due to age (Kumari Prasad et al., 2019).

Furthermore, statistical tests result between the variable length of work and pulmonary function disorders, the results obtained p-value = 0.450, it can be concluded that there was no significant relationship between the work duration and lung function disorders, aligned with the results of the study (Irjayanti et al., 2012) found no significant relationship between them in workers because the length of work did not guarantee that exposure to inhaled dust causes lung function disorders was also getting severe. After all, the exposures number for each person was different.

The working period was related to the duration of the worker starting at the place calculated in the annual period (Fatimah et al., 2018). Based on the results of statistical tests using the chi-square test at the 95% confidence level, the results obtained a p-value = 1,000 indicate no significant relationship between tenure and lung function. This case is in line with the previous research (Yuvaraj et al., 2016) that tenure or working period was not related to pulmonary function disorders in workers. It was because all respondents have a working period of (less than) < 10 years, as shown in table 1. Occupational diseases such as pulmonary function disorders appear with an average period of > 10 years. Based on research in China, a group of workers who had a service period of (more than) > 10 years, experience lung function disorders with a p-value of < 0.05 (Bian et al., 2015). The working period was related to a decrease in lung function capacity because the longer the worker work in a risky place (exposure to dust) will impact health problem, especially those related to respiratory disorders (Thomas et al., 2018).

TABEL 4. Analysis of the Use of PPE (Masks) and Smoking Habits with Pulmonary Function Disorders in Workers at *Semen* X Company, Mempawah Regency in 2020

Variable	Category	Pulmonary Function Disorders				Total		p value [a]	OR
		Distraction		Normal		N	%		
		n	%	n	%				
PPE	Do not use	7	50	7	50	14	36,8	0,006*	11
	Use	2	8,4	22	91,6	24	63,2		
Total		9	23,7	29	76,3	38	100,0		
Smoking	Smoking	7	21,9	25	78,1	32	84,2	0,613*	0,560
Habit	Do not smoking	2	33,3	4	66,7	6	15,8		
Total		9	23,7	29	76,3	38	100,00		

Source: Primary Data,2020

[a] Chi Square, α = 5%; *Significance p ≤ 0.05

Based on statistical test results using the chi-square test at a 95% confidence level, the results obtained a p-value = 0.006, which can be concluded that there was a significant relationship between the use of PPE (masks) and lung function disorders. The workers who did not use PPE tend to have a risk of experiencing lung function disorders greater than 11 times higher than workers who did it. Personal Protective Equipment (PPE) was needed to minimize exposure or hazards that result in injury or health problems in the workplace that cannot be controlled administratively or technically, it serves to protect the respiratory tract from exposure to steam, gas, or dust in the workplace, by using it, can affect the occurrence of malfunctioning lungs in workers, so dust exposure needs to be minimized (Muhith, 2018). Based on the results of observations and interviews conducted by researchers, 36.8% of workers did not use it because they thought it was not comfortable and prevented workers from doing work. It is the equipment used to protect the body from exposure to hazards in the workplace. Disciplined while using it in work activities can protect certain body parts from exposure to hazards. One of its functions to protect the respiratory tract from the risks of dust exposure was a mask functioned as a deterrent to dust exposure. It must also be appropriate and meet standards to prevent dust of any size from entering the worker's body (Fatimah et al., 2018). The use of masks can prevent and reduce the entry of dust. Although they do not protect completely, but can minimize the risk of pulmonary function disorders.

Based on statistical test results using the chi-square test at the 95% confidence level, the results obtained a p-value = 0.613, indicating no significant relationship between smoking habits and pulmonary function disorders. It was in line with research (Kumari Prasad et al., 2019) due to several factors. Namely the length of smoking, the number of cigarettes smoked per day, and others. The relationship analysis between variables obtained OR = 0.560, which meant that workers who had a smoking habit experienced a tendency of pulmonary function disorders 0.560 times greater than workers who did not. Its smoke was a mixture consisting of complex chemicals. The chemical complexity contained in cigarettes, and cigarette smoke has many effects on human health and contributes to adverse health problems such as chronic bronchitis and other respiratory symptoms (Ghanem & Hage, 2018). Smoking can cause death and health problems, including being a risk factor for lung function disorders and causing respiratory and cardiovascular disease (Tantisuwat & Thaveeratitham, 2014). A person with a smoking habit can accumulate sediment in the lungs, causing narrowing of the air in and out passages (Balkhyour et al., 2019).

Conclusion

There is a relationship between the use of PPE (masks) and lung function disorders in cement company workers with a p-value = 0.006; OR = 11. From the results of the bivariate analysis, it is also known that there is no relationship between inhaled dust levels (p-value = 0.0205; OR = 3,067), length of work (p-value = 0.450; OR = 0.489), age (p-value =

1,000; OR = 0.781), smoking habits (p-value = 0.613; OR = 0.560), and working period (p-value = 1, 000) with pulmonary function disorders in cement company workers. Based on the research results, Semen X company should be able to monitor dust levels by checking the dust levels in the area of the production unit regularly, increasing the personal awareness of workers in using PPE through organizing socialization activities with the help of related third parties regarding the importance of using PPE, conducting health checks regularly routine as an effort to prevent disruption of work functions among workers who work in the production section and improve administrative control by providing PPE in the form of masks and gloves that meet standards, conducting regular supervision to increase workers' compliance in using PPE, regulating working hours, cleaning ventilation and dust collectors where workers do work and enforcing regulations regarding occupational safety and health in the company as an effort to prevent occupational accidents and occupational diseases.

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The Oral Health and Comorbid Diseases Knowledge Between Urban and Rural Community during Pandemic

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Abstract

The restriction of social mobility and activity during the COVID-19 pandemic has been implemented to stop the deadly transmission of the SARS-CoV2 virus. People are forced to stay at home and strictly perform the COVID-19 health protocol in their daily activities. Currently, a continuous self-maintenance of the health, including oral health, is considered the best strategy worldwide. This community service activity aimed to assess the knowledge of the urban and rural adult community about oral health, comorbidity, and the quality of life (QoL) during this pandemic situation by using a pre-and post-test quasi-experimental design with an intervention of health-knowledge sharing using leaflets and videos, and a WHOQOL 2012 questionnaire to study the QoL. Paired t-test was used as statistical analysis. Total respondents were 131 (n = 76 for urban and n = 55 for rural), selected using the purposive sampling method. There was a significant difference between the results of the pre-test and post-test in both urban and rural groups (t count ranged from 1.69 to 5.98; $p < 0.05$). Based on the WHOQOL 2012 questionnaire, both urban (90.79%) and rural (87.27%) respondents indicated a good QoL, while the remaining was scored as medium. Physical conditions/pain was the main domain that directly affects the QoL in both communities. It could be concluded that the knowledge-sharing intervention to the community gave a good impact in enhancing the knowledge of the respondents, however, a continuous program should be further carried out for better results.

Introduction

The current state of the COVID-19 pandemic has lasted more than a year and has forced people to limit their mobility and social activities. As a result, the order of people's lives, such as economic conditions, also has a negative impact (Pak et al., 2020; Allen et al., 2020), so an effort is then needed which is expected to overcome these problems. The wider community living in densely populated urban areas and other areas, are equally affected by the economy and health. The Indonesian and regional governments have then issued policies in the form of a COVID-19 health protocol so that people's lives can take place again but do not endanger public health (Ministry of Health, 2020; Herdiana, 2020), which includes: maintaining distance between humans when interacting; staying at home more or avoiding high mobility; maintain body hygiene, including regular hand washing; improve immunity and maintain body health, including maintaining

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oral health; and use a mask if you have to leave the house or when needed (Ministry of Health, 2020). We expect the guidelines can be followed by the public to prevent the spread of SARS-COV2.

The SARS-CoV2 virus, as the cause of COVID-19, has mutated several times with virus characteristics that are more infectious, making medical treatment more difficult (Callaway, 2021). It can be seen from the increase in the number of positive COVID-19 cases in Indonesia and several other countries some time ago. The main triggering factor for this increase is said to be due to the uncontrolled movement of people, accompanied by a lack of public awareness of implementing the correct and disciplined health protocols (Sharma et al., 2021). This viral infection becomes more dangerous and hard to treat if it attacks individuals with comorbid diseases, like hypertension and diabetes mellitus, or other comorbidities such as malignancy (cancer). Risk factors for hypertension include high cholesterol in the blood (hypercholesterolemia), while one of the risk factors for malignancy is smoking (Fang et al., 2020; Zhou et al., 2020; Nandy et al., 2020; Huang et al., 2020; Liu et al., 2020; Pathania et al., 2021).

Efforts that can prevent comorbid diseases are to control risk factors, including maintaining blood sugar and cholesterol levels within normal limits, maintaining blood pressure in the normal range, and stopping smoking (Samadian et al., 2016). Good knowledge about the causes, signs, and early symptoms of a disease is also expected to help reduce disease risk factors, reduce the severity of the disease, and help improve quality of life. Sufferers can seek help as soon as they feel these signs and symptoms (Wake, 2020).

In addition to systemic comorbid diseases, oral disease is also a factor that can interfere with a person's quality of life (QoL), including during a pandemic. Oral health is needed to maintain the body's immunity because the mouth serves as the entrance for nutritious food and drinks. Oral health is a reflection of the body's general health, which is influenced by various things related to the body's immunity, including nutritional intake, fluid intake, stress conditions, hormonal balance, the balance of body activities, and viral and fungal infections (Riad et al., 2021). The most common oral mucosal disease is stomatitis, or inflammation of the oral mucosa in the form of ulcerated lesions, painful, and can reduce a person's quality of life (Riad et al., 2021), but research on stomatitis and other oral mucosal diseases has not been found.

The pandemic period allows a person to experience stress, lack of nutritious food intake, and lack of body activity, making it possible to get certain oral mucosal diseases (Riad et al., 2021; Sinadios and Shelswell, 2020; Kitakawa et al., 2020). A study on the community dental and oral health status that had been carried out during the COVID-19 pandemic, using a questionnaire, stated that many people complained about cavities and sore teeth (Balafif et al., 2021), but did not discuss oral mucosal diseases. The results of another study stated that community dental and oral health status was related to the stress conditions experienced related to mobility restrictions during the pandemic (Susanto et al., 2020). Both studies did not assess the QoL of the respondents.

QoL is a human perception of his position in life in terms of culture, behavior, and the value system in which a person lives. QoL is also related to one's expectations, pleasures, and standard of living (Soósová, 2016). A research result states that the QoL of individuals who are active in physical activity is better than those who are more passive (Lesser & Nienhuis, 2020). A person's physical activity can be disrupted, if he is experiencing a specific disease reducing the daily QoL. It becomes worse if the disease lasts a long time/chronic, or recurs. Pain, social and psychological pressure, and helplessness due to an illness, further reduce a person's quality of life. Differences in social and cultural relationships of people according to their domicile are also known to affect differences in QoL (Sitlinger & Zafar, 2019).

Therefore, the study purpose was to measure the level of public knowledge about oral health and disease, prevention of COVID-19 infection and comorbid diseases, as well as QoL related to health problems. This study will compare the conditions in urban communities

(large and densely populated cities) and rural communities. The results of this study could be used for further studies and to improve health education materials in the community, especially related to oral health and disease, prevention of Covid-19 infection, and comorbid diseases that can reduce QoL during this pandemic.

Research Method

This research is a health education intervention research with a pre-test and post-test quasi-experimental design and has been approved by Padjadjaran University with Certificate No. 1828/UN6.1.1/PM/2020. The measuring instrument is an electronic questionnaire (google form) distributed through the WhatsApp network by the Research Team. The research population is the general adult population. The purposive sampling was used to recruit respondents with adult criteria (aged > 18 years), willing to fill out complete electronic pre-test and post-test questionnaires and to take part in counseling provided online in the form of leaflets or e-posters (shared through Whatsapp) and videos (https://www.youtube.com/channel/UCCQBGHqNqldX90UENn7dAbA/videos). The counseling materials were given between the pre-test and post-test times.

The research flow begins with sending pre-test electronic questionnaires to respondents to fill out, then sending health education materials in the form of posters and video links to respondents for the study, and ends with sending post-test electronic questionnaires to respondents to fill out. Details of the contents of the pre and post-test questionnaires consist of demographic data, namely: age, gender, last education level, occupation, and income. In addition, the questionnaire also contains questions regarding matters related to smoking habits and disease history, both at the time of filling out the questionnaire and before, previous hospital treatment experience, and current medication. Table 1 shows the recapitulation of research respondents' self-data when Table 2 shows the recapitulation of data on smoking history, other medical histories, and health-related QoL or HRQoL categories of respondents' quality of life. Tables 1 and 2 show the data recapitulation after dividing the groups based on the respondents' domicile/place of residence, namely urban community groups (living in the cities of Jakarta, Bekasi, and Bandung) and rural (living in districts/cities other than Jakarta, Bekasi, and Bandung). Score calculation per dimension is obtained by calculating the number of times the respondents answered the question with points according to the provisions. The QoL assessment of each individual is also calculated by adding up the points according to each individual answer (total point range 0 – 24/individual). The QoL level is divided into three categories, namely "good" if the total points are between 0-8; "medium" if the total points are between 9-16; and "bad" if the total points are between 17-24.

There are three groups of questions in the questionnaire, which consist of 8 (eight) questions regarding oral health and thrush, 14 (fourteen) questions regarding knowledge related to comorbid diseases, and 5 (five) questions related to preventing COVID-19 infection. Each correct answer gets a score = 10, the wrong answer scores = 0. The total score of all respondents is then divided by the number of respondents to get the average score for each group of questions. The normality of the data distribution was tested using the normality test calculator (https://www.gigacalculator.com/calculators/normality-test-calculator.php). The mean pre-test scores were then compared with the post-test mean scores in the same group of respondents, to evaluate changes in scores after the health education intervention and statistically analyzed using paired t-test. Furthermore, the difference in the mean scores of pre-test and post-test between groups of respondents (urban and rural communities) was analyzed using an unpaired t-test with differences in variance and number of samples.

QoL of respondents was measured using the WHOQOL 2012 questionnaire (https://www.who.int/tools/whoqol) modified more simply, covering six dimensions. Namely: environmental, physical, psychosocial, level of independence, social relations, and spiritual (results as shown in table 5). The scoring system is as follows: answer "never" score = 0; "rarely" score = 1; "sometimes" score = 2; "often" score = 3; and "very often" score = 4.

Results and Discussions

A total of 131 respondents are willing to participate in this study, namely, 76 respondents are domiciled in Jakarta, Bekasi, and Bandung (in this study categorized as urban), while 55 respondents live in other cities/regencies, namely: Bandarlampung, Garut, Tasikmalaya, Subang, and others (in this study called rural). Table 1 shows the data recapitulation of the demographic characteristics of the respondents.

TABLE 1. Demographic Characteristics of Research Respondents

Category		Urban Respondent (n=76)	Rural Respondent (n=55)
Age	Age 18 - <30	62	31
	Age 30 – 39	4	4
	Age 40 – 49	4	8
	Age 50 – 59	4	7
	Age ≥ 60	2	5
Gender	Male	30	16
	Female	46	39
Education	Primary or equal	1	2
	Junior High or equal	2	2
	Senior High or equal	54	22
	Diploma	3	1
	Graduate (S1)	15	26
	Post Graduate/Master (S2)	1	2
Occupancy	University student	42	26
	Entrepreneur	7	9
	Housewife	5	9
	Labour	0	2
	Unemployment/Retirement	2	1
	Private worker	16	6
	Police/Military (TNI)/Civil Servant (ASN)	4	2
Income	Not yet/No Income	44	31
	< Average Minimum Wage (UMR) in residential region	11	2
	Same as UMR in residential region	6	2
	> UMR in residential region	15	20

Note: UMR = average minimum wage.

The sociodemographic characteristics of the respondents (Table 1) show that they are between 18-66 years old, most of whom are 18 to less than 30 years old (81.58% in the urban group, 56.56% in the rural group). The majority of respondents are women (60.52% in the urban group, 70.91% in the rural group), and most of the respondents are not/not yet earning, because they are student respondents. Most of the respondents with high school education (SMA) or students are expected to be able to support the readiness of respondents to maintain dental and oral health, as well as to safely undergo the COVID-19 pandemic. According to Wake (2020), respondents' sociodemographic data can affect the status, maintenance efforts, and level of knowledge related to a person's health to support a good quality of life (Wake, 2020).

The respondent's health characteristics related to smoking habits and disease history

are as an assessment of the quality of life-related to health problems, listed in Table 2.

TABLE 2. Data on Smoking Habit, History of Diseases, and Categories of Quality of Life related to Health Problems (n respondents=131)

Category	n	Urban Respondent (n=76)		Rural Respondent (n=55)	
		%	n	%	
Smoking Habit	No	67	88,16	54	98,18
	Yes	9	11,84	1	1,82
Currently suffering from illness	No	59	77,63	43	78,18
	Yes	17	22,37	12	21,82
Past Medical history	No	48	63,16	33	60
	Yes	28	36,84	22	40
History of hospitalization	No	44	57,89	35	63,64
	Yes	32	42,11	20	36,36
Are taking medication	No	69	90,79	45	81,82
	Yes	7	9,21	10	18,18
Quality of Life Related to Health Problems	Good	69	90,79	48	87,27
	Average	7	9,21	7	12,73
	Poor	0	0	0	0

Source: Primary Data, 2020.

Most respondents have good health conditions as indicated by not smoking (88.16% in the urban group, 98.18% in the rural group), not suffering from certain diseases (77.63% in the urban group, 78.18% in the rural group), have no history of illness or hospitalization, and are not currently taking medication. Respondents who have a smoking habit consume between 4-12 cigarettes/day (urban communities) or 1-4 cigarettes/day (rural communities), while the length of stay in hospital 1-2 times so far, ranging from one day to one month (urban communities), or two days to two weeks (rural communities). Types of diseases that are currently or had, consist of gastritis, asthma, allergies, cough, colds, hypertension, pulmonary tuberculosis, gastroesophageal reflux disease, typhoid, dengue fever, sinusitis, and toothache, but none of them with malignancy. Some of these diseases are chronic or recurrent diseases, which sometimes require regular treatment, and if they are infected, they can reduce a person's quality of life.

Smoking is a bad habit that can affect a person's general and oral health status. Things related to a history of disease and drug consumption are conditions that are expected to affect a person's quality of life. Smoking habits also harm the ability of the lung capacity to function daily as well as increase the risk of developing lung cancer and increase the risk of developing oral cancer. It is related to the characteristics of the COVID-19 virus infection that attacks lung cells and causes shortness of breath, as well as the decline in oral health due to smoking, making it easier for a person to experience a worsening if infected with COVID-19 infection (Kashyap et al., 2020). A person with a smoking habit or a history of disease and consumption of certain drugs needs special attention and needs to be given health education to avoid COVID-19 infection and possible complications.

Table 2 also shows that the majority of respondents have a good QoL, namely 90.79% urban people and 87.27% rural people. A small proportion of respondents have a moderate quality of life, namely 9.21% in urban communities and 12.73% in rural communities, and none of them show poor quality of life (0%). From this data, in general the QoL of urban communities is better than that of rural communities.

Our study is in line with an oral health-related QoL (OHRQoL) study in Kutai Kartanegara, Kalimantan, which states the influence of factors such as individual, social status, household settings, daily habits, and other local factors. This article concludes that the OHRQoL of urban communities is better than that of rural communities (Husain and Tatengkeng, 2017).

A similar study in the USA concluded that rural people, especially the elderly, had lower HRQoL scores than urban people because, generally, the elderly lived apart from their families. It was also stated that black and Hispanic ethnicity showed lower scores than whites (Baernholdt et al., 2012).

Furthermore, table 3 shows the difference in the knowledge between urban and rural community groups regarding oral health and disease, efforts to prevent Covid-19 infection, and comorbid diseases. The results of the pre-test assessment showed a significant difference (t count>1.66; p <0.05) in the level of knowledge of respondents between urban and rural communities. Interestingly, from the results of the post-test assessment, only knowledge related to the prevention of Covid-19 infection had a significant difference between the two groups of people (t count < -1.66), while the answers to questions related to oral health and comorbid diseases were not significantly different (- 1.66<t count<1.66; p<0.05). It can be said that this health education intervention can affect the increasing knowledge of oral health and comorbid diseases in both community groups. But COVID-19 prevention knowledge still requires further intervention, especially in urban groups.

TABLE 3. Differences in Knowledge Levels between Urban and Rural Communities on Oral Health, Prevention of COVID-19 Infection, and Comorbid Diseases

	Knowledges	Pre test			Post test		
		Urban Community Average Score	Rural Community Average Score	t count	Urban Community Average Score	Rural	t count
1.	Oral Health	61,84	65,45	1,81	70,13	70,36	**0,13**
2.	Prevention of COVID-19 Infection	41,32	36,55	4,19	43,68	44,00	-0,22
3.	Comorbid Diseases	97,63	104,91	12,57	115,39	120,18	**1,56**

Note: t table = -1,66 and 1,66; accepted H0: if -1,66 < t count <1,66 (there is no difference in the mean score)

Table 4 shows the differences in the results of the pre-test and post-test in each urban and rural community group. The results of the pre-test showed a significant difference (t count>1.66; p <0.05) between the mean pre-test and post-test scores in the three knowledge groups and in the two groups of people who were respondents. It means that the extension intervention provided can significantly increase public knowledge.

TABLE 4. Differences in Pre and Post-test Knowledge Levels in the Community about Oral Health, Prevention of COVID-19 Infection, and Comorbid Diseases

	Knowledges	Urban Community (n=76)			Rural Community (n=55)		
		Pre-Test Average Score	Post-Test Average Score	t count	Pre-Test Average Score	Post-Test Average Score	t count
1.	Oral Health	61,84	70,13	5,03	65,45	70,36	2,73
2.	Prevention of COVID-19 Infection	41,32	43,68	1,69	36,55	44,00	4,37
3.	Comorbid Diseases	97,63	115,39	5,98	104,91	120,18	4,49

Note: t table = -1,66 and 1,66; accepted H0: if -1,66 < t count <1,66 (there is no difference in the mean score)

Oral health is an integral part of the general health of the human body. Knowledge of oral health maintenance is vital because the mouth is the entry point for nutrition and hydration. It maintains human health. On the other hand, sprue is a disease of the oral cavity. It can reflect general health status. Sprue can also arise if it is triggered by stressful conditions (Riad et al., 2021). In this case the COVID-19 pandemic condition can also be a factor causing stress in a person (Susanto et al., 2020). The public needs to know the truth about sprue, can be experienced by anyone of any age.

Based on the results, both urban and rural communities already have good knowledge of a healthy mouth, proper oral health care, description of sprue, things that cause sprue, and types of food to prevent sprue. This health education intervention can increase knowledge about the definition of sprue and food/drinks for the prevention. What still needs attention is the habit of washing hands before eating and drinking, as an effort to prevent sprue, because most of the respondents did not answer this question correctly. Washing hands habit, in addition to the transmission of COVID-19 infection prevention, can also prevent the occurrence of sprue caused by viral infections (Sinadinos & Shelswell, 2020; Kitakawa D, 2020).

Sprue is an ulcerated lesion of the oral mucosa that causes pain, can interfere with daily oral function activities, and reduce QoL (Noviana et al., 2018). The condition is highly correlated with QoL. Sprue prevention is by maintaining the body's immune and supported by good oral and body hygiene (Riad et al., 2021; Balafif et al., 2021). Thus, necessary to provide counseling materials regarding oral mucosal health and sprue for the community. Especially for vulnerable communities. Namely patients with certain systemic diseases, children and adolescents, pregnant women and productive women, and the elderly.

The next level of knowledge measurement is about preventing COVID-19 infection using a questionnaire including five questions related to the prevention of transmission, which is from other people transmitted or transmitting to others. Three things resulted from the respondent, before being counseled, having a good level of knowledge, namely in terms of preventing transmission when outside the home, after touching objects in public places, and about the transmitting or spread of the virus. After the counseling, the respondents' post-test results on these three things showed an increase. However, there are also two other things that indicate that respondents do not have good knowledge even after being given counseling, namely related to the equipment that must be worn to prevent transmission in public places and what to do when you return home after traveling. Based on these results, this study recommends strengthening counseling materials. Regarding personal protection that a person must wear to prevent transmission in public places and activities carried out if someone has returned home after traveling during this pandemic, related to efforts of COVID-19 infection prevention.

The results are supported by data in Indonesia that there has been an increase in transmission originating from public places, such as office clusters, worship clusters, social gathering clusters, and others. Most of the respondents in this study knew that the mode of transmission of the SARS-CoV2 virus was through droplets of saliva, coughing, or nasal secretions, knowing what to do outside the home, such as maintaining a safe distance of interaction and the need for adequate ventilation. Likewise, it is imperative to wash your hands frequently, especially after touching items in markets/shops/other public places. However, if you do not understand the completeness of personal protection that must be worn, such as masks, glasses, and face shields, you will still have the risk of contracting or transmitting infections. The occurrence of transmission in household clusters is also thought to be related to the low level of public knowledge about things to do after returning home from traveling during this pandemic. Each family member should be able to carry out the routine of bathing, brushing teeth, and washing hair every time they arrive home from traveling. If these things are not solved, then there is a possibility that the family member can infect other family members in their home.

Various communication methods by the government, like providing information on

health protocols related to COVID-19 infection prevention in the community, whether through television broadcasts, internet-based social media, and direct counseling in the community. So that the community can obey (Kemenkes, 2020). The obstacle often found to change health behavior is the low awareness of the community itself. Public awareness, could be improved by increasing knowledge through regular counseling. Periodic counseling is an effort to provide repeated exposures that can build and strengthen one's knowledge and change his behavior toward a healthier life (Ngigi & Busolo, 2018).

Knowledge about comorbid diseases also needs to be given to the larger community because it is related to the severity of the COVID-19 infection. The respondent's knowledge about this comorbid disease includes the definition, prevention efforts, recognition of signs and symptoms, and long-term effects, whether on hypertension, diabetes mellitus, and malignancy. This study also explored the respondents' knowledge about herbal remedies to reduce the symptoms of these diseases. Nowadays, the use of herbal medicines in the community increased, which should be accompanied by evidence-based medicine. Herbal medicines are said to have insignificant side effects, and according to traditional culture preparation of some is relatively easy, just by boiling. However, the use of herbal medicines must still meet the rules. To prevent unexpected things. Habits in traditional Indonesian society, namely consuming herbal ingredients/herbs, can also help reduce the risk of the disease. Various herbal medicines have been studied and have efficacy in reducing the symptoms of comorbid diseases, such as helping to reduce headaches due to hypertension (Chrysant & Chrysant, 2017) and helping to lower blood sugar levels (Trojan-Rodrigues, 2012).

Comorbidity can be prevented from occurring or worse. One of which is by recognizing the originator or recognizing the signs and symptoms of the disease. If someone knows the originator of a disease, they will at least try to avoid it (Samadian et al., 2016). Knowledge of the signs and symptoms also needs to be known or used as material for public health education. Because by knowing the signs and symptoms early on, the community can immediately find a solution for its management which is expected to reduce the severity of the disease and increase a person's QoL (Ministry of Health, 2020). The results of this study indicate that knowledge about the signs and symptoms of cancer still needs to be strengthened in future counseling. Furthermore, Table 5 presents data on the health-related quality of life assessment (HRQoL) of respondents.

TABLE 5. Assessment of the Dimensions of Research Respondents Quality of Life Related to Health Problems That Most Affected

Dimensions of Quality of Life Related to Health Problems	Total Score per Dimension	
	Urban Community (n=76)	Rural Community (n=55)
1. Physical Dimension	68	45
2. Psychosocial Dimension	57	40
3. Environment Dimension	43	23
4. Independence Level Dimension	40	24
5. Social Relation Dimension	27	26
6. Spiritual Dimension	22	19

Source: Primary Data, 2020

Table 5 shows an overview of the QoL dimension assessment. Most of the respondents stated that they had never experienced difficulties, worries, and disturbances related to their health problems, it is in line with the respondents' medical history and medication data. Based on the assessment of the total score per dimension, the physical dimension (feeling sick/painful) and the psychosocial dimension (feeling worried) are the ones that have the most impact on the QoL of the two groups of respondents. The next order of dimensions affected in urban communities is the environmental dimension (difficulty

moving), the level of independence (feeling disturbed to the point of stopping activities), social relations (feeling shy/irritable), and the spiritual dimension (feeling surrendered and helpless). In contrast to rural communities, after the physical and psychosocial dimensions, the next affected dimensions are the dimensions of social relations, the level of independence, the environment, and finally the spiritual dimension.

Several studies on HRQoL during the pandemic have also been reported. Research on adult respondents in China during this pandemic stated that 65% of respondents showed good QoL. Efforts to increase the percentage of QoL like through changes in diet in 23% of respondents, and 30% of respondents stated that they consumed more fruit, vegetables, and milk during the isolation/quarantine period than before. 75.2% of respondents said they had felicitous sleep quality. Efforts to improve diet and sleep quality have been shown to increase QoL (Wang et al., 2020).

A study during the pandemic in Spain that used an online questionnaire stated that 39.7% of respondents had poor QoL, 44.7% of respondents did not do physical activity during the isolation/quarantine period, while 21.8% of respondents stated that they consumed food because of stress (emotional). eater) and 11% of respondents consumed food because they were very stressed (very emotional eaters), and 38.8% of respondents experienced weight gain, but 31.1% experienced weight loss (López-Moreno et al., 2020). Another study, using a survey based on Facebook social media, also stated that during this pandemic a total of 22% of respondents experienced weight gain during the isolation period at home/quarantine. It was triggered by stress or the habit of consuming snacks after dinner, sleeping irregularly, and decreased physical activity (Zachary et al., 2020). Things considered the weight gain related to stressful conditions need to be considered in subsequent health education materials because they are also related and are risk factors for canker sores and comorbid diseases in COVID-19 infection.

Conclusions

Research and counseling on oral health knowledge, quality of life, and comorbid diseases during the pandemic have been carried out in urban and rural communities. The intervention using health education showed a significant increase in the knowledge of urban and rural communities about oral diseases, health protocols during the COVID-19 pandemic, and comorbid. In general, the HRQoL scores of the two community groups showed good conditions, but the urban community is better than the rural. From the results of this study, it can be suggested that similar programs should be sustainable so that the government's goal of stopping the pandemic can be successful, taking into account the general characteristics of the community according to where they live. Several things related to health education materials also still need to be repeated and strengthened. So that they affect on improving public health.

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Impact of COVID-19 Outbreak on Women Quality of Life in Indonesia

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Abstract

The COVID-19 outbreak and its designated policy conveyed unprecedented impacts on the life of women. This study aims to assess women's quality of life (QOL) during the pandemic. This cross-sectional study was conducted in Java and Sulawesi, as both sites implemented the large-scale social restriction policy. The Indonesian version of the WHO Quality of Life Instrument, Short Form (WHOQOL-BREF) was used to collect the QOL data. The whole questionnaire was self-administered online by 191 women using Google Form. Descriptive analysis and Mann-Whitney test were carried out to analyze the data in statistical software. Overall, women who were involved in this study conveyed a relatively moderate quality of life and overall health (4.08 + 0.76 SD and 4.07 + 0.78, respectively). The highest and lowest mean scores of QOL were observed in the social relationship (78.3 + 17.05 SD) and physical health domain (60.8 + 10.76SD). Family monthly income and type of family were significantly associated with environmental health ($p<0.05$). Astoundingly, during the outbreak women described high satisfaction in social relationships. These results may advocate policy in regards to women's welfare.

Introduction

Since the start of the COVID-19 outbreak, World Health Organization (WHO) has reported 110.7 million cumulative cases and more than 2.4 million deaths globally as of early 2021 (World Health Organization, 2020). Indonesia has noted more than 1.3 million confirmed cases and 35 thousand deaths nationwide. The data distribution shows that the cases are slightly higher among women than men (50.7% and 49.3%, respectively). Among Indonesia's government efforts to control the transmission of the virus is the implementation of a large-scale social restriction policy by limiting any form of social activity (Tosepu et al., 2020). However, the application of the policy gives inevitable impacts, especially on the lives of women. The 2020 national online survey undertaken by National Commission on Violence Against Women revealed the effects of the outbreak on women's life. Among them is the increase in domestic burden, stress, and domestic violence (Qibtiyah et al., 2020). SMERU Research Institute reported that COVID-19 has lowered women's labor force involvement since it hits informal sector jobs that mainly engage female workers (Rahman et al., 2020). Subsequently, there is a decrease in family income. Those effects encountered by women may affect their quality of life, and may lead to more serious consequences like low self-esteem, child neglect, and even suicide (Park et al., 2002; Savolainen et al., 2014).

WHO defines the individual quality of life through four domains measure, namely physical, psychological, environmental, and social relationships. The composite of the four domains will present the overall quality of life. The tool widely used for assessing the quality of life is the WHO Quality of Life, Short Form

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(WHOQOL-Bref) questionnaire, available in the Indonesian language version (World Health Organization, 2004). Quality of life assessment has been extensively investigated, however, most studies focus on physically or physiologically impaired persons only, like patients with cataracts, HIV infection, and diabetes mellitus (Gholami et al., 2016; Lin et al., 2017; Meemon et al., 2016). Because of the paucity of the studies investigating the women's quality of life and the relevance of nowadays circumstances of the COVID-19, the current study is undertaken. This study aims to measure the quality of life of women during COVID-19 outbreak using WHOQOL-Bref Instrument, the Indonesian version. The result of the current study may provide a holistic consideration of the problem faced by the women and advocate policies regarding women's welfare.

Method

This cross-sectional study conducted data collection between July and August 2020 in Java and Sulawesi. The sites were purposively selected since both islands applied large-scale social restriction policies. The study received Ethical Approval from the Health Ethics Research Committee of Universitas Pembangunan Nasional Veteran Jakarta Number 2617/VI/2020/KEPK. The participants were married women aged 19-49 years old who owned a smartphone with an internet connection. Women who were originally from outside Java and Sulawesi were excluded. The data collection was conducted online by broadcasting a link to the Google Form questionnaire via Whatsapp, Instagram, and Facebook. A total of 191 women filled out the questionnaire and written informed consent was obtained before the data collection.

The questionnaire consisted of two sections. They were demographic characteristics (age, place of residence, type of family, working status, educational attainment, and monthly family income) and the WHOQOL-Bref questionnaire. Demographic characteristics were considered as an independent variable, while the WHOQOL-Bref questionnaire was considered as the dependent variable. The participants' age was represented by two categories: younger than and equal to 30 years old and older than 30 years old. Place of residence classified as urban and rural, based on Indonesia Statistics categorization. Type of family categorized as nuclear and extended family. Family monthly income was grouped as more than or equal to 5 million IDR and less than 5 million IDR. Educational attainment was classified as less than senior high school and higher education graduates. Working status was grouped as working and not working. The WHOQOL-Bref Questionnaire consisted of 26 questions in Indonesia Language, with the details as follows: two separate questions asking about the overall quality of life and general health, seven items on physical health (domain 1), six items on psychological health (domain 2), three items on the social relationship (domain 3), and eight items on environmental health (domain 4) (World Health Organization, 2004).

The data were analyzed using a statistical software. The descriptive analysis presented the frequencies and the percentages of the participants characteristics, the QOL mean score, and standard deviations (SD) of each WHOQOL domain. Mean scores from each domain were derived from the transformed score within the 0 to 100 range. The reliability of the WHOQOL-BREF questionnaire was examined using Cronbach's alpha, r score of 0.7 and over was deemed adequate internal consistency. For checking data normality, Kolmogorov-Smirnov test was performed. The Mann-Whitney test was used to examine the association between women's quality of life and their characteristics ($p < 0.05$).

Result and Discussion

A total of 191 women self-administered the online questionnaire in this study. The characteristics of the study participants are shown in Table 1. The age of the participants differed slightly, with more women younger than 30 years old. Most of the women lived in the urban areas with the nuclear family and earned a family income of more than 5 million IDR per month. Most of the women were higher education graduates and currently working.

TABLE 1. Characteristics of Study Participants

Characteristics	n	%
Age (years)		
≤ 30	98	51.3
> 30	93	48.7
Place of residence		
Urban	161	84.3
Rural	30	15.7
Type of family		
Nuclear	126	66.0
Extended	65	34.0
Income (IDR/month)		
> 5 million	105	55.0
< 5 million	86	45.0
Education attainment		
Higher education	163	85.3
Less than high school	28	14.7
Working status		
Working	140	26.7
Not working	51	73.3

Source: Primary Data, 2020

Cronbach's alpha coefficient of the WHOQOL-BREF was 0.898. It indicates an adequate internal consistency. Table 2 presents the mean score and standard deviation (SD) for each domain. The overall quality of life and health were moderately high (4.08 and 4.07, respectively). The highest and lowest mean score was noticed in the social relationship domain (78.31) and physical health domain (60.84), respectively. The three domains (psychological health, social relationship, and environmental health) were observed to have a mean score above 70. It denotes a good quality of life in the related facet, while the physical health domain indicated a fair quality of life.

TABLE 2. Mean Scores of Each QOL Domain

Items	Mean	SD
Overall QOL	4.08	0.76
Overall health	4.07	0.78
Physical health (DOM 1)	60.84	10.76
Psychological health (DOM 2)	75.54	12.33
Social relationship (DOM 3)	78.31	17.05
Environmental health (DOM 4)	77.19	14.45

Source: Primary Data, 2020

Table 3 shows the mean rank score of the four domains WHOQOL-BREF according to the independent variable (age, place of residence, type of family, income, educational attainment, and working status) using the Mann-Whitney test. Since the data were not normally distributed based on the normality test using Kolmogorov-Smirnov ($p<0.05$). The mean rank indicating satisfaction in all domains was higher among women aged younger than 30 years. Higher satisfaction in all domains, was also observed in women who lived in a nuclear family, work, and earned more than 5 million IDR per month than those who lived in an extended family, not work, and earned less than 5 million IDR per month. A significant difference in perceiving environmental health (domain 4) was noticed between the place of residence, type of family, and family income ($p<0.05$). Women whose families earned more than 5 million IDR per month reported higher satisfaction with social relationships ($p<0.05$), while those who achieved lower education described higher satisfaction with physical health ($p<0.05$).

TABLE 3. Comparison of the Mean Rank Scores in Four Domains According to Independent Variables

	DOM 1	DOM 2	DOM 3	DOM 4
Age (years)				
≤ 30	100.30	98.44	100.40	101.61
> 30	91.47	93.42	91.36	90.09
p-value	0.26	0.52	0.24	0.14
Place of residence				
Urban	94.41	97.38	99.20	99.61
Rural	104.55	88.58	78.83	76.63
p-value	0.35	0.41	0.05	0.03
Type of family				
Nuclear	98.89	98.52	99.01	104.52
Extended	90.27	91.00	90.03	79.09
p-value	0.30	0.37	0.27	0.00
Income (IDR/month)				
≥ 5 million	99.71	100.18	104.37	109.41
< 5 million	91.47	90.90	85.78	79.63
p-value	0.30	0.24	0.01	<0.001
Education attainment				
Higher education	92.35	93.85	97.28	98.02
Less than high school	117.25	108.52	88.54	84.21
p-value	0.02	0.19	0.42	0.22
Occupation				
Working	96.24	98.83	99.22	99.56
Not working	95.34	88.25	87.16	86.24
p-value	0.92	0.23	0.17	0.13

Source: Primary Data, 2020

This study aimed to investigate the quality of life of women during the COVID-19 outbreak. WHO defines the quality of life as "an individual's perception of their position in life in the context of the culture and value systems in which they live and to their goals, expectations, standards and concerns" (World Health Organization, 2012). The study was conducted after three months of social restriction policy was implemented in Java and Sulawesi. Furthermore, the outbreak still occurs and even gets its peak in July-August 2021 on Java. Many studies have investigated the psychological measure during the COVID-19 outbreak, however, to the best of our knowledge, only this study specifically examined the QOL among women in Indonesia. This study investigated the association between the outbreak and large-scale social restriction on the various facets of women QOL. The Indonesian government implemented social restrictions in March-July 2020 to control coronavirus infections. However, the application of this policy gave uncertainty and changed female daily lives (Rahman et al., 2020). Therefore, it is pivotal to identify the female quality of life during the COVID-19 incident. In our research, the quality of life measurement generated good internal consistency (Cronbach's alpha = 0.898). Nearly the same in the QOL study from the Kingdom of Saudi Arabia which also showed good internal consistency (Cronbach's alpha = 0.81) (Algahtani et al., 2021) as well as in several different settings (Al-Shannaq et al., 2021; Dule et al., 2021). It shows how closely related a set of facets incorporated within domains constructed whole QOL instruments.

The findings of this study suggested that the social relationship domain has the highest mean score (78.31+17.05). Other studies conducted in the Indonesian, Italian and Chinese general population revealed inverse results with lower mean scores in the social relationship domain (63.13; 13.57 and 69) (Epifanio et al., 2021; Purba et al., 2018; Wang et al., 2020). The facets incorporated within the social relationship domain are personal relationships, social support, and

sexual activity, which may be impaired during the pandemic. However, it may also reveal that the home activity results personal relationship between the family members and give each other support like never before. However, the pandemic may change couples' sexual relationships: confinement, sexual activity difficulties, loss of work, economic problems, and future uncertainty can trigger the break of many couples (Ibarra et al., 2020). In contrast, the physical health domain has the lowest mean score (60.84 + 10.76). The facets within this domain are daily living activities, medical aids dependency, fatigue, mobility, discomfort, resting and work capacity. The possible explanation for this finding is that during the pandemic, the dependence on medical aids was high, moreover, the working culture shifted which may cause fatigue and discomfort. In addition, a systematic review reported that social isolation harms physical health (Leigh-Hunt et al., 2017). In line with this study, physical health domains also have the lowest score in studies conducted in China (Wang et al., 2020). However, it was different from the research conducted in Italy, where physical health has the highest average score, although the score in this study was much higher (Epifanio et al., 2021).

The result also showed the environmental health domain has good quality. We found the average score in this domain was higher than in other studies, even before the outbreak (Epifanio et al., 2021; Purba et al., 2018; Wang et al., 2020; Wong et al., 2018). It was possible because most of the respondents lived in urban areas when the research was conducted, and most of them were in locations of social restrictions. It may affect low levels of pollution and noise. Moreover, respondents in rural areas are supported by green environments and open spaces. Which condition may lead to quality of life in the environmental health domain (Lercher, 2003; Wong et al., 2018). A study conducted by Saha and Khan (2020), found that the majority of the respondents stated that staying at home is one of the best prevention techniques to avoid COVID-19. Most of the respondents were come from the urban area, had a university background, and had more information about COVID-19. Therefore they preferred to stay at home during the COVID-19 lockdown (Saha & Khan, 2020). Urban people with higher education levels have a higher chance getting updated information about COVID-19. It helps them gather information and prepare for prevention strategies at home during the lockdown. Women are aged <30 years had better QoL and vice versa. According to Correa-Velez et al. (2019), women with older age have a negative correlation with the physical and psychological domains, although other studies stated that after the age of 59, there is no decrease in the psychological domain (Correa-Velez et al., 2020; Gudkov et al., 2019). Women who live with families and have a good economy (work and earn more) have more QoL than the opposite category. As previously explained, this variable was closed to the good quality of the social relationship domain, and as we know, those domain has a positive relationship with other domains (Epifanio et al., 2021; Wong et al., 2018).

Among quality of life influencing factors suggested by Hilari et al. in 2015 are health, participation, independence, personal factors, environmental factors, and communication (Hilari et al., 2015). While European statistics explained nine dimensions of quality of life, encompassing living conditions, productivity, health, education, leisure, economic, basic rights, living environment, and life experience (Eurostat Statistics Explained, 2019). From the two theories mentioned earlier, three determinants are relevant in the era of the COVID-19 pandemic. They are health, social interaction, and economics. Health is a pivotal determinant of individual quality of life and is also considered human capital. WHO mentioned that it is built by three different spectrums such as physical, social, and mental well-being. During the pandemic, the three spectrums may be impaired by various factors and cause women to compromise their quality of life. Social interaction is a form of communication that plays a vital role on human lives as it directly influences life satisfaction. However, there are constraints on conducting social interaction during the pandemic that causes its quantity and quality to be decreased and shift to online interaction. Economic factors determine the women's quality of life. During the pandemic,

the family income decreased caused of limited activities to earn money or, worse, losing a job. However, life must go with short of resources. It also affects women's quality of life.

There are several limitations to this study. First, the online self-administer for data collection may lead to under or over-estimation of quality of life. Second is the possibility of uncontrollable confounders by characteristics or other factors. This study may imply the information regarding QOL in women during the pandemic and advocate the policy related to women's empowerment. The study showed that the pandemic period did not significantly affect women's QOL, where the mean score was moderate. However, in formulating policies, it can take into account the area of residence, income level, and type of family. In addition, this study can be used as a reference in developing an online method to measure women's QOL.

Conclusion

The reliability analysis in this study showed an adequate degree of internal consistency of WHOQOL-BREF to measure QOL among women of reproductive age. Astonishingly, during quarantine, women reported high satisfaction with social relationships. Overall, women who participated in this study reported a relatively moderate quality of life. In contrast, low satisfaction with physical health was reported by the women. Higher quality of life was observed among younger women who live in a nuclear family. A prompt intervention was expected to intervene in women's quality of life by considering their characteristics. Since women carry high responsibilities toward their children, families, households, and even themselves, it is pivotal to ensure that they live their life to the best.

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Study of Differences in COVID-19 Vaccine Responses in Developed and Developing Countries

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Abstract

SARS-CoV-2 can spread rapidly and has been shown to cause a wide spectrum of severity. Vaccines exist as a preventive effort to control the transmission of COVID-19 by forming herd immunity. The presence of the COVID-19 vaccine has caused many responses in the community, both positive and negative responses. The article aim to compare risk factors affecting people's intentions as respond to the COVID-19 vaccine in developed and developing countries. The research was carried out in January 2021 and used the literature review method by collecting and concluding data from previous research. The search for previous research articles was carried out on the Scopus, Science Direct, Clinical Key, and SpringerLink portals with keywords in the form of COVID-19, Vaccine, Acceptance, Intention, and Hesitancy. This narrative review uses 29 articles that meet the inclusion and exclusion criteria. The intention was the lowest positive response (49.64%), and a fairly high form of doubt (71.20%) was found to be a negative response. Respondents who have high confidence in the country's health system are at 3.05 times greater risk of having the intention to use the COVID-19 vaccine in developed countries (OR = 3.05; 1.13-4.92). Respondents over 65 years of age were at 3.65 times greater risk of having the intention to receive the COVID-19 vaccine in developing countries (OR = 3.65; 2.57-5.17). The COVID-19 vaccine creates positive and negative responses in the community. The intention is the lowest positive response influenced by trust in the country's health system (developing countries) and age (developed countries).

Introduction

SARS-CoV-2 is a new coronavirus first reported in Wuhan, China in December 2019. The virus causes Coronavirus disease 2019 (COVID-19) with symptoms of severe pneumonia (Guan et al., 2020). The SARS-CoV-2 genome includes 29,903 nucleotides with 12 Open Reading Frames (ORF) (Shahhosseini et al., 2021). The virus spreads rapidly and has been shown to cause a broad spectrum of severity (Agustin et al., 2021). Some COVID-19 patients do not experience symptoms such as fever or radiological abnormalities, so they require preventive measures to control COVID-19 transmission (Guan et al., 2020). Therefore, social distancing is one of the measures to prevent the spread of COVID-19, but its implementation in the community has not been optimal (Nugroho et al., 2021).

Vaccines are one of the efforts to overcome the COVID-19 outbreak by establishing herd immunity. The COVID-19 vaccine has become a global public good that can be accessed by all people in developed and developing countries so that Health For All is achieved (Abila et al., 2020). The COVID-19 vaccination campaign and implementation are more effective when there is transparency and clear communication on the part of government officials about the schedule, priorities of different groups, vaccine product choices, and administration schedule design. Furthermore, preparing the proper transportation to distribute it because it requires a specific temperature in packaging. COVID-19 vaccine. A monitoring and evaluation system is needed to monitor the vaccination program

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and to ensure that the community continues to implement the health protocols recommended by WHO (Abila et al., 2020).

There are many public responses to the COVID-19 vaccine, such as disagreements, doubts or refusal to vaccinate can threaten progress in tackling vaccine-preventable diseases. According to WHO, ten threats to global health, one of which is the acceptance of the COVID-19 vaccine in the community. The world is now facing this threat, and the doubt refers to people's thinking to accept or reject vaccines even though vaccination services are available (Gagneux-Brunon et al., 2021).

Factors affecting the level of vaccine acceptance include sociodemographic characteristics such as gender, race, ethnicity, education, income, employment status, and place of residence. Political affiliation and perceptions of the COVID-19 threat may also influence acceptance of the COVID-19 vaccine. Various other factors that are considered to have the same influence include distrust of health care for minorities, problems related to costs, and low levels of awareness (Khubchandani et al., 2021). Based on these facts, this study was conducted to compare the risk factors affecting people's intentions as a positive response to the COVID-19 vaccine in developed and developing countries.

Method

This research is a narrative review using the literature review method by collecting and concluding data from previous research. It took time in January 2021. The search for previous research articles was carried out on the Scopus, Science Direct, Clinical Key, and SpringerLink portals with keywords such as COVID-19, Vaccine, Acceptance, Intention, and Hesitancy.

TABLE 1. Inclusion and Exclusion Criteria of Previous Research Articles

Inclusion Criteria	-	Research article on factors related to public response to the presence of vaccines and vaccines for COVID-19
	-	Can be accessed on indexed international journal portals
	-	Published in 2016-2021
	-	Original article
Exclusion Criteria	-	Only accessible in an abstracts and proceedings

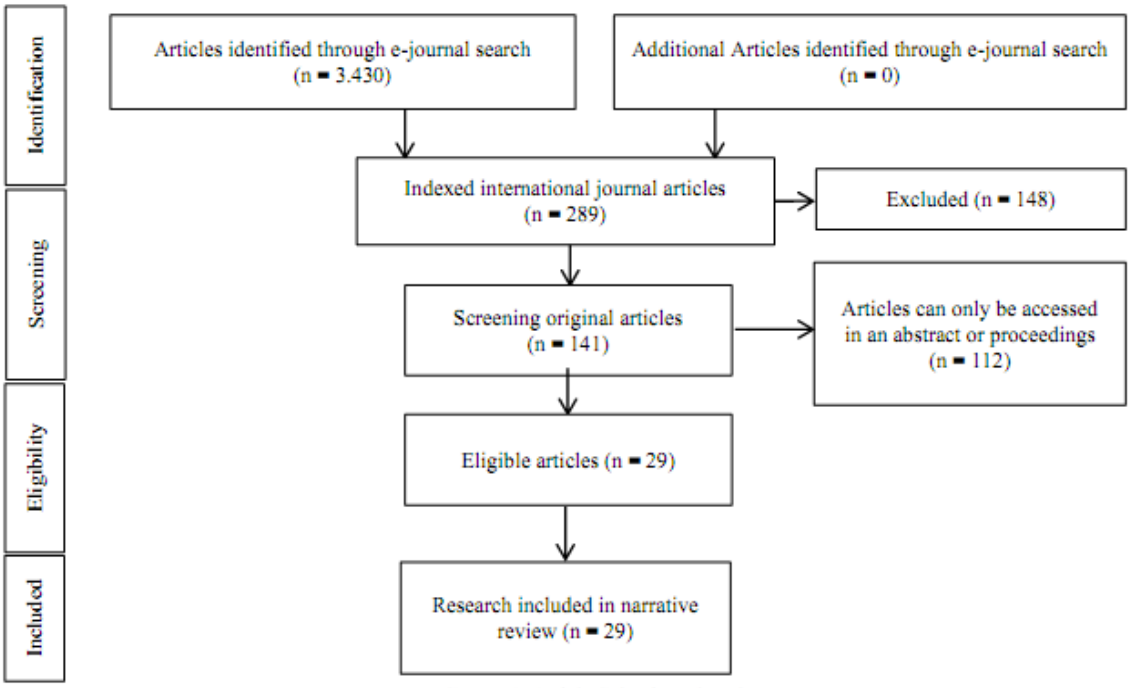

FIGURE 1. Article Selection Flowchart

The evaluation of the articles referred to the inclusion and exclusion criteria of the previous articles. Of the 3,430 articles found, 289 articles discussed factors related to the public's response to the presence of COVID-19 vaccines and vaccines published in 2016-2021. A total of 141 original articles can be accessed on indexed international journal portals. Of those 141 articles, 112 can only in abstract form. Then 29 articles met the inclusion and exclusion criteria and were used in writing this narrative review. They consist of eight on the Scopus journal portal, eight on the Science Direct journal portal, six on the Clinical Key journal portal, and seven on the SpringerLink journal portal.

Result and Discussion

TABLE 2. Distribution of Community Responses to the COVID-19 Vaccine

Sample	Sample Total	Responses	Frequency (%)	Reference
Medical Workers	2,047	Intention	76.90	Gagneux-Brunon *et al.*, 2021
Hospital Employees	12,034	Intention	63.70	Kuter *et al.*, 2021
Nurses	1,205	Intention	63.00	Kwok *et al.*, 2021 and vaccination could be a viable future option. However, vaccine hesitancy remains a global challenge. Nurses, as a trustworthy and creditable source of vaccine-related information, may build public confidence in vaccination. Hence, research on vaccine hesitancy among nurses is warranted. Objectives: This study estimated nurses' influenza vaccination behaviors and intention to receive COVID-19 vaccine when available, and examined their corresponding 5C psychological antecedents (confidence, complacency, constraints, calculation, and collective responsibility
Students	2,267	Hesitation	59.90	Caserotti *et al.*, 2021
Parents	2,557	Intention	43.00	Goldman *et al.*, 2020
Health Officer and General Public	1,941	Intention	59.00	Dror *et al.*, 2020

(Sources: Literature review based on the references listed in the last column in the table)

The COVID-19 vaccine caused positive and negative responses from various levels of society in the form of intentions and hesitation to receive the COVID-19 vaccine. The highest intention (76.9%) came from hospital medical personnel. A group of students (59.9%) expressed a fairly high hesitation level (TABLE 2).

TABLE 3. Distribution of General Public Response to the COVID-19 Vaccine in Several Countries

Responses	Frequency		Sample Total	Country	Reference
	n	(%)			
Intention	205	40.97	501	United States	Olagoke, Olagoke and Hughes, 2020
	171	29.00	589	Nigeria	Reuben *et al.*, 2020
	1,163	59.00	1,972	Italy	Palamenghi *et al.*, 2020which decreased between phase 1 and phase 2 of the Italian pandemic. According to the results of our study, the proportion of citizens that seem to be intentioned to get the Covid-19 vaccine is probably too small to effectively stop the spreading of the disease. This requires to foster a climate of respectful mutual trust between science and society, where scientific knowledge is not only preached but also cultivated and sustained thanks to the emphatic understanding of citizens worries, needs of reassurance and health expectations.”,”author”:[{“dropping-particle”:””,”family”:”Palamenghi”,”given”:”Lorenzo”,”non-dropping-particle”:””,”parse-names”:false,”suffix”:””},{“dropping-particle”:””,”family”:”Barello”,”given”:”Serena”,”non-dropping-particle”:””,”parse-names”:false,”suffix”:””},{“dropping-particle”:””,”family”:”Boccia”,”given”:”Stefania”,”non-dropping-particle”:””,”parse-names”:false,”suffix”:””},{“dropping-particle”:””,”family”:”Graffigna”,”given”:”Guendalina”,”non-dropping-particle”:””,”parse-names”:false,”suffix”:””}],”container-title”:”European Journal of Epidemiology”,”id”:”ITEM-1”,”issue”:”8”,”issued”:{“date-parts”:[[“2020”]]},”page”:”785-788”,”publisher”:”Springer Netherlands”,”title”:”Mistrust in biomedical research and vaccine hesitancy: the forefront challenge in the battle against COVID-19 in Italy”,”type”:”article-journal”,”volume”:”35”},”uris”:[“http://www.mendeley.com/documents/?uuid=542c5169-db74-41ba-a494-19ef6b06d360”]}],”mendeley”:{“formattedCitation”:”(Palamenghi et al., 2020
	350	66.70	525	United States	Mercadante and Law, 2021
	677	65.00	1,041	Ireland	Murphy *et al.*, 2021
	1,397	69.00	2,025	English	
	642	64.70	992	Arab Saudi	Al-Mohaithef and Padhi, 2020
	1,016	28.70	3,541	China	Lin *et al.*, 2020
	242	30.70	788	United States	Guidry *et al.*, 2021
	579	57.70	1,004	Yunani	Kourlaba *et al.*, 2021
Total	**6,442**	**49.64**	**12,978**		
Confidence	1,465	78.00	1,878	United States	Khubchandani *et al.*, 2021
Total	**1,465**	**78.00**	**1,878**		
Trust	350	59.10	592	United States	Latkin *et al.*, 2021
Total	**350**	**59.10**	**592**		
Acceptance	450	67.00	672	United States	Malik *et al.*, 2020
	446	37.20	1,200	Hong	Wong *et al.*, 2021
	1,136	80.00	1,420	Kong	Seale *et al.*, 2020
Total	**2,032**	**61.72**	**3,292**	Australia	
Hesitation	1,383	71.20	1,942	Prances	Schwarzinger *et al.*, 2021
Total	**1,383**	**71.20**	**1,942**		

(Sources: Literature review based on the references listed in the last column in the table)

Table 3 shows that the general public has varying positive responses to the COVID-19 vaccine, including intention, belief, trust, and acceptance to access the COVID-19 vaccine. Intention to be the lowest positive response (49.64%) compared to other positive, and it cannot be denied that negative responses were also found in the form of quite high doubts (71.20%).

TABLE 4. Factors Related to Community Intention to Receive the COVID-19 Vaccine

Research Place	Risk Factors	OR (CI=95%)	Reference
Developing Country	Trust in Health System	3,05 (1,13-4,92)	Al-Mohaithef & Padhi, 2020; Lin et al., 2020
	Exposure Risk	2,13 (1,35-3,85)	
	Health Condition	1.74 (1.44-2.09)	
	Fear	1.46 (1.14-1.87)	
	Gender	1,12 (0,97-1,30)	
Developed Country	Age > 65 Years	3,65 (2,57-5,17)	Kourlaba *et al.*, 2021
	Vulnerable Group	2,34 (1,78-3,09)	
	Marital Status	1,36 (1,02-1,81)	
	Child Ownership	0,69 (0,53-0,91)	
	Employment Status	0,51 (0,39-0,65)	

(Sources: Literature review based on the references listed in the last column in the table)

The intention is a vital thing for someone to act. Based on table 4, the risk factors related to people's intentions to receive the COVID-19 vaccine in developing and developed countries include demographic characteristics (gender, age, marital status, child ownership, and employment status), trust in the health system, risk exposure, and vulnerable groups. Trust in the health system is a high risk factor for the formation of people's intentions to receive the COVID-19 vaccine in developing countries. Respondents who have high confidence in the country's health system have a 3.05 times greater risk of having the intention to use the COVID-19 vaccine (OR=3.05; 1.13-4.92). Age over 65 years is the primary risk factor for the formation of people's intentions to receive the COVID-19 vaccine in developed countries. Respondents who are more than 65 years old have a 3.65 times greater risk of having the intention to receive the COVID-19 vaccine (OR=3.65; 2.57-5.17).

Gender influences people's perceptions of receiving vaccines. Research in Saudi Arabia proves a relationship between gender and intention to take the COVID-19 vaccine. As many as 64.7% of respondents have the intention of receiving the COVID-19 vaccine, and 62.33% are women (Al-Mohaithef and Padhi, 2020). The same pattern occurs in Greece 55.1% of respondents who have a positive response to receiving the COVID-19 vaccine are women (Kourlaba et al., 2021). Female respondents have a 1.12 times greater risk of having the intention to receive the COVID-19 vaccine compared to those who are male (OR=1.12; 0.97 – 1.30) (Lin et al., 2020). Women were more likely to avoid risky behavior and practice preventive behaviors such as influenza vaccination and wearing masks to prevent COVID-19 infection (Khubchandani et al., 2021).

Marital status is a person's status to find whether someone is married or not. Marital status was an important factor influencing the acceptance of the COVID-19 vaccine. Research in the United States shows that most married respondents (77%) prefer to receive the COVID-19 vaccine than those who are not (Khubchandani et al., 2021). Its result was in line with (Al-Mohaithef and Padhi, 2020) research in Saudi Arabia. Married respondents (69.34%) intend to receive the COVID-19 vaccine if the vaccine is available. Married respondents had a 1.36 times greater risk of having the intention to receive the COVID-19 vaccine compared to those who were not married (OR=1.36; 1.02 – 2.67) (Kourlaba et al., 2021). Marital status was an important factor that affects the acceptance or rejection of the COVID-19 vaccine, especially if the household already has children (Khubchandani et al., 2021).

An interesting finding in the United States

is that most respondents (25%) were hesitant to receive the COVID-19 vaccine (Khubchandani et al., 2021). That result was in line with a study in Greece, which stated that respondents who had children (60.6%) chose not to receive the COVID-19 vaccine compared to those who had children (51.6%). Respondents who have children have a 0.69 times greater risk of having the intention to receive the COVID-19 vaccine compared to those who do not have children (OR=0.69; 0.53–0.91) (Kourlaba et al., 2021). Ownership of children was important in receiving the COVID-19 vaccination, where there was research stating that having children was a negative predictor for respondents to receive the COVID-19 vaccine (Dror et al., 2020).

The community's response to the COVID-19 vaccine was related to employment status. The majority of respondents who have the intention to accept were those who worked, both as medical personnel, hospital employees, and nurses (Gagneux-Brunon et al., 2021; Kuter et al., 2021; Kwok et al., 2021). Another finding stated that respondents who did not work or were students have hesitancy (59.90%) to receive the vaccine (Caserotti et al., 2021). Respondents who worked had a 0.51 times greater risk of having the intention to accept the COVID-19 vaccine compared to those who did not work (OR=0.51; 0.39 – 0.65) (Kourlaba et al., 2021). The difference in receiving the COVID-19 vaccine can be seen in the type of work. Vaccine acceptance among doctors (78%) was significantly higher than among nurses (61%). The same thing in the medical team in the COVID-19 department showing a higher acceptance rate (94%) than the non-COVID-19 department (77%). It can be interpreted that employment status was a factor considered by respondents in accepting or refusing the COVID-19 vaccine (Dror et al., 2020).

High trust in the health system was a vital factor considered to have a relationship with the health services usage for disease prevention, including access to vaccinations (Fu et al., 2020). Previous research has proven a relationship between trust in health care providers and acceptance of flu vaccines that existed before the COVID-19 vaccine, such as the H1N1 vaccine (Larson et al., 2018). The majority (64.7%) of respondents said having an intention to use the COVID-19 vaccine in Saudi Arabia when the vaccine becomes available. The intention rate in Saudi Arabia (a developing country) was lower than the intention of the people in the United States (67%) as a developed country (Malik et al., 2020). Respondents who have high trust in the health system have a 3.05 times greater risk of having the intention to use the COVID-19 vaccine (OR=3.05; 1.13-4.92) (Al-Mohaithef and Padhi, 2020). Trust was critical to achieving, sustaining, and increasing vaccine demand among people in developing countries (Ozawa et al., 2016).

People with low socioeconomic status have a higher risk of dying from COVID-19, mainly because of their comorbid disease (Lee et al., 2021). The highest proportion with a definite intention to vaccinate (34.8%) were respondents who considered their overall health to be very good. Respondents had the perception that they have low susceptibility, so they disagree with the possibility of contracting COVID-19, contracting COVID-19 in the next few months or for now. Respondents also had high perceptions of the severity of COVID-19 and the benefits of vaccination. Many respondents (92.1%) would receive the COVID-19 vaccine if provided with adequate information. While 82% would accept it if consumed by many people (Lin et al., 2020).

Emotional threats to oneself and distress in the face of widespread media coverage of the increasing number of COVID-19 cases, including the toll, overburdened health systems, and inadequate government response to COVID-19, can foster anxiety or a person's fear of COVID-19 (Dror et al., 2020). Research in France found that 76.9% of respondents would receive the COVID-19 vaccine. As many as 48.1% of respondents have a fear of COVID-19. Respondents who have a fear of COVID-19 have a 1.58 times greater risk of having the intention to receive the COVID-19 vaccine (OR=1.58; 1.21 – 1.07). It can be said that anxiety or fear was a factor affecting the acceptance of the COVID-19 vaccine (Gagneux-Brunon et al., 2021).

The risk of exposure to SARS-CoV-2 can occur through inanimate surfaces or objects (Goldman et al., 2020). Patients infected with

COVID-19 can experience symptoms such as fever, cough, headache, diarrhea, and acute respiratory distress, have a high probability of receiving intensive care and have a high risk of dying (Huang et al., 2020). Research in Saudi Arabia stated that respondents who had a higher perceived risk of being infected with COVID-19 were 2.13 times more likely to be vaccinated compared to those who had a lower risk of contracting COVID-19 (Al-Mohaithef and Padhi, 2020).

People in vulnerable groups have a higher intention to receive the COVID-19 vaccine. Age was one of the factors in classifying vulnerable groups. Research in Greece shows that respondents aged over 65 years (79.3%) were the dominant group who answered "yes" and would receive the COVID-19 vaccine if it was available. Respondents over 65 years had a 3.65 times greater risk of having the intention to accept the COVID-19 vaccine compared to those aged under 65 years (OR=3.65; 2.57 – 5.17) (Kourlaba et al., 2021). Different conditions were found in China. Most respondents (75.5%) aged 18-25 years had a higher intention to receive the COVID-19 vaccine compared to other age groups (Lin et al., 2020). It can be concluded that each country has different characteristics of society and the age factor plays a vital role in receiving the COVID-19 vaccination in a country.

Developed countries were considered to have higher readiness for the success of the COVID-19 vaccination program associated with the country's economic status (Kourlaba et al., 2021). People in developed countries had an intention to receive a COVID-19 vaccine ranging from 37.2 to 80.0% (Malik et al., 2020; Seale et al., 2020; Wong et al., 2021). This condition is affected by many factors such as age >65 years, vulnerable groups, marital status, child ownership, and employment status. Respondents over 65 years had a 3.65 times greater risk of having the intention to receive the COVID-19 vaccine compared to those aged under 65 years (OR = 3.65; 2.57-5.17). Married respondents had a 1.36 times greater risk of having the intention to receive the COVID-19 vaccine compared to those who were not married (OR = 1.36; 1.02-2.67). Respondents who have children have a 0.69 times greater risk of having the intention to receive the COVID-19 vaccine compared to those who do not have children (OR = 0.69; 0.53-0.91). Respondents who worked had a 0.51 times greater risk of having the intention to receive the COVID-19 vaccine compared to those who did not work (OR = 0.51; 0.39-0.65) (Kourlaba et al., 2021).

The COVID-19 vaccine faces the same challenges as other vaccine programs to combat the disease before the COVID-19 pandemic. There were variations in public responses to the COVID-19 vaccine in developing countries. Research in China and Saudi Arabia shows that respondents who intend to vaccinate ranged from 28.7-64.7% (Al-Mohaithef and Padhi, 2020; Lin et al., 2020). These conditions were influenced by many factors such as trust in the health system, risk of exposure, health conditions, fear of COVID-19, and gender. Respondents who have high confidence in the country's health system are 3.05 times more likely to have the intention to use the COVID-19 vaccine (OR = 3.05; 1.13-4.92) (Al-Mohaithef and Padhi, 2020). Respondents who had a fear of COVID-19 have a 1.58 times greater risk of having the intention to receive the COVID-19 vaccine (OR = 1.58; 1.21-1.07) (Gagneux-Brunon et al., 2021). Respondents who are female have a 1.12 times greater risk of having the intention to receive the COVID-19 vaccine compared to those who are male (OR = 1.12; 0.97-1.30) (Lin et al., 2020).

Conclusion

The COVID-19 vaccine has generated both positive and negative responses in the community. The intention was the lowest positive response influenced by trust in the health system of countries (developing countries) and age (developed countries). The majority of respondents in developing countries said that they have the intention to use the COVID-19 vaccine when the vaccine is available. The level of intentions in a developing country was lower than in a developed country. However, when compared to other factors, trust in health systems in developing countries is the most influential factor in public acceptance of the COVID-19 vaccine. Whereas developed countries showed that the majority

of respondents aged over 65 years will receive a COVID-19 vaccine if it is available. Compared to other risk factors in developed countries, age was the most influential factor in public acceptance of the COVID-19 vaccine. Further research is needed on the role of the country's health system in shaping people's intentions to receive the COVID-19 vaccine in developing countries.

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Related Factors of Anxiety Level in Covid-19 Patient during Self Quarantine

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Abstract

Coronavirus disease-19 was a pandemic in the world. One of the efforts to reduce the spread of Covid-19 cases was to self-quarantine. Self-quarantine impacted emotional mental disorders in the form of anxiety. This study aimed to identify factors related to the anxiety of Covid-19 patients who were undergoing self-quarantine. METHODS: This study used a descriptive research design with a cross-sectional study. The population was all confirmed COVID-19 patients who underwent self-quarantine in Wonogiri Regency as many as 70 respondents. Samples used clustered randomized sampling with 40 respondents. The instrument used a sociodemographic questionnaire, and anxiety was measured using Hamilton Rating Scale-Anxiety. Data were analyzed using multiple linear regression. RESULTS: The results showed that the mean age was 33.58 ± 11.08 years. Most participants were women 52.5%, 87.5% of the respondents had high education background, 37.5% were medical workers, 37.5% were private workers, and 95% of the participants had received information about covid-19. The mean of the time they were self-quarantined was 8.1 ± 4.77 days. 55% of the participants had no anxiety, 15% had mild anxiety, 10% had moderate anxiety, and 20% had severe anxiety. Factors that affect the level of anxiety are age (p-value = 0.047), occupation (p-value = 0.031), education (p-value = 0.035) and length of self-quarantine (0.023). CONCLUSION: The conclusion said that age, occupation, education, and length of self-quarantine have a strong relationship and have a significant effect on anxiety. Social support is needed to reduce the anxiety of COVID-19 patients during self-quarantine.

Introduction

Coronavirus disease-19 (Covid-19) is a disease caused by the betacorona type coronavirus. It is named by the World Health Organization (WHO) SARS-CoV-2 and the name of the disease Coronavirus Disease 2019 (COVID-19). This coronavirus was a pathogen in respiratory diseases. The virus transmission is between humans, so it is fast (PDPI et al., 2020). Symptoms of COVID-19 were symptoms of acute respiratory distress such as fever, cough, and shortness of breath. The average incubation period was 5-6 days, with the incubation period up to 14 days. In severe cases of COVID-19, it could cause pneumonia, acute respiratory syndrome, kidney failure, and even death. Countermeasures and prevention were urgently needed because COVID-19 has an impact on several aspects, namely political, economic, social, cultural, defense, and security aspects, as well as the welfare of the people in Indonesia (Kemenkes RI, 2020). Fear of the Covid-19 pandemic caused cognitive distress, negative emotions, aggressiveness, and reduced sleep quality or numbness (Cao et al., 2020). One of the management efforts for patients with confirmed Covid-19 was self-quarantined with monitoring, especially for patients without symptoms and mild symptoms. Self-quarantine at home/quarantine facilities for a maximum of ten days from the onset of symptoms plus three days free of symptoms of fever and respiratory problems. If symptoms were more than 10 days, then quarantine was continued

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until symptoms disappear plus 3 symptom-free days. Quarantine could be done independently 93.8% at home or in public facilities prepared by the government (PDPI et al., 2020). The management of self-quarantine for COVID-19 patients who were asymptomatic and had mild symptoms made some people feel restless and anxious. It would raise the risk of other mental health disorders during the Covid-19 pandemic in the community. Anxiety, lack of social contact, and fewer opportunities to deal with stress were major concerns (Fegert et al., 2020). The related factors of anxiety needed to be explored further to overcome anxiety so that it did not have an impact on other health problems if anxiety was not overcome.

Based on data from the World Health Organization (WHO), as of September 10, 2021, the number of confirmed COVID-19 patients was 223,022,538 people, and the number of patients who died from Covid-19 was 4,602,882 people (World Health Organization, 2021). In Indonesia, as of September 10, 2021, the number of confirmed COVID-19 patients was 4,158,731 (+5,367) cases, the number of patients who died from Covid-19 was 128,431 (3.3%), the number of patients recovered was 3,901,766 (93.8%), and the number of active cases was 118,534 (2.9%)(Kemenkes RI, 2020). In Central Java Province, as of September 11, 2021, the number of confirmed patients was 6,102 cases, the number of patients recovered was 439,042 cases, and the number of patients who died was 31,596 (Tengah, 2021). The number of Covid-19 cases in Wonogiri Regency as of September 10, 2021 namely 142 confirmed cases (48 hospitalized and 94 self-quarantine), 10,199 confirmed recovered cases, and 1,353 confirmed deaths (Wonogiri, 2021). Based on Cao et al. study, during the Covid-19 pandemic in Hubei Province, China, there were 62 students (0.9%) experiencing severe anxiety, 196 (2.7%) students had moderate anxiety, and 1,518 (21.3%) students experiencing mild anxiety (Cao et al., 2020).

From some literature mentioned, the number of anxiety diagnoses increased during and after the Covid-19 pandemic. Anxiety diagnosis often presented with symptoms of poor sleep and depression (Nicolini, 2020). Anxiety was a disguised feeling of fear accompanied by feelings of uncertainty, insecurity, helplessness, and isolation. The Covid-19 pandemic caused emotional and mental disorders that have a physical and psychological impact on every individual, especially individuals who have to isolate themselves due to Covid-19. Individuals who have to live in particular quarantine homes partially experienced mental and emotional disorders. Signs of emotional and mental disorders symptoms are experienced in the form of somatic complaints, namely anxiety, tension, and neglected daily activities(Ozamiz-Etxebarria et al., 2020). Health concerns and anxiety associated with an epidemic or pandemic could have a significant psychological impact (e.g., stress, intrusive negative thoughts, avoidance) and might be associated with ineffective or unfavorable preventive behavior. A person's anxiety response to an epidemic/pandemic could vary from one person to another (Ahmad & Murad, 2020). Anxiety during the COVID-19 pandemic could be caused by several factors. Namely, predisposing factors include the COVID 19 pandemic, spending >9 hours at home, excessive online information seeking, more common in women, economic status, having a baby, married status, student status, learning environment, and internet network. Factors that could prevent or reduce anxiety in this literature are reinforcing factors were emotion regulation, resilience, supportive intervention, religious coping, family support, limiting exposure to information media and physical activity or sports (Brooks et al., 2020).

Self-quarantine was one of the efforts to reduce the spread of Covid-19, but self-quarantine caused mental and emotional problems in the form of anxiety. The factors that caused anxiety during self-quarantine in COVID-19 patients need to be explored more deeply to develop possible preventive measures and therapeutic interventions. It was what underlies the authors to examine the factors related to the anxiety of Covid-19 patients who were self-quarantining.

Method

The study took place in the Wonogiri District Health Office Work Area. It is in the southern part of Central Java in Indonesia. During this study piloted, the number of

Covid-19 cases in Wonogiri Regency as of December 2020, namely 108 confirmed cases (38 hospitalized and 70 self-quarantine). A cross-sectional study took place in Wonogiri from December 2020 – May 2021 to assess the anxiety level of the covid-19 patient during self-quarantine. The population was all confirmed COVID-19 patients who underwent self-quarantine as of December 2020, as many as 70 people (Wonogiri, 2021). The primary criterion for the inclusion of participants in the study was people with covid-19 who self quarantined without comorbid. The sampling technique used was Cluster Random Sampling. Samples were taken from 2 sub-districts with the highest number of cases, as many as Wonogiri and Selogiri sub-districts with 40 respondents.

Research data were collected using the Hamilton Rating Scale-Anxiety, Indonesian Version of HRS-A. The validation is through an international field trial (Maier et al, 1988) and an Indonesian field trial (Ramdan, 2019). Various instruments for measuring Anxiety have been developed and described, but very few studies used the HRS-A instrument to assess anxiety levels. HRS-A questionnaire included 14 symptoms containing: [1] Anxious mood: Worries, anticipation of the worst, fearful anticipation, irritability; [2] Tension: Feelings of tension, fatigability, startle response, moved to tears easily, trembling, feelings of restlessness, inability to relax; [3] Fears: Of dark, of strangers, of being left alone, of animals, of traffic, of crowds; [4] Insomnia: Difficulty in falling asleep, broken sleep, unsatisfying sleep and fatigue on waking, dreams, nightmares, night terrors; [5] Intellectual: Difficulty in concentration, poor memory; [6] Depressed mood: Loss of interest, lack of pleasure in hobbies, depression, early waking, diurnal swing; [7] Somatic (muscular): Pains and aches, twitching, stiffness, myoclonic jerks, grinding of teeth, unsteady voice, increased muscular tone; [8] Somatic (sensory): Tinnitus, blurring of vision, hot and cold flushes, feelings of weakness, pricking sensation; [9] Cardiovascular symptoms: Tachycardia, palpitations, pain in chest, throbbing of vessels, fainting feelings, missing beat; [10] Respiratory symptoms: Pressure or constriction in chest, choking feelings, sighing, dyspnea; [11] Gastrointestinal symptoms: Difficulty in swallowing, wind abdominal pain, burning sensations, abdominal fullness, nausea, vomiting, borborygmi, looseness of bowels, loss of weight, constipation; [12] Genitourinary symptoms: Frequency of micturition, urgency of micturition, amenorrhea, menorrhagia, development of frigidity, premature ejaculation, loss of libido, impotence; [13]Autonomic symptoms: Dry mouth, flushing, pallor, tendency to sweat, giddiness, tension headache, raising of hair; [14] Behavior: Fidgeting, restlessness or pacing, tremor of hands, furrowed brow, strained face, sighing or rapid respiration, facial pallor, swallowing, etc (Ramdan, 2019). Each symptom was assigned a score of 0-4 (0: no symptoms; 1: mild symptoms; 2: moderate symptoms; 3: severe symptoms; 4: very severe symptoms). The scores of the 14 symptoms are added up, and the total score obtained was used to determine a person's anxiety degree. The anxiety degree was classified as follows: <6: no anxiety; 7-14: mild anxiety; 15-27: moderate; 28-41: severe anxiety; >41: severe. The questionnaire was in the form of a Google Form distributed via WhatsApp. Therefore, the researcher was with the respondents when they filled out the questionnaire. Sociodemographic data measurement use a questionnaire containing age, gender, education, occupation, exposure to information, and length of self-quarantine. The researcher also provided clarifications where necessary.

The subjects were invited to participate in the study while being self-quarantined. All the subjects were informed about the purpose of the study. After obtaining the informed consent, they filled out the questionnaire. The data collection took time from January to March 2021, when they were self-quarantined. Definition of operational Anxiety Level: an emotional response without a specific object that is subjectively experienced and communicated interpersonally is defined as normal, if the score is less than 6, mild anxiety if it is from 7 to 14, moderate anxiety if it is from 15 to 27 and severe anxiety if the score more than 27. After explaining the research objectives, we obtained informed consent from each participant. Ethical permission to carry out this study was granted by the Department of Research and Community Engagement,

the School of Nursing, Giri Satria Husada Wonogiri. The confidentiality of the data was ensured for all participants.

The data were organized and coded in Excel spreadsheets and exported to the Statistical Package for the Social Sciences (SPSS) version 20.0 program. The descriptive statistics, the absolute and relative frequency, mean, standard deviation, coefficient of variation, and minimum and maximum values were used. Quantitative data are presented as means ± standard deviations (SD), while qualitative data are presented in frequencies and proportions (Guillén-Astete et al., 2020). Linear regression was used to evaluate factors that correlate with anxiety levels of covid-19 patients during self-quarantined. The statistical significance threshold was set at a p-value less than 0.05.

Result And Discussion

Table 1. Socio-demographic variables of respondents and level of anxiety during self-quarantine

(n = 40)

Variable	n		%
Age	M±SD	33.58± 11.08	
Gender	Male	19	47.5
	Female	21	52.5
Education	Low	5	12.5
	High	35	87.5
	Unemployment	6	15.0
	Medical Worker	15	37.5
Occupation	Government Employee	1	2.5
	Private Employee	15	37.5
	House wife	3	7.5
Information exposed	have not received information	2	5.0
	received information	38	95.0
Length of Self-Quarantine (Days)	M±SD	8,1 ± 4.77	
Anxiety Level	Normal	22	55.0
	Mild	6	15.0
	Moderate	4	10.0
	Severe	8	20.0

Note: M = mean; SD= Stanard Deviation

Table 1. describes the sociodemographic data of the participants. The mean age was 33.58 ± 11.08 years of the 40 participants: 52.5% were females, and 47.5% were males. Regarding educational background, 12.5% of the respondents had low education, and 87.5% had high education. In occupation status, 37.5% were medical worker, 37.5% were private worker, 15% were unemployed, 7.5% were housewife, and 2.5% was a government employee. 95% of the participants had received information about covid-19, and 5% had not received information about covid-19. The mean of the time they were self-quarantined was 8.1 ± 4.77 days. 55% of the participants had no anxiety, 15% had mild anxiety, 10% moderate, and 20% had severe anxiety.

The mean age of the respondents was 33.58± 11.08 years. In their study, Kapasia et al. said that anxiety occurred in respondents aged 18-35 years. 70% of respondents faced various problems related to anxiety, and depression, due to poor internet connectivity and an unfavorable learning environment at home (Kapasia et al., 2020). The risk factors for the development of anxiety included initial or peak phase of the outbreak, female sex, younger age, marriage, social isolation, unemployment, and student status, financial hardship, low educational level, insufficient knowledge of COVID-19, epidemiological or clinical risk of disease and some lifestyle and personality variables (Santab´arbara et al., 2021).

In terms of gender, the most respondents were female, as many as 21 (52.5%) respondents. It was in line with Galindo-Vazques et al. research which explains that single women, who have no children, have co-morbidities, and have a history of mental health care have a higher risk of symptoms of anxiety and depression (Galindo-Vázquez et al., 2020). Older women and professionals experience higher symptoms of stress, anxiety, depression, and insomnia among healthcare workers during the Covid-19 pandemic (Dosil Santamaría et al., 2021). In infected people, females have higher anxiety symptoms than males (Pashazadeh Kan et al., 2021). In line, our study revealed that females are more likely to be affected by anxiety than males (OR = 0.81, CI = 0.37-1.74) (Kan et al., 2021). Female was the risk factor for anxiety because female are more openly and firmly in their emotions (Fu et al., 2020). Female anxiety level is higher than male due to differences in brain chemistry and hormone levels. Females with anxiety had higher testosterone and estradiol composition (Fu et al., 2020).

In terms of education, most respondents had high education as many as 35 (87.5%). It was in line with Wang et al. study, which explains that respondents with high education level has anxiety level higher than those who had low education (Wang et al., 2020). Most of the respondents' occupations were medical personnel, as many as 15 (37.5%), and private employees as many as 15 (37.5%) respondents. Most health workers experience anxiety due to the lack of personal protective equipment and family safe during the Covid-19 pandemic. Health workers had experienced mild anxiety in as many as 52 respondents (65.0%), 11 respondents (13.8%) had moderate anxiety, two respondents (2.5%) had experienced severe anxiety and 15 respondents (18.8%)) who do not experience anxiety (Fadli et al., 2020). Frontline health care workers engaged the direct diagnosis, treatment, and care of patients with COVID-19 were associated with a higher risk of symptoms of anxiety (OR, 1.57; 95% CI, 1.22-2.02; P < .001) (Lai et al., 2020). Some study has identified a high prevalence of moderate depression, anxiety, and PTSD among healthcare workers during the COVID-19 pandemic (Li et al., 2021).

Most of the respondents have received information related to Covid-19, as many as 38 (95%). Predisposing factors that caused anxiety during the COVID-19 pandemic were spending >9 hours at home, excessive online information search, more common in women, economy, having babies, marital status, student status, learning environment, and internet network. Watching/reading COVID-19 news for ≥ 2 h/ daywere associated with a high prevalence of severe to very severe depression, anxiety, and stress (Lasheras et al., 2020). Knowledge about COVID-19 transmission, treatment, prognosis, and prevention can stabilize the anxiety level of medical students during the pandemic. Ensuring that the general population receives enough timely and transparent information during health emergencies is critical for healthy psychological self-adaptation (Lasheras et al., 2020).

The mean of the time they were self-quarantined was 8.1 ± 4.77 days. Most of the studies reviewed reported negative psychological effects of quarantine during confirmed COVID-19, namely symptoms of post-traumatic stress, confusion, and anger. Stressors include longer quarantine duration, fear of infection, frustration, boredom, inadequate supplies, inadequate information, financial loss, and stigma (Brooks et al., 2020). feelings of loneliness and lack of social support were among the strongest correlators with anxiety during the pandemic (Arafa et al., 2021; Horesh et al., 2020).

Table 2. Distribution of the scores among anxiety level of covid-19 patient during self-quarantine, according to HRS-A*

Domain	No. Items	Mean	SD	Variance	Min	Max
Anxious mood	1	1.58	1.279	1.635	0	4
Tension	1	1.50	1.320	1.744	0	4
Fears	1	1.28	0.933	0.871	0	3
Insomnia	1	1.33	1.095	1.199	0	4
Intellectual	1	0.85	0.864	0.746	0	3
Depressed mood	1	1.53	1.339	1.794	0	4
Somatic (muscular)	1	1.00	1.109	1.231	0	4
Somatic (sensory)	1	0.80	0.723	0.523	0	3
Cardiovascular symptoms	1	0.58	0.747	0.558	0	2
Respiratory symptoms	1	1.20	1.436	2.062	0	4
Gastrointestinal symptoms	1	0.75	1.056	1.115	0	3
Genitourinary symptoms	1	0.48	0.640	0.410	0	2
Autonomic symptoms	1	1.15	1.167	1.362	0	3
Behavior	1	0.88	1.090	1.189	0	4

*HRS-A : Hamilton Rating Scale-Anxiety

The distribution of the parameters related to the HRS-A domains is presented in table 2. The symptoms of anxiety level were revealed in all 14 symptoms investigated. Regarding the gross mean scores observed, the highest ones were assigned to the anxious mood symptoms (1.58). It evaluates the perception of the respondents regarding worries, the anticipation of the worst, fearful anticipation, irritability, and depressed mood symptoms (1.53) evaluating the perception of the respondents regarding loss of interest, lack of pleasure in hobbies, depression, early waking, diurnal swing. Tension symptom (1.50) was related to feelings of tension, fatigability, startle response, moved to tears easily, trembling, restlessness feelings, and inability to relax. Insomnia symptoms (1.33), evaluate the perception regarding the difficulty in falling asleep, broken sleep, unsatisfying sleep and fatigue on waking, dreams, nightmares, and night terrors. The lowest means were assigned to the genitourinary symptoms (0.48), evaluating the frequency of micturition, the urgency of micturition, amenorrhea, menorrhagia, development of frigidity, premature ejaculation, loss of libido, impotence, and the scores of cardiovascular symptoms (0.58). It assesses the perception of the respondents regarding tachycardia, palpitations, pain in the chest, throbbing of vessels, fainting feelings, and missing beat.

The highest ones were assigned to the anxious mood symptoms (1.58), which evaluates the respondents' perception regarding worries, the anticipation of the worst, fearful anticipation, and irritability. Worrying about infection of oneself or loved ones was common in the respondents and correlated strongly with anxiety (Lei et al., 2020). The degree of worry about epidemiological infection significantly influenced psychological status, specifically anxiety (Liu X et al., 2020).

Table 3. Linear regression of factors Correlating Anxiety level of Covid-19 patient during self-quarantine (n = 40).

Variables	Anxiety Level				
	B	Beta	t	p-value	95 % CI
Age	0.296	0.280	2.071	0.047*	0.005 – 0.587
Gender	-0.601	-0.026	-0.193	0.848	-6.954 – 5.752
Occupation	2.054	0.334	2.256	0,031*	0.199 – 3.908
Education	-4.849	-0.310	-2.198	0.035*	-9.343 - -0.356
Information Exposed	3.655	0.069	0.472	0.640	-12.124 – 19.433
Length of self quarantine	-0.771	-0.314	-2.384	0.023*	-1.429 - -0.112

Note:*p<0.05; CI = Confidence Interval

A regression model was used to examine factors related to anxiety level during self quarantine. The results are presented in table 3 - the factors that associated with anxiety level were age (B = 0.296, β = 0.280, t = 2.071, p value = 0.047), occupation (B = 2.054, β = 0.334, t = 2.256, p value = 0,031), education (B = -4.849, β = -0.310, t = -2.198, p value = 0.035), and length of self-quarantine (B = -0.771, β = -0.314, t = -2.384, p value = 0.023).

The factors that associated with anxiety level were age (B = 0.296, β = 0.280, t = 2.071, p-value = 0.047), occupation (B = 2.054, β = 0.334, t = 2.256, p-value = 0,031), education (B = -4.849, β = -0.310, t = -2.198, p-value = 0.035), and length of self-quarantine (B = -0.771, β = -0.314, t = -2.384, p-value = 0.023). It was in line with research from Lai et al. which stated that nurses, women, and frontline health workers have higher anxiety scores than other health workers (Lai et al., 2020). It was also in line with research from Perez-Cano . which stated that the majority of respondents who experience anxiety, depression, and stress due to the Covid-19 pandemic are women and have undergraduate education (Pérez-Cano et al., 2020). Respondents aged 20-60 years experienced mental-emotional disorders while in quarantine. The most complaints were psychological complaints, namely feeling anxious, tense/worried (40%), followed by complaints of neglected daily activities/tasks (37%). The next complaint was somatic complaints such as loss of appetite (30%) and poor sleep (30%). Older adults reported lower levels of anxiety and sadness than middle-aged adults, and middle-aged adults reported lower levels than younger participants (Losada-baltar et al., 2020). Most of the jobs in this study were health workers and private employees. It is in line with research by Ridlo et al. stating the psychological responses of nurses during the COVID-19 pandemic include: anxiety, symptoms of depression, feelings of fear, worry, and acute stress. During the COVID-19 pandemic, nurses must provide optimal services to the community regarding infection prevention and control. It causes a psychological response that occurs in nurses when treating COVID-19 patients. Psychological responses obtained from nurses' direct statements are a source of information to provide psychological interventions for nurses in improving mental health during the COVID-19 pandemic. One effort to reduce anxiety levels was with peer support. Peer support could reduce stress levels in health workers (Saleha et al., 2021).

Conclusion

Self-quarantine in patients who are confirmed positive for Covid-19 can cause another mental health problem, namely anxiety. The factors that directly affect the anxiety level of patients undergoing independent quarantine are work, education, and the length of self-isolation. Factors that indirectly affect are age, gender, and exposure to information. The above factors together can significantly affect the anxiety level of Covid-19 patients undergoing self-quarantine. Furthermore, during self-quarantine, monitoring and providing information about what to do during self-quarantine and support from families and communities around COVID-19 patients needs to be increased to reduce the anxiety of Covid-19 patients who are undergoing independent isolation.

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Intrinsic Factors of Mortality Due to DHF in 2018-2021

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Abstract

The number of cases of mortality due to dengue fever in the ex-residence of Semarang and ex-residence of Pati from January to December 2020 was 24 people. The purpose of this study was to analyze the factors associated with mortality from dengue fever from 2018-2020 in ex-residents of Semarang and ex-residents of Pati. This type of quantitative analytic research with a case-control approach. The sample consisted of 60 respondents, 30 case groups, and 30 control groups, taken using the Consecutive sampling technique. Analysis using chi-square test. The results showed that the related factors were gender (p-value = 0.009, OR = 4.750) and a history of suffering from DHF (p-value = 0.001, OR 7.500). Lack of public awareness of the importance of 3M in preventing DHF. It is necessary to conduct counseling with promotional media that is more interesting and informative to the surrounding community so that they care about the surrounding environment, so that the community can start by cooperate in cleaning the environment.

Introduction

Dengue Hemorrhagic Fever (DHF) is an acute viral infectious disease caused by the dengue virus. It is characterized by a fever of 2-7 days accompanied by bleeding manifestations, decreased platelets (thrombocytopenia), hemoconcentration marked by plasma leakage (increased hematocrit, ascites, pleural effusion, hypoalbuminemia) (Kemenkes RI, 2017). According to WHO, cases of dengue fever in the world are increasing daily. The report from WHO stating in the last two decades, there has been a significant increase in active cases of dengue fever from 505,430 active cases in 2000 to 2,400,000 in 2010. It increased to 5.2 million in 2019 (Dengue WHO , 2021). Dengue fever is a public health problem in the tropical and subtropical world. Dengue fever cases have grown dramatically in recent years, as well as mortality due to dengue fever (Arauz et al., 2015). Dengue virus infection poses significant health and economic burden worldwide (Budigi et al., 2018).

Active cases of dengue fever in Indonesia are classified as high, there are 95,893 active cases of dengue fever in 2020, but this has decreased compared to 2019, which amounted to 112,954 active cases of dengue fever. And for the mortality rate due to dengue fever in 2020 amounted to 661. While the mortality rate due to dengue fever in 2019 amounted to 751 (Kemenkes RI, 2020). Data on active cases of DB in Central Java from January to December 2017 before the COVID-19 pandemic was 21,601/100,000, and mortality due to DB were 1.24%. In January-December 2018, the number of active DB cases was 3,519, and mortality due to DB was 37. The number of DB cases during the COVID-19 pandemic from January to December 2020 was 5,602. The

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cases spread across 35 districts/cities in Central Java. Of these, 114 people died due to dengue fever (Dinas Kesehatan Provinsi Jawa Tengah, 2020). Of course, this is indeed a decline but keep in mind that the increasing number of COVID-19 cases in Indonesia at the beginning of 2020 caused other diseases were not recorded properly. The contributors to the highest DB cases among regions throughout Central Java Province include Semarang City, Semarang Regency, Salatiga City, Kendal Regency, Demak Regency, Grobogan Regency, Pati Regency, Kudus Regency, Blora Regency, and Rembang Regency. From January to December 2020, there were 1481 cases and 24 mortality caused by DB during the Covid-19 pandemic (Dinas Kesehatan Provinsi Jawa Tengah, 2020).

Several studies have assessed the factors affecting the risk of mortality caused by dengue fever. They are access to health services, a history of suffering from dengue fever, and the severity of the disease (Hikmah et al., 2015). COVID-19 infection is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) (SARS-CoV-2) (Kemenkes RI, 2020). The number of COVID-19 cases is increasing daily, and it is reported that there have been at least 192 million confirmed cases of COVID-19, with a mortality toll of 4 million people worldwide (data taken from the WHO report, dated July 23, 2021) (Dengue WHO, 2021). The high case of DB and Covid-19 is a new phenomenon that allows someone infected with Covid-19 also at risk of being infected with DHF (Kemenkes RI, 2020). Both diseases are caused by a virus but of different types (Bernal et al., 2021). It's just that these two viral infections often attack simultaneously during the COVID-19 pandemic. There are similarities in clinical and laboratory characteristics between dengue infection and Covid-19 so that it obscures the diagnosis by the examining doctor and makes it difficult to make a diagnosis and provide therapy (Rana et al., 2020). The study's purpose was to analyze all the factors that could affect mortality from DHF, then determine the strength of the relationship and the main factors.

Method

The research's design is quantitative and analytical, with a case-control approach. The sample in the study was divided into two. Namely, the case samples were some DHF patients who died in Semarang Residence and Pati Residence in 2018-2021. The control samples were some DHF patients who were declared cured in Semarang Residency and Pati Residency in 2018-2021. The independent variables in the study were age, gender, and history of suffering from DHF. The dependent variable in the study was mortality due to DHF in 2018-2021. However, there is a confounding variable in the study, namely the time of mortality of DHF patients. The sample size of the case and control groups in this study was determined using the Lemeshow formula, namely 30 case groups and 30 control groups using the Consecutive Sampling technique. The sample criteria were divided into two groups. They are the inclusion-exclusion criteria for the case group and the inclusion-exclusion criteria for the control group. The inclusion criteria for the case group were the families of DHF patients in 2018-2021 who were declared dead from DHF and in the medical record and were willing to be interviewed. The exclusion criteria for the case group were the patients' families who could not be contacted. The inclusion criteria for the control group are patients with DHF in 2018-2021 who have been declared cured, while the exclusion criteria for the control group are patients with DHF in 2018-2021 who cannot be contacted. Data were analyzed using univariate and bivariate analysis techniques with a chi-square test. If the chi-square criteria are not met, the cells are simplified with one of the categories used as a comparison.

Results and Discussions

This study was conducted to know the factors associated with DHF mortality in the ex-Karisidenan Semarang and ex-Karisidenan Pati in 2018-2021. Semarang Residence consisted of six regions. Namely Semarang City, Semarang Regency, Salatiga City, Kendal Regency, Demak Regency, and Grobogan Regency.

Pati Residence consisted of five. Namely Pati, Kudus, Jepara, Rembang, and Blora Regency. Geographically, the Residency of Semarang and Pati are located on the North Coast of Java Island. They are directly adjacent to the Java Sea. According to the Central Java Central Statistics Agency 2021, the Semarang and Pati Residence area is 11,078.71 km2, while the population is 11,514,052 people. So the Population Density is 1,039.29. So the population density in Semarang and Pati residences is considered high.

Table 1. Research Result

Variables	Categories	Mortality Due to DHF				Numbers		*P-value*	OR 95% CI
		Patients Mortality Due to DHF		DHF Patients declared cured					
		N	%	N	%	n	%		
Age	Toddlers and Children	7	41.2	9	52.9	16	47.1	0.732	-
	Adult	10	58.8	8	47.1	18	52.9		
	Teenagers	9	50	5	38.5	14	45.2	0.717	-
	Adult	9	50	8	61.5	17	54.8		
	Adult	9	69.2	8	50	17	58.6	0.451	-
	Eldery	4	30.8	8	50	12	41.4		
Gender	Female	22	73.3	11	36.7	33	55	0.009	4.750 1.584-14.245
	Male	8	26.7	19	63.3	27	45		
DHF Recording	Ever	25	83.3	12	40	37	61.7	0.001	7.500 2.244-25.062
	Never	5	16.7	18	60	23	38.3		

Source : Primary Data, 2022

The results showed that the research data did not meet the chi-square requirements, so cell simplification was carried out, one of the categories for comparison. After merging the cells and making the adult group as a comparison, the p-value (Asymp Sig) > = 0.05, which means that there is no relationship between age and death of dengue fever in 2018-2021 in ex-Residency of Semarang and Pati. Age was not associated with mortality from DHF based on the research conducted by researchers. There was a difference between the incidence of mortality due to DHF among young, toddlers, children, adolescents, adults, and the elderly. Respondents who died in the category of toddlers, children, and adolescents were more dominant. In theory, the younger, the higher the mortality is. So the formation of antibodies or immunity in the body increases (Anggraini & Mahmudah, 2021), because the blood vessel permeability (porosity) of toddlers and children are higher compared to adults (Abiyoga & A'in, 2021). In another study, the mortality rate for children aged 3-14 years was 14.5 times higher than for young adults aged 15-39. The mortality rate increases somewhat in adults 50 years of age and over (Guzmán, 2020).

The research aligned with this study was Saddique et al., (2020), stating there is no relationship between the age of patients with DHF and mortality as seen from the p-value obtained, which is 0.813. A similar study by Naeem et al. (2018), showed no relationship between age and death from DHF in a hospital in Puerto Rico. But an average of 58.8% of those who died from DHF were aged 15-49. According to Trang et al. (2016), showed no relationship between age and death from DHF in a hospital in Puerto Rico. But an average of 58.8% of those who died from DHF was aged 15-49. According to (Hikmah & Kasmini, 2015), there was a relationship between age and the incidence of death in DHF patients. The study also stated that the incidence of death in children patients was higher than in adults and adolescents. Other researchers support that a lower risk of DHF mortality is associated with older age with an interquartile range (27-47 years) (Chaudhury et al., 2017).

In a different study, most of the patients in Bangladeshi hospitals were males (2.2 times more than females) who took longer to recover than females (p < 0.01) (Pratay et al., 2022). Research by Mallhi et al. (2015) found that the factors associated with dengue mortality were >40 years of age (p=0.004).

Table 1 also shows that 22 (73.3%) women experienced the most deaths from DHF and 8 (26.7%). The p-value (Asymp Sig) results is < = 0.05. So there is a relationship between gender and dengue fever mortality in 2018-2021 in ex-Residency of Semarang and Pati. The OR value is 4,750, which means that female patients are 4,750 times more likely to die from DHF than male patients. Gender is associated with deaths from DHF. It plays a major role in mortality from dengue fever, where more females die than males. It is affected by hormones in the female body. The glycoprotein hormones affect the development of mononuclear phagocytic cells and granulocyte cells as a response to the body's defenses. (Nguyen et al., 2021).

Research in line with this study conducted by Hikmah & Kasmini (2015), showed a relationship between the patient's gender and the incidence of mortality due to DHF with a p-value = 0.011. Respondents experiencing patient mortality tend to be female. Research similar to gender has a relationship with mortality due to dengue (Zomosa et al., 2020). Another study found a relationship between gender and DHF mortality (p=0.000) (Gerald et al., 2021). Another study, namely the results of statistical tests, assessed a relationship between gender and the degree of dengue infection (Wollner et al., 2021). Other studies agree that there is a difference between the control group and cases in terms of gender in the risk of dengue shock syndrome and DHF mortality (Santana et al., 2022). Research contradicting found no relationship between male and female gender with DHF mortality is by (Liew et al., 2016). Research conducted by Hikmah & Kasmini Hikmah & Kasmini (2015), found a significant relationship between comorbidities and the incidence of DHF mortality. In another study, a high risk of severe dengue (SD) was associated with the female gender and lower hematocrit levels than male (Carrasco et al., 2014). Research by Nicolete et al. (2021), found gender has a relationship with DHF mortality. Other researchers also said that there was a relationship between DHF mortality and the female gender, which was 2.1 times higher than male (Kumar et al., 2015).

In Table 1, the history of suffering from DHF in the ever category was 25 (83.3%), with the most deaths from DHF. The category of never experiencing death from DHF was 5 (16.7%) respondents. The p-value (Asymp Sig) of < = 0.05 shows a relationship between a record of suffering from dengue fever and dengue fever deaths in 2018-2021 in the ex-Residency of Semarang and Pati. The OR value of 7,500 means that patients who ever had DHF have a 7,500 times greater risk of death by DHF than patients who have never had a history of DHF.

DHF history has a relationship with mortality due to DHF. Based on studies of people who have been exposed to dengue fever before, in primary dengue infection, when the patient recovers, the individual will have lifelong immunity to the serotype of the virus that has attacked him. But against other dengue virus serotypes, they are not immune (Eltom et al., 2021). The cross-reactivity existence occurring due to previous dengue infection can increase the infectivity of the dengue virus. It can cause the spread of the disease to be more severe and severe. Various reinfections are associated with dengue/DSS outbreaks, where cases are severe. Generally occur in children (Prasetya et al., 2017). Other studies also assume that secondary infection shows DEN-3 is the dominant viral serotype causing severe cases. For example, someone suffers from dengue. Then they get reinfection with a different type of virus within six months to 5 years. Among those who got a second infection, an immunological reaction can occur, thus can lead to DHF symptoms (Gallichotte et al., 2018). Of the 60 respondents, 40 experienced previous DHF events related to death.

A similar study with the results of the Chi-Square statistical test showed that there was no relationship between a history of DHF and the incidence of death due to DHF with a p-value of 0.668 (p > 0.05) (Hikmah & Kasmini., 2015). The relationship between a history of ever suffering from dengue

hemorrhagic fever and the incidence of dengue shock syndrome was significant (p-value = 0.0009). The OR calculation resulted OR = 7.980 with a 95% Confidence Interval (CI) = 2.837 – 23.909 (Gerald et al., 2021). In a similar study, a variable that was significantly related to the incidence of DHF was a history of suffering from DHF (p-value= <0.001; OR= 9.1; 95% CI: 2,486-32,579) (Díaz-Quijano & Waldman, 2012). Another study stated that there was a relationship between a history of DHF infection in cases of DB death with a p-value of 0.003 (Yatra dkk, 2015). Research by Carabali et al. (2015) found factors associated with dengue mortality are the history of having suffered from DHF before (p<0.05) and a history of having other comorbidities (p<0.001).

Another study in line is by Prasetya et al. (2017), who said a statistical test of a history of suffering from DHF p-value 0.033 in the incidence of DHF in the city of Bandung. One of the factors affecting DHF mortality is a patient with a DHF record (p-value of 0.05) (Anggraini & Mahmudah, 2021). Another study with a p-value of 0.015 found that DHF record is related to DHF incidence, with an OR of 2,213 at the Celikah Health Center (Hikmah & Kasmini, 2015). Priyamvada et al. (2016)

Table 2. DHF Mortality by Time of Death in Januari 1, 2018 - December 31, 2021

Time of Death	DHF Mortality	Anxiety in Visits to Health Services				Numbers		Or 95% CI
		No		Yes				
		n	%	n	%	n	%	
Januari 1, 2018 - December 31, 2019	DHF patients who are declared cured	7	70%	3	30%	10	100%	44.333 3.929-500.269
	DHF patients who death	1	5%	19	95%	20	100%	
Januari 1, 2018 - December 31, 2019	DHF patients who are declared cured	8	88.9	1	11.1	9	100	76.000 6.002-962.319
	DHF patients who death	2	2	19	30.5	21	100	

Source : Primary Data, 2022

Table 2 shows the relationship between the DHF mortality incidence and anxiety in visiting health services based on the time of death from January 1, 2018 - December 31, 2019. The value of OR(1) = 44,333 means that respondents feel anxiety in visiting health services, and at the time of death on January 1, 2018 – December 31, 2019, had a 44,333 times risk of dying from DHF compared to respondents who did not feel anxious when visiting health services. After controlling for the relationship between time of death, it turns out that experiencing anxiety during visits to health services increases the risk of death due to DHF due to rough OR < OR(1) (3.3 > 44.3), so there is confusion that increases the relationship between anxiety about visiting health services and actual death due to DHF.

Table 2 also produces OR (2) = 76,000, which means that respondents who experience anxiety visit health services and experience time of death for the period January 1, 2019-December 31, 2020 or during a pandemic have 76,000 times more risk of experiencing death from dengue than respondents who do not experience anxiety visiting health services. After controlling for the relationship between time of death, it turns out that experiencing anxiety when visiting health services has an increased risk of death from DHF due to crude OR < Or (2) (3.3 > 70), so there is confusion that increases the relationship between anxiety about visiting health services and actual death due to dengue.

Prolonged anxiety will cause stress. It interferes with daily activities and causes instability in the situation and condition, one of which is that people are afraid to check with health services. Anxiety is a feeling almost the same as fear, but anxiety tends to be less specific

(Hikmah & Kasmini, 2015). A similar study conducted by Livana et al. (2020) found that all respondents were worried about visiting local health services so that people were alert and avoided the transmission of Covid-19. Another researcher explained that five respondents experienced anxiety resulting from concerns that made respondents afraid to check with health services during the COVID-19 pandemic (Puspita Mustakim, 2021).

Conclusions

Based on the results, the study concludes that the factors associated with DHF mortality are gender (p-value = 0.009, OR = 4.750) and a history of suffering from DHF (p-value = 0.001, OR 7.500). While the age factor was not associated with mortality due to DHF (p-value > 0.05). From the confounding variables, there was an increase in anxiety about visiting health services during the COVID-19 pandemic.

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Determinants of Diarrhea in Toddlers at Post-Declaration Open-Defecation-Free Area

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Abstract

Kudus District Health Office in 2020 reported that diarrhea was still the main cause of post-neonatal and toddler mortality even though Kudus District had become an Open Defecation Free (ODF) District in 2019. The highest case finding was in the working area of the Gondosari Health Center at 22.9% in 2020 and an increase of 20.8% compared to the previous year. Aim: to find out the determinants of the incidence diarrhea in toddler after ODF declaration in the work area of the Gondosari Health Center, Kudus Regency. Method: this type of research is an analytic observational study with a cross-sectional design and was obtained in December 2021. The number of samples was 71 samples with the purposive sampling technique. The research instrument used a questionnaire sheet and an observation sheet. Data analysis used Chi-Square and Fisher tests. Result: the results showed the quality of latrine facilities (RP=1.9 and p=0.112), PAMRT (RP=1.0 and p=1,000), PLCRT (RP=3.1 and p=0.001), drinking water sources (RP= 1.1 and p=0.986, water microbiological quality (RP=4.0 and p=0.026). Conclusion: there is a relationship between PLCRT and water microbiological quality with the incidence of diarrhea in children under five after the ODF declaration in the Gondosari Health Center working area. It is hoped that the government will seek a better water source development program for the community and regular monitoring of ODF areas.

Introduction

Diarrhea ranks eighth globally as the leading cause of death for all ages and accounts for approximately 1.65 million annually worldwide. In children under five, diarrhea kills more than 440,000 children annually, making it the major cause of death in children under five (GBD 2016, 2018). About 78% of children dying from diarrhea live in Africa and Southeast Asia (Mernie, Kloos and Adane, 2022). One of the risk factors for diarrhea that is often studied is the environmental factor of the settlement or community residence, which includes clean water facilities, environment sanitation, family latrines, and home conditions.

On December 2, 2019, Kudus Regency was declared 100% Open Defecation Free (ODF) and became the 14th district in Central Java to achieve ODF Regency. With this declaration, it is hoped that it will prevent the spread of environmental-based diseases, one of which is diarrhea. Nevertheless, the rate of finding cases of diarrhea is still increasing from 2019 to 2020. The Incident Rate (IR) of diarrhea for all ages in the Kudus Regency is from 18.5% to 31.3% (Dinas Kesehatan Kabupaten Kudus, 2020b) , exceeding the 10% predetermined target of the estimated number of people with diarrhea of all ages. When IR diarrhea in children under five in Kudus Regency is 8% of the estimated diarrhea in health facilities. It has decreased by 3.5% from 2019. Yet it is still the major cause of post-neonatal death and death in children under five, so it is still a concern and priority in its prevention. The highest finding of diarrhea cases in the Kudus Regency was in the working area of the Gondosari Health Center, which was 22.9%. This figure has increased by 20.8% compared to 2019. Based on data as of August 2021, there were findings of 45 cases of

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diarrhea served at the UPTD of the Gondosari Health Center (Puskesmas Gondosari, 2021).

Community-Based Total Sanitation (Sanitasi Total Berbasis Masyarakat/STBM) is a health program launched by the government through Kepmenkes No.852/Menkes/SK/IX/2008, then strengthened by the issuance of Minister of Health Regulation No. 3 of 2014 concerning Community-Based Total Sanitation. The outcome indicator of the STBM National Strategy is a decrease in the incidence of diarrheal diseases and other diseases related to sanitation and hygiene behavior. STBM consists of five pillars, namely: stopping open defecation, washing hands with soap (Cuci Tangan Pakai Sabun/CTPS), managing drinking water, and household food, securing household waste, and securing household liquid waste. Children who live in families that do not apply STBM have a 1.63 times higher chance of experiencing diarrhea compared to children who live in families that implement STBM, as well as the use of clean water and good quality latrines, will experience a 20% less risk of diarrhea (Soboksa et al., 2019). In addition, improved hygiene, such as the practice of washing hands with soap at critical times can reduce the incidence of diarrhea in children by 35% (Hashi, Kumie and Gasana, 2017).

In the working area of the Kudus District Health Center, families with access to proper sanitation facilities (healthy latrines) account for 95.6% of the total population (Dinas Kesehatan Kabupaten Kudus, 2020b). Based on the Environmental Health Risk Assessment (EHRA) study report in 2020, 78.73% of the 132 villages/sub-districts in Kudus Regency did not do CTPS at five critical times, did not do waste sorting, and did not segregate waste by 92.39%. The waste canal (Saluran Pembuangan Air Limbah/SPAL) at risk of being polluted is 94.7%. Meanwhile, 20% of the drinking water used by households still uses rainwater, and 25% comes from river water (Dinas Kesehatan Kabupaten Kudus, 2020a).

By 2020, around 2 billion people worldwide will not have access to safely managed drinking water, and 3.6 billion will not have access to safely managed sanitation services (Wagari, Girma and Geremew, 2022). In Indonesia, nearly 100 million people lack access to proper sanitation, and 33 million live without proper drinking water (Cameron et al., 2021). Drinking water from protected sources does not mean it is safe because it still allows contamination with pathogens during transportation and storage. The estimation is that 10% of good drinking water sources have been contaminated with fecal material containing at least 100 Escherichia coli or thermotolerant coliform bacteria per 100 ml (Bain et al., 2014). Meanwhile, the water in the packaging has a small risk of contamination with feces (Wolf et al., 2018).

Based on a preliminary survey conducted in October 2021, out of ten respondents, four of them did not wash their hands with soap in five critical times of CTPS, six had open trash cans, seven had open SPAL and were not airtight, and seven still used drinking water from unprotected sources

In Kudus Regency, the findings of diarrhea cases still occur in areas with ODF, especially in the work area of the Gondosari Health Center, Gebog District. This study aims to determine the determinants of the incidence of diarrhea in children under five in areas that have been declared ODF, including the quality of latrine facilities, household drinking water management, household liquid waste management, drinking water sources, and water microbiological quality. The results of this study are expected to provide a more comprehensive picture as a basis for policy-making in preventing diarrhea.

Method

This type of research uses analytic observational with a cross-sectional research design. It took time from December 2021 until February 2022 in the working area of the Gondosari Health Center, Kudus Regency. The independent variables in this study were the quality of latrine facilities, Household Drinking Water Management (Pengelolaan Air Minum Rumah Tangga/PAMRT), Household Liquid Waste Management (Pengelolaan Limbah Cair Rumah Tangga/PLCRT), drinking water sources, and microbiological quality of water. The dependent variable in this study is the incidence of diarrhea in children under five. It used instruments of questionnaire sheets,

observation sheets, and compact dry to measure the microbiological quality of water.

The sampling technique used is purposive sampling by the inclusion and exclusion criteria. Obtained 71 samples that meet the inclusion and exclusion criteria. The inclusion criteria in this study were that the respondent was a mother of a toddler who was willing to be the subject, and in the house, some toddlers lived in the working area of the Gondosari Health Center. The exclusion criteria were mothers of children under five who were not at home at the time of the study. The primary data collection technique was direct observation of the research location. Secondary data collection techniques were from the Kudus Regency Health Office and Gondosari Health Center.

The analysis used was cross-tabulation to determine the relationship between the independent and dependent variables. The statistical test used is the Chi-Square test if the cells have an expected value of less than five and a maximum of 20%, and Fisher's test if the Chi-Square test conditions do not meet. This research has obtained ethical clearance from the Health Research Ethics Commission, Semarang State University, with registration number 394/KEPK/EC/2021.

Results and Discussions

Table 1 shows 24 (33.8%) toddlers with diarrhea in the last three months and 47 (66.2%). Respondents with quality latrine facilities do not meet the requirements (18.3%), while respondents having quality latrine facilities meet the requirements (81.7%). Respondents who manage drinking water unsafely are (4.2%), while those with drinking water safely are (95.8%). Respondents who do liquid waste poorly are (31.0%), while those who manage liquid waste well are (69.0%). Respondents with unprotected drinking water sources are (39.4%), while those with protected drinking water sources are (60.6%). Respondents with water microbiological quality do not meet the requirements of (73.2%), while those who have water microbiological quality meet the requirements are (26.8%).

Tabel 1. Univariate Analysis Results

Variables	Frequency	Percentage(%)
Diarrhea Incident		
Yes	24	33,8
No	47	66,2
Latrine Facility Quality		
Does not meet the requirements	13	18,3
Meet the requirements	58	81,7
Drinking Water Management		
Unsafe	3	4,2
Safe	68	95,8
Domestic Liquid Waste Management		
Poor	22	31,0
Well	49	69,0
Drinking Water Source		
Unprotected	28	39,4
Protected	43	60,6
Water Microbiology Quality		
Does not meet the requirements	52	73,2
Meet the requirements	19	26,8

Source: Primary Data, 2021

Pathogens that cause diarrhea are transmitted mainly by the fecal-oral route. Pathogens from contaminated feces can be transmitted to new hosts through contaminated hands, drinking water, soil, flies, and food (Majorin et al., 2019). The availability of latrines reduces environmental pollution from excreta and can prevent the transmission of disease-causing organisms (Tafere et al., 2020). The quality of latrine facilities that meet the requirements are latrines with waterproof and non-slip floors and are channeled to the Wastewater Treatment System (SPAL). In addition, under the latrine is the septic tank with a distance of >10 meters from the water source. As in the research (Getahun and Adane, 2021) and (Yaya et al., 2018) that the latrines meet the requirements of the waste/sewage is channeled through the sewer system, septic tanks, facilities in the form of pit latrines, ventilated pit latrines, pit latrines with slabs, and compost toilets. The mechanism of diarrheal disease transmission is due to the latrine facility's quality that does not meet the requirements. It transfers disease-causing bacteria in the feces to the host through various media. Such as water, hands, insects, and soil which in turn will contaminate food/drinks (Sidhi et al., 2016). Children from homes with feces around holes/slabs/around latrines are three times more likely to get diarrhea than those with clean latrines (Natnael, Lingerew and Adane, 2021). Based on the analytical test, there is no relationship between the quality of latrine facilities and the incidence of diarrhea in children under five in the working area of the Gondosari Health Center, Kudus Regency, with a value of p = 0.112 (p> 0.05). This study is in line with research (Tutuanita, 2019), where there is no significant correlation between access to sanitation and the incidence of diarrhea. It is because Kudus Regency has been declared ODF, and based on research from 71 respondents, 81.7% already have quality latrines that meet the requirements.

Safe household drinking water management can break the chain of the spread of pathogens, but based on the results of research using the Chi-square test analysis, the p-value = 1,000 (p>0.05). It shows that there is no relationship between household drinking water management and the incidence of diarrhea in children under five in the working area of the Gondosari Health Center, Kudus Regency. It is because it is very likely that the route of germs transmission in the study site is not dominated by drinking water. Of the 71 respondents, 95.8% have managed to drink water safely, including boiling it before drinking and storing it in a clean and closed container. Boiling water to a boil can kill some diarrhea-causing pathogens such as Shigella flexneri (Moyo et al., 2022). People tend to only know the importance of safe drinking water management but ignore personal hygiene when using the water (Ko and Sakai, 2022). According to (Mcclelland et al., 2022), storing drinking water in separate special containers and separating drinking water from other water supplies can reduce the risk of diarrhea.

The research on household liquid waste management variables with diarrhea in toddlers obtained a p-value = 0.000 (p <0.05). It shows a relationship between household wastewater management and the incidence of diarrhea in children under five in the working area of the Gondosari Health Center, Kudus Regency. Domestic or domestic liquid waste includes water used for bathing, used for washing clothes, used for washing furniture, food ingredients, and others. In this study, the household liquid waste management meet the requirements when it does not stagnate, the sewer is watertight and closed, and connected to infiltration wells or communal Wastewater Treatment Plants (IPAL). Disposal of liquid waste that does not meet the requirements can cause contamination of groundwater surfaces and water sources. According to (Barrantes et al., 2022), rotavirus, enterovirus, and norovirus are pathogens that are often transmitted through water. They pollute water through human activities such as leakage of sewers and septic systems, agricultural and urban runoff, and unsafe disposal of wastewater. Reducing the risk of water-borne diarrhea is critical to achieving the 6th sustainable development goal of ensuring people have access to clean water and sanitation (Meki, Ncube and Voyi, 2022). The waste needs proper management to prevent contamination so that liquid waste does not become a breeding ground for disease germs such as flies, does not contaminate water sources,

and soil, and does not cause odors. Puddles of water around the house due to unqualified sewerage can trigger the emergence of disease vectors such as cockroaches and cause diarrhea (Sembiring, Wulan S.R., Annida H., 2022). The results are in line with research (Mebrahtom, Worku and Gage, 2022), stating households that manage wastewater inappropriately are closely related to the diarrhea incidence and are three times more likely to die from diarrhea in infants than households that manage their waste liquid properly.

The research on the source of drinking water with the incidence of diarrhea in toddlers obtained a value of p = 0.784 (p> 0.05), which means that there is no relationship between drinking water sources and the incidence of diarrhea in children under five in the work area of the Gondosari Health Center, Kudus Regency. According to Grady et al., (2015), the criteria for protected drinking water sources include water sources from plumbing/companies, drilled wells/pumps, protected dug wells and protected springs, rainwater storage, and bottled water (if the water source is for other household needs are protected). The results are in line with research (Magdalena et al., 2019) which states that there is no relationship between drinking water sources and the incidence of diarrhea in toddlers, with a p-value of 1,000. According to research (Bhar et al., 2017), on the use of safe drinking water and slum household sanitation facilities in Siliguri, West Bengal said that the use of drinking water sources by the community is increasing or high. But the piping connections and toilet sanitation used are still low. So the incidence of diarrhea is influenced by water sources contaminated with feces. Changes in surface water and groundwater conditions that are contaminated due to climate change also contribute to the transmission of diarrheal diseases (Dimitrova et al., 2022).

The study obtained a p-value = 0.026 (p <0.05), indicating a relationship between the microbiological quality of water and the incidence of diarrhea in children under five in the Gondosari Health Center working area, Kudus Regency. The cause of microbiological contamination of clean water could be pipe leaks, water source conditions, and water reservoir conditions. When boiled water, it could be recontamination. Especially during storage and transfer, include boil with incorrect temperature/time (Wani, Smeets and Shrivastava, 2022). Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 492/MENKES/PER/IV/2010 concerning Drinking Water Quality Requirements, namely water that meets physical, microbiological, chemical, and radioactive requirements contained in mandatory and additional parameters (Peraturan Menteri Kesehatan RI, 2010). Raw water for drinking water that meets biological requirements must not contain pathogenic microorganisms that can cause disease. The pathogenic bacteria determination presence can be done by testing the presence of Escherichia coli, an indicator bacteria of water pollution, and total coliform, showing coliform bacteria from feces, soil, or other natural sources (Rakesh et al., 2022). The microbiological parameters in the drinking water quality requirements meet the requirements if the total coliform bacteria is 0 CFU/100 ml of water sample and the permissible level of E. coli is 0 CFU/100 ml. Lack of access to clean water, poor sanitation, and inadequate personal hygiene account for 90% of the incidence of diarrhea (Ayalew et al., 2018).

The results are in line with research Mengistie et al., (2022), which states that the presence of E.coli in water is associated with an increase in the incidence of diarrhea.

Table 2. Bivariate Analysis Results

Independent Variables	Diarrhea		Not Diarrhea		RP (95%Cl)	p
	f	%	f	%		
Latrine Facility Quality						
Does not meet the requirements	7	53,8	6	46,2	1,9 (0,96-3,49)	0,112
Meet the requirements	17	29,3	41	70,7		
Drinking Water Management						
Unsafe	1	33,3	2	66,7	1,0 (0,19-5,05)	1,000
Safe	23	33,8	45	66,2		
Domestic Liquid Waste Management						
Poor	14	63,6	8	36,4	3,1 (1,64-5,89)	0,001
Well	10	20,4	39	79,6		
Drinking Water Source						
Unprotected	10	35,7	18	64,3	1,1 (0,56-2,11)	0,986
Protected	14	32,6	29	67,4		
Water Microbiology Quality						
Does not meet the requirements	22	42,3	30	57,7	4,0 (1,04-15,48)	0,026
Meet the requirements	2	10,5	17	89,5		

Source: Primary Data, 2021

Conclusions

There is a relationship between Domestic Liquid Waste Management/PLCRT and water microbiological quality with the incidence of diarrhea in children under five after the ODF declaration in the Gondosari Health Center work area. There is no relationship between the quality of latrine facilities, Drinking Water Management/PAMRT, and drinking water sources with the incidence of diarrhea in toddlers after the ODF declaration in the Gondosari Health Center work area. Health agencies are expected to give special attention to the community, especially parents of toddlers who live far from health facilities, while still providing health education. In addition, regular monitoring for ODF areas with collaboration between communities, government organizations, and community associations as a strategy for preventing diarrhea in children under five, as well as developing better water sources.

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Availability of Infrastructure and Covid-19 Prevention Behavior in Public Place

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Abstract

Public places or facilities are places that can be the locus of the spread of Covid-19. Previous research shows that the application of health protocols in public places is still low in the discipline. The purpose of this study is to find out how the availability of infrastructure impacts the behavior of preventing Covid-19 in public places. This research is a cross-sectional study, with the independent variable being the availability of infrastructure in public places and the dependent variable being the behavior of preventing Covid-19. It took time in 2021. Public places, include malls/shopping centers, traditional markets, places of worship, and public service places. The sample is 264 people with incidental sampling techniques. Data collection was through the distribution of online questionnaires. Data were analyzed by univariate and bivariate with the Chi-Square test (α <0.05). There is a relationship between the availability of infrastructure and behavior in preventing Covid-19 in public places. Public Places with adequate infrastructure are more supportive of the implementation of the behavior of Covid-19 prevention. The government, community leaders, and public place managers must monitor the availability of infrastructure to prevent the spread of Covid-19. There needs to be special attention to the implementation of Covid-19 prevention in public places, especially in traditional markets or street vendors.

Introduction

Nowadays, there has been a novel coronavirus pandemic SARSCoV-2 (Covid-19 disease, previously 2019-nCov) where the epicenter was from Hubei Province, China, and spread to various countries in the world (Velavan & Meyer, 2020). As of November 2021, 224 countries, areas, and territories worldwide infected with Covid-19. The number of cases reached 252 million, with fatality or death totaling 5 million people. In Indonesia alone, to date, the total number of cases is 4.2 million, with deaths reaching 143,592 people (Worldometers, 2021).

The Covid-19 pandemic causes various impacts, ranging from health, economic, and agricultural to environmental. Not only morbidity and mortality, but Covid-19 also affects mental health. There was an increase in anxiety, depression, post-traumatic stress disorder, psychological distress, and stress in populations in China, Spain, Italy, Iran, the United States, Turkey, Nepal, and Denmark during the Covid-19 pandemic (Xiong et al., 2020; Cao et al., 2020). From an economic perspective, the length of lockdown, monetary policy, and international travel restrictions affect economic activity (Ozili & Arun, 2020) and increase the number of unemployed (Song & Zhou, 2020). The Covid-19 pandemic also impact the agricultural sector, where restrictions on mobility affect the food supply chain, thus impacting food security (Siche, 2020). From the environmental side, Covid-19 has had a positive impact in the form of improving air quality (Saadat et al., 2020), reducing carbon emissions, and cleaner air which are the effects of the lockdown policy (Wang & Su, 2020; Lal et al., 2020). However, the pandemic is increasing the amount of bio-medical waste as well as the use of plastics (Debata et al., 2020; Chowdhury et al., 2021).

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Covid-19 can be transmitted between humans Liu et al., (2020), or through close contact with an infected person through oral and nasal secretions. These secretions include saliva, respiratory secretions, or droplet (splash) secretions (Baghizadeh Fini, 2020; Jayaweera et al., 2020). Some of the efforts that can be taken to prevent the transmission of Covid-19 are maintaining distance, self-isolation, washing hands, using a hand sanitizer, routinely disinfecting surfaces that are frequently touched, and wearing masks (Kumar & Morawska, 2019; Chu et al., 2020).

The Indonesian government has launched various programs to prevent the spread of Covid-19. Some steps to prevent the spread of Covid-19 are using masks, washing hands, maintaining distance, reducing mobility, and avoiding crowds. However, conditions on the ground state that public compliance with COVID-19 prevention behavior is still lacking. BPS data shows that the implementation of health protocols still needs attention, such as not being obedient in avoiding crowds (22%), washing hands with soap/hand sanitizer (25%), and maintaining a minimum distance of 2 meters (33%) (Tusianti et al., 2021).

The application of health protocols in public places needs special attention because they potentially be the locus of the spread of Covid-19. Public places such as shopping centers or malls, or traditional markets have the potential to create crowds, making it hard to maintain a distance. Compliance with the application of health protocols in public places is still not optimal. It is known from many researches conducted in public places such as markets and places of worship. As many as 55.63% of Padang Bulan Morning Market traders in Medan City do not implement health protocols (Ginting et al., 2021). Based on the survey on compliance with the implementation of the Covid-19 health protocol, some mosque congregations do not apply health protocols, such as not wearing masks and not washing their hands with soap or hand sanitizer, and still crowding after prayers. (Mudhofar, 2021).

The formation of a person's behavior, including Covid-19 prevention behavior, is affected by several factors. One of the enabling factors for COVID-19 prevention behavior is the availability of facilities and infrastructure. The study's purpose is to find how the availability of infrastructure impacts the behavior of preventing Covid-19 in public places.

Method

This study is an observational analytic study with a cross-sectional approach. The independent variable in this study is the availability of infrastructure (hand washing facilities, hand sanitizers, thermometers). The dependent variable is Covid-19 prevention behavior, including using masks, washing hands or using a hand sanitizer, and keeping a distance. The population is Indonesian people who visit public places. The sample was taken by incidental sampling where the determination is based on chance, and who was deemed suitable could be used as a sample, with the respondents' criteria being over 17 years old and willing to become respondents by agreeing with informed consent. The sample obtained were 264 people. It is calculated based on the formula for the hypothesis test for two population proportions (two-sided test), where the value of the population proportion comes from similar studies.

The instrument in this study was a questionnaire containing questions about the availability of infrastructure and Covid-19 prevention behavior. The scale used was the Guttman scale which consisted of two answer choices, namely yes and no. The instrument has been tested for validity and reliability. Data collection was by distributing online questionnaires by google form and analyzed by univariate and bivariate with Chi-Square Test with a significance value of = 0.05. This research has passed the ethical review of the Malang Health Polytechnic with the number Reg.No.: 071/ KEPK-POLKESMA/2021.

Results And Discussions

A total of 264 respondents participated in this study. They were from 21 provinces in Indonesia. Most are from West Java, DKI Jakarta, Central Java, and Banten. Consisting of 190 female respondents and 74 male respondents. The average age of the respondents is 26 years, with the youngest age 18 years and the oldest at 62 years, and the majority of respondents aged

25 years. Most respondents have an SMA/SMK (high school) equivalent (Table 1).

Of a total of 264 respondents, 230 respondents visited malls or modern shopping centers (87.12%), 208 traditional markets or street vendors (78.78%), 219 places of worship (82.95%), and services public (samsat, banks, government offices, etc.) as many as 218 people (82.57%) (Image 1).

Table 1. Respondents' Characteristics

Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	74	28,03%
Female	190	71,97%
Age		
≤ 25 years	165	62,50%
26-45 years	87	32,95%
>45 years	12	4,55%
Education		
Junior High	2	0,80%
Senior High	121	45,80%
Under Graduate	40	15,20%
Graduate	62	23,50%
Post Graduate	39	14,70%

Source: Primary Data, 2021

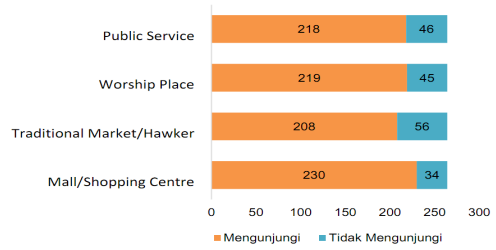

Image 1. Number of Respondents visiting Public Places
Source: Primary Data, 2021

Public places in the form of malls, worship places, and public service places (samsat, banks, government offices, etc.) have adequate facilities and infrastructures such as hand washing facilities, hand sanitizers, and thermometers for temperature checks. However, public places like traditional markets or street vendors have inadequate infrastructure because not all provide hand washing facilities or hand sanitizers and rarely provide thermometers for checking the temperature of visitors or traders. In contrast to malls, places of worship, and public service places where there is usually a person in charge at each entrance to check the temperature of visitors, traditional markets, tend to be difficult. Apart from the absence of someone responsible for temperature checks, there are also many market entrances. The availability of hand washing facilities also needs attention. Because of the research results, not all traditional markets provide adequate hand washing facilities. It requires serious attention from various elements, both regional heads and traditional market managers to improve infrastructure for Covid-19 prevention.

Respondents stated that most Covid-19 prevention behavior in public places such as malls, worship places, and public services is well. But the Covid-19 prevention behavior in traditional markets was not good because visitors or traders found it difficult to keep their distance and avoid crowds. It is in line with Nugroho's research which states that people have implemented social distancing in their daily lives but do not comprehensively implement it because of situations that are not possible (Nugroho et al., 2021). Keeping a distance can not only reduce transmission or transmission (Chian et al., 2020) but also reduce the number of unknown contacts that are difficult to trace (Kucharski et al., 2020). Research with computational fluid dynamics analysis shows that in no wind conditions, simulating breathing and coughing by keeping a distance of 1-2 meters is considered effective. However, when sneezing, the recommendation is at least 2.8 meters to reduce droplet exposure.

Evaluation by assuming the presence of wind in the environment shows that when breathing in light wind conditions, maintain the recommended distance of 1.1 meters. When coughing at least 4.5 meters and when sneezing at least 5.8 meters. Therefore, mask use can protect during static air conditions (Chea et al., 2021). The mask usage also potentially prevents transmission and reduces the pandemic burden (Eikenberry et al., 2020). The use of masks is considered cost-effective. It is not only a form of self-protection but also a form of concern for the larger community in tackling the Covid-19 pandemic (Cheng et al., 2020).

The results of the bivariate test with the Chi-Square test showed a relationship between the availability of facilities and infrastructure in modern malls or shopping centers with Covid-19 prevention behavior (p = 0.000; PR 3.716), meaning that modern malls or shopping centers have the less risky infrastructure. 3.7 times to allow less Covid-19 prevention behavior to occur. Covid-19 prevention behavior in other public places such as traditional markets, places of worship, and public services is also influenced by the availability of infrastructure with a p-value of 0.000 and a PR value of 2.074, respectively; 3,364; 6,324. It shows that the absence or inadequate infrastructure, both in malls or modern shopping centers, traditional markets or street vendors, places of worship, and public services, can increase the risk of visitors not implementing Covid-19 prevention behavior or health protocols (Table 2).

Table 2. Relationship of Facilities and Infrastructure Availability with Covid-19 Prevention Behavior in Public Places

Facilities and Infrastructures	Covid-19 Prevention Behavior			p-value	PR (95% CI)
	Poor	Good	Total		
Mall					
Inadequate	20	16	36	0,000	3,716 (2,382 - 5,800)
Adequte	29	165	194		
Traditional Market or Hawker					
Inadequate	143	32	175	0,000	2,074 (1,351 - 3,185)
Adequte	13	20	33		
Worship Places					
Inadequate	51	36	87	0,000	3,364 (2,230 – 5,076)
Adequte	23	109	132		
Public Service Places					
Inadequate	25	23	48	0,000	6,324 (3,575 – 11,188)
Adequte	14	156	170		

Source: Primary Data, 2021

One of the things that can be done to prevent the spread of Covid-19 is to wash your hands using antiseptic soap and with clean running water for at least 20 seconds before consuming food, after touching your nose, coughing, or sneezing to ensure that your hands are free of germs and also kill SARS-CoV-2 (Ayenigbara et al., 2020). However, the practice of washing hands will be difficult if there is no water availability or there is no water distribution mechanism (Ray, 2020). The water availability is vital because washing hands under running water is the primary approach to reducing the transmission of Covid-19 (Antwi et al., 2021). So that the lack of availability and access to water can increase the risk of Covid-19 (Ghosh & Das, 2020), and increase the incidence of several infectious diseases such as diarrhea, cholera, typhoid, hepatitis (Hathi et al., 2017) and global mortality (Adelodun et al., 2020).

During the Covid-19 pandemic, there was an increase in global water use (Amuakwa-Mensah et al., 2021; Sowby, 2020). It is undeniable that not all Indonesians have access to adequate clean water. Access to clean water in Indonesia reaches 87.75%, but only 6.8% of the population has safe access (Purwanto, 2020). BPS data shows that the proportion of households that have hand washing facilities

with soap and water in Indonesia in 2020 is around 78.3% (BPS, 2020). One alternative if hand washing facilities such as water and soap are unavailable is to use a hand sanitizer. Hand sanitizers containing alcohol can inactivate viruses and improve hand hygiene, especially when hand washing is difficult, like in locations with a high contact risk, such as transportation facilities or shopping centers (Howard et al., 2020). In addition, the use of hand sanitizer is considered efficient, accessible, and requires relatively little time to use (Hakimi & Armstrong, 2020). To prevent the spread of Covid-19, the improvement of hand hygiene in the community is necessary (Wu et al., 2020).

What can be done regarding increasing the availability of Covid-19 prevention facilities and infrastructure is to change the paradigm that water and sanitation are the pillars needed to create a healthy society (McGriff & Denny, 2020). Not only limited to the availability, but hand washing facilities provided in public places should also use the stampede model or other automatic models to minimize the touch of visitors' hands. Smart tech such as touchless is currently identified as one of the priorities in preventing Covid-19. Hand sanitizer can be provided as an alternative if water availability is difficult to obtain at the location. Both the availability of water, soap, and hand sanitizer must be checked regularly and refilled as soon as they run out. The provision of a thermometer is also necessary to ensure that visitors who come are not in a fever condition. Regional heads, people in charge of public places, and community leaders can collaborate across sectors in realizing the availability of sustainable Covid-19 prevention infrastructure. Public and government awareness is a vital component in reducing Covid-19 cases throughout Indonesia (Agustin et al., 2021).

Conclusion

There is a relationship between the availability of infrastructure and Covid-19 prevention behavior in public places. Public Places with adequate infrastructure are more supportive of the implementation of Covid-19 prevention behavior or health protocols. The government, community leaders, and public place managers must monitor the availability of infrastructure to prevent the spread of Covid-19. Special attention on the implementation of Covid-19 prevention in public places is needed, especially in traditional markets or street vendors. In addition to being able to provide education, it is necessary to provide adequate infrastructures such as hand washing facilities or hand sanitizers and thermometers. Supervision or inspections also need to be carried out to ensure that people comply with health protocols.

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Causative Factors of Chronic Kidney Disease in Patiens with Hemodialysis Therapy

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Abstract

Chronic kidney disease (CKD) is a pathological process with various etiologies, causing decreased kidney function progressively and irreversibly. The prevalence of CKD in the last ten years has increased. Causative factors of CKD vary highly in each countries around the world. Hemodialysis is still the primary kidney therapy besides peritoneal dialysis and kidney transplantation. This study aims to discover the causative factors of chronic kidney disease in patients with hemodialysis therapy at the Medan Rasyida Kidney Specialty Hospital in 2019. The design of this research is a descriptive method, the respondents were 307 chronic kidney disease patients with hemodialysis therapy taken by total sampling. The most common factors causing chronic kidney disease in patients with hemodialysis therapy were hypertension (59.6%), diabetes mellitus (32.2%), obstructive nephropathy (2.6%), and gout nephropathy (2.3%), polycystic kidney (2.0%) and glomerulonephritis (1.3%). Hypertension is the most common cause of CKD in Medan Rasyida Kidney Hospital in 2019.

Introduction

Chronic kidney disease (CKD) is a pathological process with various etiologies, causing decreased kidney function progressively and irreversibly. Chronic Kidney Disease (CKD) is a significant general medical issue portrayed by chronical frailty results and exceptionally high medical services costs. CKD, characterized as an expected glomerular filtration rate (eGFR) of under 60mL/min/1.73 m2, influences 10% to 16% of everyone worldwide and is related to death and kidney failure. The commonness of CKD increments with age (from 4% at more youthful than 40 years to 47% at 70 years or more established), as accomplish more extreme CKD stages described by lower eGFR and more regrettable results. The number of people with CKD will continue to increase as the elderly population grows, as will the number of people with diabetes and hypertension. Primary care clinicians will be faced with managing the complicated medical conditions specific to patients with chronic renal disease as the number of CKD patients grows. The nephrologist seldom handles the medical needs of CKD patients before renal replacement therapy is needed, as well established in the literature. We'll describe CKD staging and go through five CKD complications: anemia, hyperlipidemia, diet, osteodystrophy, and cardiovascular risk in this chapter (Matovinović, 2009; Tonelli, 2014; Ravani, 2020). The prevalence of chronic kidney disease over the past ten years has increased. Changes in the prevalence of CKD over time are debatable. According to data from the American National Health and Nutrition Examination Study, the prevalence of CKD stages 1 to 4 increased dramatically between 1999 and 2004 compared to 1988 to 1994 (131 versus 100 percent). Women had a higher prevalence of CKD than men. They were found to have a higher prevalence of CKD in two-thirds of studies that documented gender-specific CKD prevalence. Muscle mass is a significant determinant of serum creatinine concentration, and women have less muscle

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mass than men. The GFR estimation equations, on the other hand, use a correction factor for women to account for gender differences. These findings add to the growing body of evidence indicating that CKD prevalence differs by gender (Ângelo, 2012; Hill, 2016; Hasan, 2018). The rising frequency of chronic diseases such as chronic kidney disease has significant health and economic consequences in emerging countries. The rapid growth of common risk factors like diabetes, hypertension, and obesity, particularly among the poor, will result in even higher and more deep costs that emerging countries would be ill-equipped to cope. More than 7 million people in Europe suffer from chronic kidney disease, and 300,000 are undergoing kidney replacement therapy, either dialysis or kidney transplantation (Nugent, 2011; Ojo, 2014). According to Baseline Health Research Indonesia 2018, the prevalence of chronic kidney disease has increased since 2013 from 2% to 3.8%. A group with older patients (65-74 years) has a higher prevalence of chronic kidney disease than the other age groups, which is 8.23%. The chronic kidney disease prevalence according to gender is 4.17% for males and only 3.52% for females (Indonesia Health Profile, 2018).

According to the Indonesian Renal Registry (IRR) 2017, hypertension is the most common etiology of chronic kidney disease at 36%, diabetic nephropathy at 29%, primary glomerulopathy at 12%, chronic pyelonephritis/ PNC at 7%, nephropathy obstruction 4%, nephropathy lupus / SLE 1%, polycystic kidney 1%, uric acid nephropathy 1%, and unknown etiology 1%, etc. 8% (Indonesian Renal Registry, 2017). Hemodialysis is still the primary kidney therapy besides peritoneal dialysis and kidney transplantation worldwide (Liu, 2015; Hyodo, 2016). About 400,000 patients are currently treated with hemodialysis in the United States (USRDS Annual Data Report, 2013; Chirakarnjanakorn, 2017). While in Indonesia, the prevalence of hemodialysis patients continues to increase annually, counting the number of new patients in 2017 as 7,444 people and 21,051 active patients. New patients are patients who got their first dialysis in 2017, while active patients are all new patients both in 2017 and old patients from the previous year who are still on routine process treatment of hemodialysis and still alive (Indonesian Renal Registry, 2017; Prasad, 2015).

Methods

The research was conducted after obtaining permission from the Health Research Ethics Committee Faculty of Medicine University of Muhammadiyah Sumatera Utara No 380/KEPK/FKUMSU/2020. The research design is descriptive; the respondents were 307 chronic kidney disease patients with hemodialysis therapy taken by total sampling who meet the inclusion criteria. The samples were taken from patients with hemodialysis treatment starting from January to December 2019. The secondary data are collected from medical records that included a history of previous illnesses. The study inclusion criteria were patients diagnosed with CKD in the medical record, with hemodialysis therapy history in the Hemodialysis Unit of the Rasyida Kidney Hospital in Medan, and patients with complete medical record data.

Results And Discussions

The study took place at the Medan Rasyida Kidney Hospital with 307 medical records. Samples are taken from patients with hemodialysis therapy starting from January to December 2019.

Table 1. Distribution of CKD Patients Based on Respondent's Characteristic in the Hemodialysis Unit of the Medan Rasyida Kidney Special Hospital 2019

	Frequency	Percentage (%)
Age		
15-24	1	0.3
25-34	18	5.9
35-44	117	38.1
45-54	118	38.4
55-64	21	6.8
≥65	32	10.4
Gender		
Male	216	70.4
Female	91	29.6
Causative Factors		
Hypertension	183	59.6
Diabetes Melitus	99	32.2
Obstructive nephropathy	8	2.6
Uric acid nephropathy	7	2.3
Polycystic kidney	6	2.0
Glomerulonephritis	4	1.3
Total	**307**	**100.0**

Source: Primary data, 2019

The results found that the most group suffering from CKD is the 45-54 age category totaling 118 people (38.4%), and the second level is the 35-44 age category with 117 people (38.1%). Furthermore, ≥ 65 age category were 32 people (10.4%), 55-64 age category there were 21 people (6.8%), 25-34 age category there were 18 people (5.9%), and 15-15 age category with one person only (0.3 %).

The study found that the gender with a higher percentage suffering CKD in patients with hemodialysis therapy was male with 216 (70.4%) and female with 91 (29.6%). The study found that the factors causing chronic kidney disease in patients with hemodialysis therapy were hypertension (59.6%). The second, there was diabetes mellitus (32.2%), then obstructive nephropathy (2.6%), uric acid nephropathy (2.3%) %), polycystic kidney (2.0%), and glomerulonephritis (1.3%).

Table 2. Overview of the Causes of CKD by Gender.

Causative Factors	Male	%	Female	%	Total
Hypertension	127	58.8	56	61.6	183
Diabetes Mellitus	69	31.9	30	33	99
Polycystic kidney	4	1.9	2	2.2	6
Uric acid nephropathy	5	2.3	2	2.2	7
Obstructive nephropathy	8	3.7	0	0	8
Glomerulonephritis	3	1.4	1	1	4
Total	**216**	**100**	**91**	**100**	**307**

Source: Primary data, 2019

Based on the table above, 127 patients with hypertension in male (58.8%), followed by Diabetes Mellitus in 69 participants (31.9%). While female, 56 participants (61.6%) suffered from hypertension, and 30 (33%) suffered from Diabetes Mellitus.

Table 3. Overview of the Causes of CKD by Age.

Causative Factors	15-24	%	25-34	%	35-44	%	45-54	%	55-64	%	≥ 65	%	Total
Hypertension	1	0.5	8	4.4	74	40.4	71	38.8	9	4.9	20	11	183
Diabetes Melitus	0	0	6	6.1	37	37.4	37	37.4	9	9.1	10	10	99
Polycystic kidney	0	0	1	16.7	0	0	3	50	1	16.7	1	16.6	6
Uric acid nephropathy	0	0	2	28.6	2	28.6	3	42.8	0	0	0	0	7
Obstructive nephropathy	0	0	0	0	1	12.5	4	50	2	25	1	12.5	8
Glomerulonephritis	0	0	1	25	3	75	0	0	0	0	0	0	4
Total													**307**

Source: Primary data, 2019

Based on the table above, it was found that the most hypertension sufferers were in the age range of 35-44 years, with as many as 74 participants (40.4%), and the highest number of people with Diabetes Mellitus was in the age range of 35-44 and 45-54 years, namely 37 participants (37.4%).

Aging is a normal, progressive, and unavoidable biological process marked by a gradual loss of cellular function and structural changes in many organ systems. These morphological and physiological changes define senescence, a word that describes age-related changes that are more predictable than those caused by diseases. Patients with chronic kidney disease with an age range of 45-54 years have a higher percentage (38.4%) of 118 people. Following the reported Indonesian Renal Registry (IRR) in 2018, the most age suffering from CKD in hemodialysis patients is the age range 45-64 years. Patients aged less than 25 years contributed 2.57% to active patients. (Denic, 2016; Indonesian Renal Registry, 2017).

There is a high prevalence of CKD in the elderly. It is attributable mainly to the increas¬ing prevalence of traditional risk factors for CKD, such as diabetes, hypertension, and cardiovascular disease (CVD), as well as due to new definitions that have expanded the estimated glomerular filtration rate (eGFR) range for CKD. Among people aged 60 years or older, approximately 30% have proteinuria, and 26% have a GFR below 60 ml/min/1.73 square meters. The elderly are also prone to kidney damage due to other chronic diseases such as high blood pressure, diabetes, and renal tubulointerstitial disease. The CKD prevalence in the US adult population, was noted to be 11%. The prevalence in the US elderly was much higher at about 39.4% of persons aged 60+ years have been noted to have CKD verses 12.6 and 8.5% of persons aged 40–59 years and 20–39 years, respectively. Serum creatinine depends on muscle mass. The relation with GFR is influenced by age, gender, and body weight. The correct assessment of GFR is for the classification of patients with CKD. Serum creatinine has been used as a GFR marker in clinical practice for several years. It is widely acknowledged that serum creatinine is not a reliable indicator of GFR. The relationship between serum creatinine and GFR is affected by age, gender, weight, and based on muscle mass. As a result, formulas for estimating GFR have been established. The K/DOQI guidelines recommend that GFR calculation is by the recently formulated 'Modification of Diet in Renal Disease (MDRD)' method. Renal diseases, enhanced protein catabolism, and dietary variables have little effect on the generation of cystatin C in the body. Unlike creatinine, it does not alter with age or muscle mass. Its biochemical properties enable free filtration in the renal glomerulus, followed by metabolism and reabsorption in the proximal tubule. For these reasons, serum cystatin C suggested to be an ideal endogenous marker of GFR (Mallappallil, 2014; Murty, 2013; Malekmakan, 2013).

CKD is more common in older adults than in younger people. The kidneys are unable to create new nephrons. Therefore, when kidney disease or aging begins, the number of nephrons falls. Because birth weight has a positive relationship with nephron number, it can be used to estimate nephron number at delivery. Every ten years, the number of functioning nephrons drops by around 10%, and by the age of 80, just 40% of the nephrons are functional. Normal aging causes nephron loss due to nephrosclerosis and, more precisely, glomerulosclerosis. It is consistent with nephrosclerosis and subsequent nephron loss caused by reasons other than normal aging. Unfortunately, subclinical nephrosclerosis cannot currently be detected without a biopsy (Denic, 2017; Fattah, 2019). If CKD events occur at a younger age, it is possible due to unhealthy lifestyles. Especially the habits of consuming certain nephrotoxic substances such as coffee, energy supplement drinks, vitamin C supplements, soft drinks, smoking, consumption of NSAIDs (Non-Steroid Anti-Inflammatory Drugs), and herbal medicines. Globally, the overall number of people with diabetes is projected to rise from 415 million (8.8%) in 2015 to 642 million (10.4%) in 2040, with the highest changes expected in low- and middle-income countries' urban populations (LMICs). According to evidence from LMICs, there is significant CKD heterogeneity between urban and rural areas. Furthermore, relative

to high-income countries, the etiology of CKD among T2DM patients in LMICs is multifactorial and influenced by the burden of both non-communicable and communicable diseases. Unhealthy lifestyles, such as a high-fat diet and lack of physical activity, can hasten the onset of diabetes and its complications in more urbanized areas. In a nationwide study, 35.4 percent of Thai T2DM patients had CKD (eGFR 60 mL/min/1.73 m2), according to the findings (Jitraknatee, 2020; Michishita, 2017; Rahman, 2021).

The study found that the most gender suffering from CKD were male with 216 (70.4%) and female with 91 people (29.6%). This picture is almost the same as that reported by IRR in 2018 that the male gender is more in the amount of 57% and female in 43% (Indonesian Renal Registry, 2017). CKD progressions may differ depending on gender. Male patients show a substantially higher prevalence of CKD and incidence rate of ESRD than those observed in female patients. A survey conducted by the Japanese Society for Dialysis Therapy indicated sex differences in mean age at the start of dialysis. According to the United States Renal Data System (USRDS), 62% of CKD patients that reached end-stage renal failure in 2015 were men, whereas only 38% were women. In addition, it has been previously shown that women with CKD have a slower decline in renal function with time when compared with men. Chronic inhibition of NO, a powerful physiological vasodilator, causes systemic vasoconstriction with negative renal hemodynamic consequences, including renal ischemia and glomeruli collapse. Cultural and social environmental disparities (e.g., differences in medication prescriptions or disease perceptions) and biologically influences are possible reasons for sex differences in progression risk factors (e.g., hormonal and genetic factors) (Chang, 2016; Fanelli, 2017; Ricardo, 2019).

The study shows that hypertension is the most common cause of CKD in Medan Rasyida Kidney Special Hospital in the January-December 2019 period of 183 patients (59.6%) and secondly Diabetes mellitus among 99 patients (32.2%). Furthermore, Obstructive Nephropathy had four patients (2.6%), Gout Nephropathy had four patients (2.3%), Polycystic Kidney was six patients (2.0%), and finally, Glomerulonephritis was four patients (1.3%). These results are consistent with data submitted by IRR in 2018 that hypertension occupies the first position as a cause of CKD in patients undergoing hemodialysis therapy, equal to 36%, and diabetic nephropathy is second-order at 28% (Indonesian Renal Registry, 2017). Hypertension is a major risk factor for cardiovascular and renal disease. Conversely, chronic kidney disease (CKD) is the most common form of secondary hypertension, and mounting evidence suggests it is an independent risk factor for cardiovascular morbidity and mortality. The prevalence of hypertension is higher among patients with CKD, progressively increasing with the severity of CKD. Based on a national survey of a representative sample of no institutionalized adults in the USA estimated hypertension occurs in 23.3% of individuals without CKD, and 35.8% of stage 1, 48.1% of stage 2, 59.9% of stage 3, and 84.1% of stage 4-5 CKD patients. The relationship between increased blood pressure (BP) and kidneys is multidirectional. The kidneys participate in the development and perpetuation of essential hypertension. Chronic kidney diseases (CKDs) are one of the most common causes of secondary hypertension. When hypertension of any etiology can lead to renal impairment (benign or malignant nephrosclerosis), increased BP accompanied by proteinuria is a vital factor related to CKD progression. Despite the high incidence of hypertension and the availability of appropriate treatments, only a few patients meet their treatment objectives. However, in the general population, this condition might be changing. Comparison of recent cohorts to patients from previous decades, it is clear that hypertension understanding and control have increased from 69 percent to 80 percent and 27 percent to 50 percent, respectively. Rates of hypertension recognition and control in CKD patients participating in prospective observational studies have been reported to be close to current levels in the general population. However, population statistics show that those with CKD have a lower likelihood of not only being informed of and controlling hypertension but also receiving sufficient care for other

cardiovascular risk factors. The unintended consequences of research participation on clinical treatment or adherence, as well as variations in the composition of different study populations, may explain this disparity. Although a large proportion of CKD patients need multiple antihypertensive drugs—in one study, 32% of CKD patients were taking four or more antihypertensive drugs—nonadherence does not seem to be any more frequent than in patients without the disease (Tedla, 2011; Monhart, 2013; Rahman, 2020).

In Indonesia, hypertension is the most common cause of CKD. As stated by Indonesia Health Profile in 2018, some people with hypertension do not know they are hypertensive. So they do not get treatment. The reasons hypertension sufferers do not take the medication include feeling healthy, irregular visits to health facilities, taking traditional medicine, using other therapies, forgetting to take medication, not being able to buy drugs, and there are side effects of drugs. According to this systematic analysis, CKD places a significant burden on the health systems of South Asian countries (India, Bangladesh, Pakistan, and Nepal). The high prevalence of diabetes and hypertension in this region is not surprising. The primary risk factor for CVD is high blood pressure, and Sub-Saharan Africa (SSA) has the highest prevalence of hypertension in the world. However, in South Asia, people are generally unaware of noncommunicable diseases such as diabetes, hypertension, and CKD. They seldom seek medical attention before a sign or symptom of CKD occurs. Furthermore, many people choose self-treatment or depend on unlicensed and unqualified practitioners. South Asian countries' health systems, like those of other LMICs, are unprepared to deal with the massive burden of NCDs. In these nations, the number of human capital devoted to the prevention and treatment of childhood diseases is also low and disproportionate. In addition, the weak referral mechanism prevalent in South Asian countries makes early detection of CKD cases difficult. Untreated CKD is clearly linked to the development of end-stage renal disease (ESRD) and cardiovascular diseases (CVDs), both of which are leading causes of death in LMICs. CKD has also been linked to a decrease in health-related quality of life and a loss of productivity (Hasan, 2018; Indonesia Health Profile, 2018; Jorgensen, 2020).

Conclusion

Based on the results of this research conducted on factors that cause chronic kidney disease in patients with hemodialysis therapy at the Rasyida Kidney Special Hospital Medan in January-December 2019, Hypertension is the most common cause causing chronic kidney disease (59.6%) and followed by Diabetes mellitus with (32.2%).

We recommend future researchers use this research as a consideration and reference to conduct research with a higher number of samples. For all doctors in Indonesia to be able to provide information and education to patients about hypertension. For colleagues to be able to give understanding to patients that anti-hypertensive drugs are always taken even though blood pressure is stable. Because anti-hypertensive drugs are neutralizing and will not cause blood pressure to rise even though it is stable. We hope health workers can provide better data and status on medical records. So easier to research patient medical record data and can provide better results for further research.

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Social Dynamics Covid-19 and Student Perceptions in Papua

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Abstract

The social dynamics faced by the people of Jayapura City related to the Covid-19 outbreak, namely increasing anxiety and even fear of the sound of ambulance sirens carrying patients so that a negative stigma appears on residents exposed to the virus. The purpose of the research carried out is to describe and analyze student perceptions as part of the community regarding the knowledge, handling, and sound of the Covid-19 ambulance siren especially in Jayapura City, in July 2021. This research is a quantitative study using a cross-sectional design, a sample totaling 63 Cenderawasih University students obtained from direct interviews as well as filling out questionnaires and google forms online. Data analysis used Chi-Square, univariate, bivariate, and multivariate with multiple logistic regression statistics. The univariate, bivariate, and multivariate values: (1) P=0.099, P=0.32, P=0.486, P=0.242, P=0.996, P=0.066, means that there is no relationship between age and gender with student perceptions of Covid-19; (2) P=0.000, P=0.005, there is a relationship between knowledge about Covid-19 and students' perceptions of vaccines; (3) P=0.411, P=0.715, there is no relationship between gender and age with students' perceptions of handling Covid-19; (4) P=0.593, P=0.000, there is no relationship between students' perceptions of the ambulance siren sound. Based on the results of the discussion in this study, namely: (1) Respondents have good knowledge or understanding of the endemic Covid-19 virus; (2) Most of the respondents saw the handling of Covid-19 in the fairly good range of categories; and (3) Respondents generally have a bad perception of the sound of ambulance sirens passing by carrying Covid-19 patients. Knowledge of influencing student perceptions is needed to provide comprehensive and equitable information to all communities about handling, prevention, and all information regarding joint efforts in overcoming COVID-19 in Papua.

Intoduction

The Covid-19 pandemic is a disease outbreak that destroys the joints of humanity worldwide (Wu et al., 2020). How come? Data and facts show that the number of confirmed cases has reached 39 million (Salmon, 2021) and has even approached 100 million (Aisyah et al., 2020). Based on these data, the mortality rate is at least 2.41%-3.1% (15,393) per day (B. Broomell & B. Chapman, 2021), with an average additional 4 thousand cases per day (Dinnes, et al., 2021). On a national scale, the Covid-19 distribution rate in Indonesia as of July 2021 reached 295,228 people, or 12.93%. Active cases are positive Covid-19 (Varela et al., 2021), and patients undergoing treatment or isolation (Sanborn et al., 2021). It shows that the percentage of active cases of Covid-19 in Indonesia has penetrated the world average, which is still at 6.32 percent. Then in a narrower sub-sector, namely in Papua Province, the number confirmed based on data from https://covid19.papua.go.id/ reached 34,232 cases. The data is described as follows: treated 6,852 (20%), cured 26,561 (78%), died 819 (2%), contacts 1,440, suspects 1,876, total hospitals 45, total referral hospitals 16.

Launching National Geographic in July 2021 stating a new variant of Covid-19 had appeared (Tali, et al., 2021), namely Corona

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delta plus (B.1.617.2.1 or AY.1) (Hossain et al., 2021). Although in-depth research has not been carried out, this variant is said to have a higher transmission ability (Zhen, 2020). Several provinces in Indonesia, which had been able to control Covid-19, are now experiencing several explosions again with the new variant. So that the government, through the Ministry of Home Affairs of the Republic of Indonesia (Kemendagri RI), issue the Instruction of the Minister of Home Affairs (Imendagri) Number 15 of 2021 concerning the Enforcement of Restrictions on Community Activities (PPKM) Covid-19 Emergency for Java and Bali Regions. Furthermore, in practice, the PPKM is also implemented by several other regions in Indonesia to form the basis for controlling the number of confirmed Covid-19 cases. Handling and preventing this virus outbreak also creates a social dilemma in society, especially in Jayapura City, Papua.

Close contact and the level of spread of Covid-19 caused hospitals to become overwhelmed and confused in accommodating patients. Field observation data in Jayapura City shows that the average place to receive Covid-19 patients has exceeded capacity, and the amount of oxygen stock is limited. The handling of patients also has a psychological-social impact on the community. Especially on the traffic back and forth for Covid-19 patients, both those who will be taken to the hospital for confirmed cases and patients who die and are taken to the cemetery. The sound of ambulance sirens from several hospitals around Jayapura City crossing the highway around the Cenderawasih University (Uncen) Abepura campus at least 5-9 times a day on average. The sound of sirens and ambulance traffic is getting more and more anxious, raising concerns for the public.

Previous research data, as follows: (1) There is a conclusion that the Task Force (Satgas) role for Handling the Covid-19 Virus in Perwata Sub-district, Kec. Teluk Betung Timur is good enough. However, the selection of mass media used has not been qualified. The information conveyed becomes less clear and does not reach the entire surrounding community (Sørensen et al., 2021); (2) First, the general perception of the importance of social distancing (SD) implementation in dealing with outbreaks can not control the public. So they behave under this general perception. Second, the general perception of non-compliance coming from certained profession, education level, or income level is not proven (Nugroho, et al., 2021); and (3) The public does not have confidence in the Covid-19 disease and the community's actions to avoid the spread of Covid-19 and are not fully aware of the dangers of the coronavirus pandemic (Seale, et al., 2021). Public perception data about the handling of Covid-19 from various places in Indonesia shows the importance of effective communication media (Chilamakuri & Agarwal, 2021). Meanwhile, providing understanding and awareness for the community to jointly fight the virus pandemic outbreak that does not yet know the end point of its completion (Kurdi et al., 2020). It is also the same as public perception regarding knowledge and handling of Covid-19 in Jayapura. When there is no good communication, it will create unrest in the community and ambulances with sirens going back and forth. Preliminary data from June to early July 2021 shows that the people of Jayapura City are getting more and more anxious to the point of causing fear with the sound of ambulance sirens carrying Covid-19 patients. Even those not carrying Covid-19 patients.

This study was conducted to describe answers to questions about the perceptions of students from the Faculty of Sports Science, Cenderawasih University (FIK Uncen) as part of the community in Jayapura City, Papua, facing the phenomenon of ambulances carrying Covid-19 patients with the sound of their sirens, and their knowledge and handling. The benefits obtained from this research data are that it can provide an overview of social phenomena that develop in the community, so stakeholders who will take policies can consider various aspects. The present value of this research is to bring up the psycho-sociological aspects of society as scientific data, especially in Jayapura City, Papua during, the new variant pandemic.

Method

The study is a cross-sectional design study (Grandou et al., 2020), and a cross-sectional approach is an epidemiological study that measures risk factors (Lee et al., 2018), and their impacts studied at the same time (Xiu et al., 2021), refined with qualitative data and quantitative values in the form of numbers (Lester et al., 2020). The research took time in July 2021 within the FIK Uncen Abepura campus. The population in this study amounted to 595 people, and the sample involved in data collection was the 2018 class of students as many as 63 respondents using the purposive sampling technique (Palinkas et al., 2015). The determination of the sample in this study was based on three criteria, namely: inclusion, exclusion, and dropout (R. de Jesus-Moraleida, et al., 2020). The data collection techniques used in this study were through phone interviews and WhatsApp applications using instruments of questionnaires and interviews (Afolayan & Oniyinde, 2019). Then, the research data was processed using descriptive quantitative with percentage techniques and analysis using Chi-Square, univariate, bivariate, and multivariate on each component aspect (Schober et al., 2018). Decision making is based on the value of r-count (Corrected Item Total Correlation) > r-table of 0.333, for df = 65-2 = 63; = 0.05 then the question item is valid or not. Then for the reliability value of 0.600, state that the questionnaire is reliable or consistent.

Results and Discussion

Validity testing was carried out using the SPSS for Window Version 23.0 program. In this study, validity testing was only carried out on 65 respondents, where decision-making was based on the value of r-count (Corrected Item Total Correlation) > r-table of 0.333, for df = 65- 2 = 63; = 0.05, then the question item is valid or not. The following is the data on the characteristics of the respondents in the univariate analysis shown in table 1 below:

Table 1. Distribution of Respondents Characteristics Data

Characteristics	Quantity (n)	Persentage (%)
1. Gender		
Male	24	38.10
Female	39	61.90
Total	63	100.00
2. Age (Years)		
20	14	22.22
21	28	44.44
22	21	33.33
Total	63	100.00

Source: Primary Research Data 2021

Table 1 describes the data as follows: (a) The respondents' gender characteristics are divided into male, as many as 24 people (38.10%), and female, as many as 39 people (61.90%). Totally, 63 people (100%). And (b) Data on the age of respondents are divided into 14 people (22.22%) 20 years old, 28 years old (44.44%), and 21 people (33.33%) age 22 years old. Furthermore, the data described include: First, data on the frequency and percentage of students' perceptions of Covid-19 knowledge are: (1) Very good, nine people (14.29%); (2) Good, 30 people (47.62%); (3) Pretty good, 13 people (20.63 %); (4) Not good, seven people (11.11%), and (5) Very not good, four people (6.35%). Based on this data, a common thread was that the majority of students at Cenderawasih University have good knowledge (understanding) about the Covid-19 virus that is endemic in the world, especially in the City of Jayapura, Papua; Second, data on student perceptions of the handling of Covid-19 are: (1) Very good, four people (6.35%); (2) Good, 19 people (30.16%); (3) Pretty good, 32 people (50.79%); (4) Not good, eight people (12.70%); and (5) Not good as much as 0%. Based on this data, most of the respondents from sports students at Cenderawasih University saw the handling of Covid-19 in a fairly good range; Third, data on the frequency of student perceptions of the Covid-19 ambulance siren sound include: (1) Very good as many

as 5 people (7.94%); (2) Good as many as 10 people (15.87%); (3) Pretty good as many as 18 people (28.57%); (4) Not good as many as 23 people (36.51%); and (5) Very not good as many as 7 people (11.11%). Based on this data, the majority of respondents have quite good and bad perceptions. Therefore, it can be concluded that the Covid-19 ambulance going back and forth with its siren sound is not acceptable to the public. Then, bivariate analysis in this study used the chi-square test. The results were presented in tabular form by displaying the p-value, confidence interval (CI), prevalence ratio (PR), mean, median, standard deviation, minimum and maximum of respective variables. The results of the bivariate analysis between age and gender groups with student perceptions, knowledge with student perceptions, respondents on handling Covid-19, and perceptions of the sound of the Covid-19 ambulance siren in Jayapura City in Table 2 below:

Table 2. Results of Bivariate Analysis of Research Data

Gender	Perception Range		Total	P Value	PR (95% CI)
	Positive	**Negative**			
	%	%	%		
Male	65.0	35.0	100	0.099	1.964 (0.979-3.940)
Female	48.6	51.4	100		1.528 (0.730-3.197)
Total	63.0	37.0	100		
Knowledge	**Perception Range**		Total	P Value	PR (95% CI)
	Positive	**Negative**			
	%	%	%		
Good	74.2	25.8	100	0.000	2.447 (1.627-3.679)
Not Good	54.1	45.9	100		1.528 (0.730-3.197)
Total	63.0	37.0	100		
Handling Covid-19	**Perception Range**		Total	P Value	PR (95% CI)
	Positive	**Negative**			
	%	%	%		
Good	64.2	40.7	100	0.411	0.811 (0.524-1.257)
Not Good	59.3	35.8	100		
Total	63.0	37.0	100		
Ambulance Sirens	Perception Range		Total	P Value	PR (95% CI)
	Positive	**Negative**			
	%	%	%		
Male	60.6	36.1	100	0.593	1.149 (0.752-1.756)
Female	63.9	39.4	100		
Total	63.0	37.0	100		

Source: Primary Research Data 2021

The data in Table 2 explains that: First, the statistical test obtained a P-value (0.099). So it can be concluded that there is no relationship between age and gender in student perceptions of Covid-19 in Jayapura City. Based on the analysis, there were two PR dummy homeworks. namely the PR of the adult age group obtained 1.964 with 95% CI (0.979-3.940). It means the male age group was 1.9 times more difficult to receive the covid-19 vaccine, and from the results, the female age group got a PR result of 1.528 with 95% CI (0.730-3.197). It means this age group is 1.5 times easier to receive the Covid-19 vaccine; Second, the statistical test obtained a p-value (0.000), so there is a relationship between knowledge about Covid-19 and students perceptions of the covid-19 vaccine in Jayapura City. Based the analysis, the PR value was 2.446 with 95% CI (1.627-3.679), meaning that students with poor knowledge of Covid-19 were 2.4 times more difficult to accept Covid-19 than those with good knowledge. Third, the statistical test obtained a p-value of 0.411, so there is

no relationship between gender and age with student perceptions of the Covid-19 handling in Jayapura City. Based on the results of the analysis, the PR score was 0.811 with 95% CI (0.524-1.257), meaning that students who had a good perception were 0.8 times more difficult to accept Covid-19 treatment than students with bad perceptions of handling Covid-19; and Fourth, the results of the statistical test obtained a P-value (0.593). So there is no relationship between students' perceptions of the sound of the Covid-19 ambulance siren in Jayapura City. Based on the analysis, the PR value was 1.149 with 95% CI (0.752-1.756), meaning that students with a good perception were 1.1 times more difficult to receive the Covid-19 ambulance siren sound than students with a bad perception of receiving the Covid-19 ambulance siren sound. Furthermore, the results of the multivariate analysis were carried out to analyze the relationship between the independent variables, which were more dominant in influencing the dependent variable in this study. The following are the stages in conducting multivariate data analysis as described in table 3 below:

Table 3. Bivariate Selection in Multivariate Modeling

Variable		P-Value	PR crude	95% CI
Sex	Male	0.323	2.075	0.488-8.824
	Female	0.486	1.934	0.302-12.371
Age	20	0.242	1.4,83	0.766-2.872
	21	0.996	0.396	0.239-4.155
	22	0.066	0.289	0.968-2.651
Knowledge of Covid-19		0.005	1.602	0.300-3.245
Handling Covid-19		0.715	0.829	0.301-2.272
Ambulance Siren Sound		0.000	0.034	0.016-0.072

Source: Primary Research Data 2021

Multivariate modeling analysis by selecting (removing) the variables gradually. Starting from the variable with the highest P-value (P-value > 0.05) among other variables. If the PR value of all independent variables changes > 10%, then the variable is confounding and must be included in the multivariate modeling analysis. Then, if the PR value is < 10%, the variable must be excluded from the multivariate modeling analysis because it is not confounding. After the selection, several confounding variables and variables were excluded because PR < 10%.

In general, the field research yielded the following results: (1) Most respondents in this study were female and mostly 21 years old; (2) In general, respondents have good knowledge (understanding) about the Covid-19 virus as a pandemic outbreak; (3) Most respondents saw the Covid-19 handling in a fairly good range; and (4) Most respondents have quite good and bad perceptions of Covid-19 ambulance traffic, so the siren is not acceptable to the public. The research carried out has several specific objectives, namely to describe and analyze the perceptions of sports students regarding the knowledge, handling, and sound of the Covid-19 ambulance siren in Jayapura City. Furthermore, the analysis is as follows:

First, respondents have good knowledge or an understanding of the Covid-19 virus that is endemic worldwide, especially in Jayapura City. The results are related to the one showing a significant relationship between knowledge and perception with preventive measures against Covid-19 disease (Coche & J. Lynn, 2020). It can then mean that knowledge is a vital basis for the formation of community action because good knowledge can create good behavior, especially Covid-19 (Susana, 2020). Therefore, it is hoped that the level of knowledge of sports students will also affect compliance with using masks and hand washing compliance as an effort to prevent the spread of the Covid-19 virus. Compliance is a positive behavior from students as part of society. On the other hand, bad public behavior will increase the number of cases and death rates due to corona virus transmission.

Second, most respondents saw the handling of Covid-19 in the fairly good category. Previous research had also emphasized this

aspect, namely poor belief in accelerating the handling of the Covid-19 pandemic and when the end of the spread of the virus caused people to not comply with health protocols (Hibbing et al., 2021). The daily needs of the community to meet the needs of life also provide psychological and economic pressure to carry out activities as usual even though PPKM is implemented (Muninggar et al., 2021). The process of handling the pandemic is also constrained by some community groups who still underestimate the spread of Covid-19 and don't even bother about enforcing health protocols, appeals from the government and the WHO (World Health Organization). In addition, there is even a stigma that Covid-19 is a conspiracy. So until now, there is still opposition, disagreement, and people continue to gather or group without paying attention to physical distancing/social distancing. Most people who feel immune and safe from the Covid-19 virus without complying with health protocols must continue to be given humanist education related to awareness of preventing and tackling pandemic outbreaks together with the support of all parties.

Third, respondents generally have a bad perception of the sound of ambulance sirens passing by carrying Covid-19 patients. The results of this study correlate with data findings in the field that there is an increasing number of reports of public stigmatization of people affected by Covid-19 transmission in several areas as a result of disproportionate information and opinion media (Merlin & Vanchapo, 2021). Building good communication and stigma about Covid-19 is vital because if there is a bad stigma, it can make confirmed positive people choose not to get checked out rather than being discriminated against (Endika & Azam, 2021). Two-way communication between the community and the government can be one of the ways to deal with a stigma so that it helps the community to find out factual information about Covid-19. Therefore, several steps and efforts are needed to make the community calmer in dealing with the pandemic, namely: (1) Disseminate correct information about Covid-9 based on facts, using language that is easy to understand; (2) Provide support to confirmed people or post-Covid-19 patients and health workers who handle them; (3) Disseminate positive news and information in the context of preventing and handling pandemic outbreaks; (4) Promote content or information about basic infection prevention measures, symptoms and when to seek Covid-19 health care, and create a positive environment that shows concern/empathy.

Based on the discussion of this research, understandable that a person's gender, whether male or female, has the same potential for intelligence and knowledge. Knowledge is the result of the knowing process and happens after people sense a particular object. Sensing occurs through the five human senses, namely the senses of sight, hearing, smell, taste, and touch. Most human knowledge is obtained through the eyes and ears. Knowledge or cognition is a very important domain in shaping one's actions. Experience and research prove that behavior based on knowledge will last longer than one that is not. The knowledge, in this case, is related to the Covid-19 virus pandemic and the genetic mutations it carries. Then speaking of epidemics and social problems, this too is closely related to how policymakers control matters.

Control policies issued by the Government related to the Covid-19 pandemic focus on preventing transmission in society. Furthermore, in principle, the Government's policy in preventing the transmission possibility is simply divided into three parts. Namely around the place of residence, while traveling, and when doing activities outside the home. For this reason, to regulate aspects of life and the number of people who are not small, it is necessary to have certained policies serving as guidelines and the dynamics of periodic renewal. These efforts are the government's reflection to always be responsive in carrying out their duties and making decisions. However, behind the handling and prevention carried out, the implementation of the policy looks like, and the cooperation of all parties and community support is vital to bring many significant results. Furthermore, to handle and prevent the Covid-19 pandemic outbreak in Jayapura City, communication is needed in implementation in the field. It is an obstacle, one of the things that happen is how the sound

of vehicles carrying Covid-19 patients, both newly exposed and dead victims. The impact that arises is stigma and psychological fear. Self-concept is a person's picture of himself, formed through experiences gained from interaction with his environment. Interactions occurred between individuals and other people, namely family, peers, and teachers at school, will direct an individual's self-concept into a positive or negative self-concept. Self-concept can be psychological, physical, and social and can develop into a positive or negative self-concept through interactions with other people or the surrounding environment.

Conclusion

Based on the background and research results, we concluded that students, as respondents, have good knowledge or understanding that the Covid-19 virus is endemic worldwide, especially in Jayapura City, Papua Province. Then, most of the respondents say that the handling of Covid-19 was in a fairly good category, and respondents generally had a bad perception of the sound of ambulance sirens passing by carrying Covid-19 patients. Suggestions recommended are the need to increase efforts to prevent Covid-19 by washing hands using soap and running water, obediently wearing masks, maintaining a safe distance, consuming nutritious intake, and exercising enough or maintaining a healthy lifestyle. Then, awarding the government and health workers struggling to overcome the pandemic outbreak. We like to acknowledge the grant from the Faculty of Sports Science, University of Cenderawasih.

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The Psychological Impact of Covid 19 Restrictions on Athletes

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Abstract

Restrictions on community activities implemented by the government to resolve the spread of the Covid 19 virus have closed several sports facilities, deactivated sports clubs, and national and international sports competitions have been delayed or canceled. This study aims to explore the effect of these restrictions on the psychological condition of athletes. This research uses the descriptive analysis method by surveying to obtain information from the respondents. There are three things to examine (i.e. athletes' feelings about the condition, how they deal with negative feelings that arise, and the actions they take during restriction). The subjects of this study were 179 athletes from 22 sports associations managed by regional governments and sports committees. The survey method was used in this research. Open questionnaires are sent to athletes to fill out. The results can be used as a recommendation for coaches and the government.

Introduction

Covid-19 has caused pandemics around the world. In order to stop the spread of the disease, the restrictive regulations imposed by most governments have disrupted people's daily lives, including in sports. The restrictive situation experienced worldwide has caused many athletes to adapt their sports training without the appropriate tools or space to develop their training routines properly. In addition, restrictions imposed by health authorities to prevent the spread of the virus have caused a number of national and international competitions have been postponed or canceled.

The government's policy regarding these sudden and special restrictions against Covid-19, might lead to an unwanted situation. This condition can have negative consequences at the emotional, cognitive, and behavioral levels. Periods of inactivity, isolation from sports teams, distance from the sports community, inadequate interactions with coaches, and lack of social support have also been shown to cause emotional distress and psychological distress in athletes (Reardon et al., 2021). The Covid-19 pandemic has created new mental health stressors for everyone; for athletes, this has been discussed in recent publications (Edwards & Singh, 2020; Edwards & Thornton, 2020; Mehrsafar et al., 2020).

This uncertain situation requires athletes to adapt quickly. When athletes can't adapt to a stressful environment, athletes will complain of mental health problems such as stress, depression, depression, and even panic (Foskett & Longstaff, 2018; Gulliver et al., 2012;

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Henriksen et al., 2020; Moreland et al., 2018). For most athletes, this sudden disruption in the training schedule will cause them to set new goals during the situation. Some athletes may develop the potential to cope with this unexpected condition. However, some other athletes may experience negative responses over several weeks to months. Individuals can respond differently to emotional distress caused by traumatic events such as this pandemic (Killgore et al., 2020). Research has shown that this situation can have adverse psychological effects such as symptoms of post-traumatic stress, confusion, and anger (Brooks et al., 2020).

Changes in training routines and the absence of regular competition, unlike in previous years, can negatively impact the motivation of athletes. Athletes may lose their motivation to keep training due to unpredictable competition. Some may still do the exercises, but not use various alternative ways to complete the training program limitations. It may be done just to meet external demands. On the other hand, perhaps, there are athletes who begin to lose the desire to participate because they feel less able to maintain active training in a program (many cannot be done) and may also think that it is meaningless because there is no competition and will not produce the results they hoped for (always failing to hit the target or due to injury sustained).

In fact, emotional changes, such as worry, anxiety, and stress are common responses when faced with a pandemic situation. It is a form of self-defense mechanism or a sign that there is a threat we are facing. However, if it is excessive, it will disturb the psychological state of the individual, such as experiencing depression (Agung, 2020). It can become even more disturbing to the psychological condition if the policy on restricting activities is prolonged due to the decline in cases of Covid 19 sufferers. This significant impact requires action and appropriate research from the field of sport. In addition, to prevent the physical consequences for athletes of restriction, research is needed to understand the actual psychological impact.

In Indonesia, there have been several studies on the psychological impact of the Covid 19 pandemic. However, they only focusing on the motivation of athletes, both achievement motivation and motivation to improve physical condition during the pandemic. Therefore, this study explores the psychological impact of activity restriction due to the pandemic on athletes. Three main points are explored, including 1) athletes' feelings regarding the situation they are experiencing, 2) coping strategies that have been used to overcome disturbing feelings, and 3) actions or efforts that have been made in overcoming limitations due to the Covid 19 pandemic. It is hoped that it can provide benefits for fostering athlete achievement through intervention programs that are per the needs and the application of a supportive training environment.

The emergence of various emotional responses from athletes regarding this limitation situation is the basis for the need to be carried out regarding the actual emotional states experienced by athletes. Knowing the condition of the feeling felt is important information for coaches and sports administrators. The goal is that coaches can adjust the appropriate treatment imposed on athletes according to their needs. For example, whether many athletes are depressed, just lose motivation or even more athletes who are not psychologically disturbed. So that by knowing the general description of the conditions felt psychological, coaches and sports management can find out the right policy in planning the next athlete coaching program.

Method

This research uses the descriptive analysis method by conducting a survey to obtain information from the respondents. There are 179 athletes involved in this study (80 girls, 99 boys) from 22 sports managed by the Ministry of Youth, Sports and Tourism, Central Java Province, and the Indonesian National Sports Committee, Central Java Province. The research participants were 13 to 33 years old and were potential athletes who participated in the national championships. These athletes are members of several sports teams, including the Development of Long-Term Sports Centers (DLTSC), Student Sports Education and Training Centers (SSETC), College Education and Training Centers (CETC), and Regional

Training Centers (RTC).

This study used an open questionnaire to collect data. It consists of three question points to be answered in writing by the respondent. The use of opened questionnaires in this study aims to obtain complete information about the conditions experienced by respondents. Through an open questionnaire, respondents can fill in according to their wishes or circumstances, so various data are obtained. The questions in this questionnaire include 1) "What was your feeling when the restrictions caused many competitions to be canceled/ postponed?"; 2) "What are you doing to overcome the unpleasant feelings and negative thoughts that have caused Covid 19?"; 3) "What was your reaction when restrictions were imposed causing many training facilities to close?". The first question is related to the perceived affection, the second question is related to possible coping strategies to overcome the affections that arise, and the third question is related to alternative actions/solutions taken. The questionnaires distribution starts from February 17 to March 31, 2021, with the hope that quite a number of respondents can participate in this research.

The data collected is then analyzed through several steps. The first step is referred to as data verification, such as checking the completeness of filling, data legibility, and conformity of the respondent's answer to the question. T second step by coding, which is the provision of codes for each data belonging to the same category. Next, the third step is tabulation to create tables containing data that has been coded according to the required analysis. (analysis based on specific characteristics of respondents). The last step is the data presentation. For the data to be easy to read and understand, the next data is displayed in tables.

Results And Discussion

A total of 179 athletes from various sports, various sports teams, and various ages were involved in this study. The detailed characteristics of the number of respondents can be seen in Table 1.

Table 1 shows that the subjects in this study.

mostly were athletes from RTC, and the least number were athletes from CETC. Meanwhile, athletes from DLTSC and SSETC are more or less the same, which is about 25 percent. The age range category is based on the Indonesian Ministry of Health (Departemen Kesehatan RI, 2009). The three age categories are: 1) Early adolescence: 12-16 years, 2) Late adolescence: 17-25 years, and 3) Early adulthood: 26-35 years. Most subjects were between 17-25 years old, and the least were 26-33 years old. Athletes heavily involved in this study are athletics, hockey, Pencak silat, bicycle racing, handball, and Tarung Derajat.

The data are further described based on the following questions: 1) athletes' feelings related to the situations experienced, 2) coping strategies used in overcoming disturbing feelings, 3) actions or efforts made to overcome limitations due to the Covid 19 pandemic. Data from 179 participants were then verified to check the suitability of the answer to the question. In the first question about the emotions felt, five answers were found that were illegible and did not match the questions. In the second question, all the answers match. In the third question, seven do not match. The next step is coding the answers that pass the verification. They are grouped into the same themes or categories. Based on the results of the respondents' answers coding to the first question, we found several types of emotions/ affections felt by athletes due to activity restrictions, presented in Table 2

Tabel 1. Respondents Characteristics

No	Sports	Sports Team												Frequency
		DLTSC			SSETC			CETC			RTC			
		A	B	C	A	B	C	A	B	C	A	B	C	
1	Fencing				2							2		4
2	Athletics	9			4	1			4			24	5	47
3	Bike Racing	4										9		13
4	Handball	5			8									13
5	Volleyball				3									3
6	Wrestling											1		1
7	Hockey											18	3	21
8	Judo				1							1		2
9	Karate				2									2
10	Archery				5							1		6
11	Rock Climbing				1									1
12	Martials Arts	7			3				4					14
13	Swimming				2									2
14	Soccer				4									4
15	Sepak Takraw				3								2	5
16	Table Tennis	3			1				3					7
17	Taekwondo				1							8		9
18	Tarung Derajat											10	1	11
19	Tennis Court	5												5
20	Boxing				2									2
21	Sand Volleyball											5		5
22	Wushu	2												2
	Total	**35**			**42**	**1**			**11**			**79**	**11**	179

DLTSC: Development of Long-Term Sports Centers; SSETC: Student Sports Education and Training Centers; CETC: College Education and Training Centers; RTC: Regional Training Centers; A: Age 13-16; B: Age 17-25; C: Age 25-35

Table 2. Athletes' Feelings Related To Restriction Situation

Feelings Experienced	Frequency	Percent
Frustation	2	1.1
Anxious	3	1.7
Sad	50	28.7
Dissppointed	75	43.1
Just Ordinary/Keep calm	9	5.2
Unhappy	8	4.6
Angry/Annoyed	2	1.1
Happy	8	4.6
Confused	2	1.1
Loss of enthusiasm	5	2.9
Uncertain	8	4.6
Bored	2	1.1
Total	179	100

Source: Primary Data, 2021

Table 2 shows that many athletes feel disappointed and sad. Some feel uncertainty, anger, displeasure, boredom, confusion, anxiety, and some even get frustrated. However, some athletes feel normal, and some are happy with the restrictions caused by Covid 19. The various negative emotions felt by these athletes were caused by several things related to competition, training, and policies. Regarding the match, the entire calendar of match activities is canceled or postponed indefinitely. It gives rise to negative feelings in the athlete. Many athletes miss the opportunity to take part in the match dreamed and planned. Some athletes feel that their training preparations are futile. There are some athletes who have applied for study leave just to prepare for the competition. But it turns out that it has to be canceled, and not clear when the competition will be held. So they feel that there are no more targets to be achieved.

Regarding training, many athletes complain that they cannot do the exercises because the facilities are closed, the lack of facilities and equipment, no coach to correct them, and no training partners. They cannot measure the progress of ability / achievement. Furthermore, related to policy. A number of athletes regretted the uncertainty of how the restrictions ended. According to them, the government should have been able to establish several policies related to the match implementation so that the competition could be held again soon.

On the other hand, restrictions due to Covid 19 do not cause negative emotions for some athletes. They have a beneficial view of policy and the emergence of the COVID-19 pandemic. Some athletes think that any government policy is well-intentioned and has been carefully considered for the safety of athletes and coaches. According to them, the policy must be accepted and implemented. Others feel that although activities are limited, many things can be done. So they choose to be patient and grateful. Several athletes feel happy because of this pandemic. Some athletes think that with a matching delay, they still have plenty of time to train and improve. Interestingly, some athletes are grateful. Because of the pandemic of Covid 19, they can learn about the meaning of life.

It may be since most of the athletes involved in this study were not novice athletes, but rather experienced athletes participating in competitions. It causes the level of perceived psychological disturbance tends to be negative. They may be worried about their performance development due to various restrictions that interfere with their practice. They are also concerned about their opponents, who may continue to train due to differences in the policy of implementing restrictions in their area. It can trigger pre-competition anxiety. As found in the results that beginner athletes experience significantly less psychological stress than those who do not (Sullivan et al., 2019). Several studies have found that starter athletes reported significantly lower levels of pre-competitive state anxiety than non-starter athletes (Han et al., 2011; Wolf et al., 2015), and starter athletes viewed state anxiety as more facilitative than non-starters (Wolf et al., 2015). Furthermore, based on the results of the respondent's answer coding to the second question, the coping strategies carried out by the subject in overcoming the negative feelings that arise are as in Table 3.

Table 3. Coping Strategies Used in Overcoming Disturbing Feelings

Feelings Experienced	Frequency	Percentage
Trying to maintain health	22	12.3
Doing Fun Activities	52	29.1
Think Positively (Take meaning from Situation)	31	17.3
Focus on Lige Goals	8	4.5
Doing spiritual activities	8	4.5
Keep thinking about doing the exercise	40	22.3
Fun Fantasies	2	1.1
Looking for information about covid 19	2	1.1
Sharing with friends to reduce anxiety/stress	2	1.1
Be alone	1	0.6
Avoid news about covid 19	4	2.2
Just ordinary (not affected)	7	3.9
Total	179	100

Source: Primary Data, 2021

In dealing with the stressors associated with this situation, athletes need to employ a coping strategies variation. In sports psychology, coping has been achieved through a trait approach, which suggests that individuals have a stable coping style in dealing with stress (Penley et al., 2002). Table 3 shows the ways athletes deal with problems related to negative feelings that arise are very diverse. Most of the subjects overcome these negative feelings by entertaining themselves. Based on the coding results, we found that athletes entertain themselves by doing various fun activities. Such as playing games, being active on social media, watching movies, watching television, reading books/comics/novels/magazines, listening to music, doing activities according to hobbies, cycling, and taking a walk to enjoy the natural environment. Most athletes still think about being able to do training and carry out targeted programs. Most of them keep thinking about the exercise. They worried that their ability decreased if they didn't exercise. They are also afraid that if the race has started, they will lose to their opponents if they don't exercise. They believe that their current opponents will also continue to train.

Some athletes try to overcome the negative feelings that arise by continuing to try to maintain their health in various ways, such as consuming vitamins, moderate exercise, and following the health protocol set by the government. Many athletes also try to overcome negative feelings by thinking positively. A number of these athletes change the negative thoughts that arise by taking advantage of the situation, such as by having their competition postponed so they have more time to train. Athletes with injuries have time to recover before the competition starts again. Athletes have time to do activities they like and have lots of time with their families. So they pay more attention to their health through food and rest.

Among the participants, some try to calm themselves down spiritually. They choose to increase their worship and think that the situation they are experiencing is a test from God. Some others are just not bothered and do things as usual. However, some feel stressed and need help from other friends in overcoming the anxiety they are experiencing. Personality dimensions such as neuroticism and extraversion can determine an athlete's style in dealing with sports-related stress (Kaiseler et al., 2012). In addition to personality, motivation and the level of social support that athletes themselves feel can also help support elite athletes from stress associated with elite competition (Fletcher and Sarkar, 2012).

Social support obtained by athletes can come from their families, fellow athletes, and most importantly, from coaches. It is well known that coaching style is associated with stress and fatigue in athletes (Isoard-Gautheur et al., 2012). Likewise, a study has highlighted that coaching styles, such as teaching perceived

as poor or uncaring, are associated with their coping and motivation for sports (Gearity & Murray, 2011). Therefore, in a difficult situation, the psychological condition felt by the athlete could be caused by the interaction between the athlete and the coach during the restriction period. Then the last is the result of coding the respondent's answer to the third question. It is known that the athletes' actions when the policy made almost all sports facilities closed

Table 4. Actions Made to Overcome Limitations Due to the Covid Pandemic 19

Action	Frequency	Percent
No Exercise	9	5.3
Look for an alternative place to exercise	31	18.0
Do Other entertaining activities	36	20.9
Do the exercise at home	71	41.3
Make own training tools	25	14.5
Total	179	100

Source: Primary Data, 2021

The government policy to close public sports facilities, repatriate some athletes in training camps, and prohibit sports activities in clubs, makes many athletes confused about what actions to take during this enforcement. Most athletes choose to keep doing exercises at home or around the house. Several athletes who train at home use standardized sports equipment according to their sport. However, many are trains without equipment. They choose to do a home exercise program that does not require special equipment.

Even though many are closed, some athletes are still trying to find a place that can be used to train. Several choices of training venues include an open field in the home environment and renting several places to use for training with friends. Some others try to make their training facilities, make exercise equipment with various materials, and modify training equipment. Some of the participants chose to do other activities that were entertaining because of the difficulty of doing the exercises. They also do this to overcome boredom. Some of the activities carried out include cycling, walking in the neighborhood, focusing on school, working, doing homework, and playing. However, some athletes feel confused, don't know what to do, and finally choose not to exercise.

Based on the data collected, it is known that athletes' responses to unexpected situations vary widely. Many negative feelings arise, but there are also positive feelings experienced by the subject. Athletes' strategies for coping with emerging negative feelings also vary. Their efforts include staying focused on training programs, some focusing on their life goals, choosing to maintain their health, trying to take lessons from the situation, avoiding news about Covid 19, some even staying calm, but some are looking for help from friend to calm their anxiety. The actions they took as a result of the restriction were varied, such as continuing to exercise at home, looking for other exercise sites, building their training facilities, doing other entertaining activities, or simply choosing not to exercise.

The findings from this study can be recommendation material for trainers and the government. Since athletes from training camps have been discharged, coaches are advised to regularly monitor their physical condition, the extent to which they can exercise, whether there is decreased ability, and so on. Trainers are also required to maintain communication with athletes and provide motivation for athletes. The trainer must also understand the various limitations experienced by each athlete and provide a training program based on them. Coaches also need to start preparing a new training program to prepare their athletes when activities return to normal and competitions can take place. And most importantly, coaches should begin to apply training programs that stimulate the athletes' mental toughness. It is because mental toughness is a vital aspect of elite sports competition. Research has shown that mental toughness is a valuable resource that helps athletes "rise" through adversity and

stress (Hermahayu, 2021).

For policymakers, the results of this study can be used as material for consideration in collaborating with the sports committee and the primary sports branch in compiling a competition health protocol standard so that the competition can be held immediately. The government can also establish several policies regarding the reopening of various public sports facilities, as well as reactivating training centers. The most important thing to recommend from these findings is that in the future, sports committees and parent sports should provide mental strengthening programs for athletes. Athletes need to be taught how to manage emotions and coping strategies that must be done when facing bad situations or unexpected situations. It is vital to maintain the stability of the psychological aspects of the athlete, which in turn can support the achievement of optimal performance

Conclusions

The dominant emotions felt by athletes due to activity restrictions in the Covid 19 pandemic are sadness and disappointment. The coping strategies used by most subjects in dealing with negative feelings that arise include entertaining themselves, keeping thinking about doing exercises, thinking positively (taking lessons from existing situations), and trying to maintain health. Furthermore, the actions taken by most athletes when the restriction policy was enforced and made almost all sports facilities closed and sports clubs disabled were to continue practicing at home, looking for alternative training venues, making their training facilities, choosing to do other activities that sleep, some even choose not to exercise. The research results can become a recommendation material for trainers in developing achievement development programs both physically and psychologically. Besides, it can also be recommendation material for the government to formulate policies related to the implementation of competitions and sports activities by the health protocol.

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Occupational Accidents Among Healthcare Workers in Central Java

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Abstract

Healthcare workers have a risk of experiencing occupational accidents that may lead to injury or even death. Unavailable incident reporting can negatively impact the health and safety of healthcare workers and other larger sectors. This study aimed to investigate the occupational accidents among healthcare workers. A descriptive with a cross-sectional approach was conducted. This study involved 377 participants from five public and private hospitals in Central Java. Data were analyzed with the independent t-test and logistic regression. Healthcare workers generally experienced low occupational accidents. The most frequent incidents were: exposure to blood and body fluids (68.9%), sharp objects (50.4%), and needles (47.7%). Low rates of occupational accidents were significantly correlated with females (p=0.013). Healthcare workers experienced occupational accidents with various frequencies. Special attention to high frequent incidents is required and a more in-depth study on on the low-frequent.

Introduction

Hospitals are public service facilities that have a high risk of occupational accidents. The complexity of a hospital system that involves various technologies and resources contributes to a high potential for occupational diseases and accidents (Redjeki & Warsito, 2016). Occupational accidents happen unexpectedly and are caused by human factors and unsafe actions. Non-adherence to standard operating procedures (SOP), not wearing or incorrect use of personal protective equipment (PPE), and carelessness are some unsafe actions that promote occupational accidents.

The United States Department of Labor, as stated by Secretary Solis, revealed that in 2011, the incidence of occupational accidents in hospitals was higher than in other places(Çelikkalp & Dilek, 2019). Similarly, the National Safety Council also stated that the prevalence of occupational accidents in hospitals is 41% higher than in other industries. In general, injuries or occupational safety cases in hospitals occur due to biological exposure, such as viruses, bacteria, and parasites from patients' body fluids, radiation, chemicals in the form of gases and drugs, sprains and back pain, psychosocial issues, and exposure to hospital wastes (Kementrian Kesehatan Republik Indonesia, 2018). Such factors threaten healthcare workers as the primary resources for hospital services.

Healthcare workers are the most significant number of human resources that make prolonged and intensive contact with patients, and this task can pose a risk that threatens work safety. The World Health Organization (WHO)reported that at least 3 million healthcare workers are exposed to pathogens from blood each year, resulting

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in 2 million infected with HBV and 170,000 with HIV (Sahiledengle et al., 2020). A study in a hospital in the Adara district showed that the prevalence of splashes of blood or body fluids from patients was 28%, and these were experienced by healthcare workers assisting births and operations; in addition, officers who washed the linen were also at double risk of being splashed with patients' body fluids (Kaweti & Abegaz, 2017).

Punctures with sharp objects or needles are other incidents that occur among healthcare workers. The 2015 American National Survey reported 71% incidents of punctures with sharp objects in 181 hospitals in 34 states(Grimmond & Good, 2017). Being punctured with sharp objects possibly occurs more in developing countries as such incidents are generally not reported(Dong et al., 2020). A previous study in Peking, China, showed that 19.33% of nurses admitted to experiencing needlestick injuries. Even though they have a health-threatening impact, only 30% of the nurses conducted a reporting mechanism (Dong et al., 2020). Some reasons preventing healthcare workers from reporting incidents include a long and complicated reporting procedure, low risk of causing health problems, and busy work.

Until now, the consequences of occupational accidents have not been drawn up precisely. Occupational accidents have resulted in death, loss of quality of life for workers, and mental health problems, such as depression and post-traumatic stress disorder (Chhabra, 2016; Gu et al., 2020). A study in the USA from 2004 to 2016 reported that healthcare workers experiencing occupational accidents were two times more likely to experience significant psychological distress than those who did not experience occupational accidents (Gu et al., 2020). The long-term effect of occupational accidents is estimated to be ten times higher than its direct effect (Leppink, 2015).

The data on occupational accidents in Indonesia, especially in the healthcare sector, has not been well reported. A previous study in Bojonegoro regional public hospital showed that the incidence of needlestick injuries among nurses in one year reached 29 times(Fitria et al., 2020). Although data related to the hazards due to occupational accidents in Indonesia have not been clearly described, we believe there are complaints from hospital employees. Therefore, it is essential that occupational safety becomes a priority for discussion. We expect this study to be a baseline to determine directions and policies in order to prevent and deal with occupational accidents. The present study aimed to investigate more deeply the types and incidents of occupational accidents among healthcare workers.

Methods

This study used a cross-sectional design with an analytical approach and took time in 2018. The samples were healthcare workers from five regional hospitals in Semarang city, Central Java, Indonesia, with type A (highest referral hospital), B (regional/regency referral hospital), and C (public health centers or polyclinic), both public and private. A consecutive sampling method was applied to recruit the samples. The inclusion criteria were healthcare workers with at least a vocational education degree (D3) who worked in the inpatient units. This study did not have any specific exclusion criteria. A total of 377 respondents participated in this study, consisting of 32 medical personnel, 281 nurses, 21 pharmacists, five nutritionists, five public health workers, four medical therapists, and 29 medical technicians.

The occupational safety assessment instrument used adapted from the National Safety Council. This instrument consisted of 18 statements related to the types and frequencies of occupational accidents healthcare workers had experienced in the hospital. The statements assessment is by Likert scales, including 1 (more than three times), 2 (less than three times), and 3 (never experienced). This instrument was chosen because of its broad coverage and had been used globally to avoid bias. The instrument's validity examination was in a previous study with a Cronbach's alpha coefficient of 0.81 (Raeissi et al., 2015).

The data collection was by conducting a paper-based survey of the potential respondents with the help of the head of inpatient units in each hospital. A total of 377 forms were distributed and completed by the respondents. The form contained detailed information regarding the research description, roles of respondents, and

consent that respondents should complete for their voluntary participation. The respondents were also requested to complete demographic data, including age, gender, type of shift, length of work, marital status, and professional status. The research ethics committee of the related hospitals and universities has approved this study.

The statistical analysis in this study was performed using SPSS version 24 for descriptive analysis, including the frequency distribution and percentage. Occupational accidents were analyzed using a cut-off point method. A univariate analysis was conducted to determine the socio-demographic distribution. Include gender, length of work, marital status, and work shift. The different types of occupational accidents and socio-demographic factors were examined using the independent t-test. The effects of socio-demographic factors on occupational accidents were analyzed using logistic regression with a significant value of $p<0.05$. This study has received ethical approval from the Health Research Ethics Committee of Dr. Kariadi Public Hospital and the Faculty of Medicine, Diponegoro University, with a reference number of 207/EC/FK-RSDK/IV/018.

Table 1.Frequency Distribution of Occupational Accidents Among Healthcare Workers (n=377)

Characteristics	*f*	%
Gender		
Male	97	25.7
Female	280	74.3
Work experience		
>3 years	195	51.7
<3 years	182	48.3
Marital status		
Married	318	84.4
Single	59	15.6
Work shift		
Permanent	195	51.8
Rotation	182	48.2

Source: Primary Data, 2008

Table 1 shows that the majority of respondents in this study were female (74.3%), married (84.4%), had permanent shift type (51.8%), and the length of work of more than 3 years (51.7%).

Table 2.Types of Occupational Accidents

Types of occupational accidents	Mean (SD)	Never experienced	<3 times	>3 times
Cutting with sharp pointed objects	2.44 (0.59)	187 (49.6)	170 (45.1)	20 (5.3)
Needle stick somewhere in the body	2.50 (0.54)	197 (52.3)	171 (45.4)	9 (2.4)
Skin contact with blood or other body fluids	2.14 (0.68)	117 (31)	195 (51.7)	65 (17.2)
Broken dishes and sample slides	2.89 (0.32)	339 (89.9)	36 (9.5)	2 (0.5)
Jumping a foreign object in the eye	2.94 (0.27)	360 (95.5)	13 (3.4)	4 (1.1)
Spraying chemicals in the eye	2.94 (0.24)	356 (94.4)	20 (5.3)	1 (0.3)
Splashing of body fluids in the eye	2.86 (0.39)	332 (88.1)	38 (10.1)	7 (1.9)
Eye contact with vapors of disinfectants	2.81 (0.48)	321 (85.1)	41 (10.9)	15 (4)
Random exposure to radiation	2.77 (0.54)	311 (82.5)	44 (11.7)	22 (5.8)
Breathing vapors of disinfectants	2.66 (0.60)	275 (72.9)	75 (19.9)	27 (7.2)
Breathing vapors of processing agents	2.91 (0.34)	350 (92.8)	20 (5.3)	7 (1.9)
Drug or chemical poisoning	2.97 (0.18)	367 (97.3)	9 (2.4)	1 (0.3)
Toxicity with solvent	2.96 (0.23)	367 (97.3)	6 (1.6)	4 (1.1)
Fall from height	2.97 (0.21)	368 (97.6)	6 (1.6)	3 (0.8)
Slipping and falling	2.61 (0.53)	240 (63.7)	128 (34)	9 (2.4)
Strains caused by heavy object falling on a part of body	2.92 (0.27)	345 (91.5)	32 (8.5)	0
Traumatic back pain due to patient's repositioning	2.54 (0.63)	230 (61)	119 (31.6)	28 (7.4)
Being beaten or injured by the patient or visitors	2.89 (0.32)	339 (89.9)	36 (9.5)	2 (0.5)
		High accident	Low accident	
Total	49.73 (4.03)	144 (38.7%)	233 (61.8%)	

Source: Primary Data, 2008

Table 2 shows that the most frequent occupational accident among healthcare workers was skin contact with the patient's blood or body fluids (M= 2.14). It is shown that 17.2% of respondents experienced this incident more than three times, and the other 51.7% experienced the incident less than three times. Furthermore, 5.3% of healthcare workers experienced cutting with sharp pointed objects (M = 2.44) more than three times and 41.5% experienced it less than three times. Needlestickwas also reported frequently, in which 2.4% of respondents experienced more than three times and 45.4% experienced less than three times (M = 2.50). Regarding back pain due to patient repositioning (M = 2.54), 7.4% of respondents experienced it more than three times, and 31.6% experienced it less than three times.

Falling from a height, toxicity with solvent, and drug and chemical poisoning were the types of accidents with the lowest frequency. The result of the study revealed that 2.4% of respondents experienced falls from height, and 2.7% experienced toxicity and drug or chemical poisoning. Most healthcare workers reported low rates of experiencing occupational accidents (61.8%), and the other party reported high occupational accidents.

Table 3. Difference between Demographic Data and Occupational Accident (n=377)

Characteristics	Mean (SD)	X2	*p-value*
Gender 0.016			
Male	48.57 (5.39)	5.821	0.016*
Female	50.13 (3.35)		
Work experience 0.015			
<3 years	49.78 (4.41)	5.933	0.015*
>3 years	49.66 (3.51)		
Marital status			
Married	49.60 (4.20)	0.182	0.669
Single	50.42 (2.82)		
Work shift			
Permanent	49.44 (4.50)	0.546	0.460
Rotation	50.03 (3.43)		

**significant < 0.05*
Source: Primary Data, 2008

Table 3 shows the difference between the respondents' characteristics and the incidence of occupational accidents. Gender (p=0.016) and length of work experience(p=0.015) showed significant value in the incidence of occupational accidents. Marital status and work shifts did not have a significant difference.

Table 4. Binary Logistic Regression Results

Characteristics	B	Wald	Exp(B)	Adjusted odds ratio (95% CI)	*p-value*
Constant	0.123	0.183	1.130		*0.668*
Gender	0.852	0.091	2.344	1.201 – 4.575	0.013*
Work experience	-0.123	0.091	0.885	0.399 – 1.962	0.763
Work experience by gender	-0.551	1.320	0.576	0.225 – 1.476	0.251

**significant < 0.05*
Source: Primary Data, 2008

Table 5. Interaction between gender and work experience

Variable	Exp (B)
Male and < 3 years experience	1.13
Male and > 3 years experience	1.00
Female and < 3 years experience	2.65
Female and > 3 years experience	1.36

Source: Primary Data, 2008

Table 4 shows that gender showed a partial significant correlation (p < 0.05) with occupational accidents. A woman had a risk of 2.344 higher to experience low occupational accidents compared to a man (p=0.013). Yet healthcare workers working experience had

no partial significant correlation with the occupational accident. Table 5 shows healthcare workers with more than three years of work experience tend to have a high occupational accidents than those with shorter years of work experience. Man with less than three years of experience had 1.13 higher experience low rates of an occupational accident than one with more than three years of experience (1.00). A woman with working experience of fewer than three years had a higher possibility (2.65) to experience a low occupational accident than one with a longer (1.36).

This study showed that all healthcare workers experienced a low occupational accident in frequency, less than three times. Exposure to patients' blood and body fluids occurred most frequently, followed by punctures with sharp objects and back pain due to patient repositioning. The highest frequency of occupational accidents among healthcare workers was skin exposure to patients' blood or body fluids. Exposure of the skin to blood or body fluids is a major factor in transmitting blood-borne infections experienced by healthcare workers. This study revealed that exposure to blood and body fluids mainly occurred at a frequency of fewer than three times. A different result was reported in previous studies that the exposure of healthcare workers to blood and body fluids occurred more frequently, namely more than three times (Raeissi et al., 2015; Samaei et al., 2015).

Exposure to body fluids can occur through splashes on the skin or eyes, nose, and mouth. Previous research reported that 80.5% of respondents, consisting of nurses and nursing students, had experienced splashes in their faces and eyes from patients' saliva or blood (Kuru et al., 2014). Other research also showed a similar finding that the face is a common area of exposure to body fluids. Healthcare workers reported that they generally had splashes from patients' body fluids in the eye area, while others reported fluids in the mouth and nose areas (Kasatpibal et al., 2016; Kaweti & Abegaz, 2017; Sahiledengle et al., 2020).

In addition to exposure to blood and body fluids, another occupational accident frequently experienced by healthcare workers was the puncture of sharp objects and needles. This kind of accident generally occurred less than three times. Needlestick puncture generally occurred in the inpatient units (31.4%) and was caused by single-use needles (64.1%); it mainly occurred in the hands (95.5%) (Memish et al., 2013). Previous studies have stated that nurses are the healthcare workers with the highest percentage of punctures with sharp objects and needles. Such incidence often occurs due to the process of collecting specimens, recapping needles, inserting intravenous lines, assisting childbirth, or lack of personal protective equipment (PPE)(Kwanzaa et al., 2020; Motaarefi et al., 2016).

Healthcare workers often experience muscle and bone disorders due to occupational accidents. A previous study showed that healthcare workers having direct contact with patients are reported to have higher muscle and bone problems due to work(Amin et al., 2020). Muscle and bone disorders are often experienced by nurses and midwives, in which back, neck, and shoulder pain are commonly reported (Amin et al., 2020; Okuyucu et al., 2020). Previous research stated that at least 60% of nurses experience a musculoskeletal problem every 14 working days (Bragazzi et al., 2019). The present study reported a similar finding in which more than 38% of healthcare workers experienced back pain due to patient repositioning. Another study showed that back pain due to repositioning was highly prevalent (more than 68%); 21% of respondents experienced it more than three times, and 43% experienced it less than three times (Samaei et al., 2015). Such a situation may result in absences from work and burnout, which can affect work productivity (Amin et al., 2020; Okuyucu et al., 2020).

Occupational accidents may occur due to chemical substances. Chemicals or irritants can get splashed or inhaled. The result of this study showed that occupational accidents due to chemicals were at the lowest prevalence; more than 90% of respondents did not experience it. Inhalation of disinfectants is a common type of accident due to chemicals that irritate the upper respiratory tract to pulmonary obstruction. The types of chemicals reported to be inhaled by healthcare workers include sprays of cleaning products and disinfectants (Clausen et al.,

2020).

Injuries can also happen due to acts of violence. Violence is a form of aggressive attitude towards someone while on duty; it can be offensive actions or threats. Violence can occur physically, emotionally, and even verbally. Research showed that 25% of violent acts, such as sexual, physical, and verbal violence occur in healthcare services. Healthcare workers are reportedly 16 times more likely to experience such violence than workers in other industrial sectors. A study in Iran showed that 91.6% of nurses in teaching hospitals had experienced physical and verbal abuse within one year of their working period (Hassankhani et al., 2017). Another study in Africa showed that the incidence of violence at work was 9-100%, while South Africa (54-100%) and Egypt (59.7-86.1%) showed the highest percentage (Njaka et al., 2020). Although the prevalence of violence at work among healthcare personnel in this study was reported to be smaller, it still shows an incident.

Gender was found to have a significant correlation with occupational accidents. Although this study found women have a lower tendency to have occupational accidents than men. In another study, women are more vulnerable. Previous studies have stated that women often experience musculoskeletal problems such as back pain and needlesticks (Çelikkalp & Dilek, 2019; Okuyucu et al., 2020). Such incidents can occur because gender also plays a vital role in shaping experiences and events of exposure. Women are more dominant in the health sector of the working population. Generally, women are placed in the nursing and midwifery divisions while men sometimes occupy pharmacy, medical, dentistry, and management. The proportion ratio between male and female employees also affects the placement of the job sector and the risks of the job itself. There is a possibility that the imbalanced number of men and women could have influenced the results of this study, so further studies are needed in this regard.

This study indicated that the length of work is significantly correlated with the incidence of an occupational accident. A previous study found that exposure to body fluids and punctures with sharp objects or needles is associated with health workers' ability or knowledge regarding preventing occupational accidents (Motaarefi et al., 2016). A longer working period is associated with increased clinical experience and knowledge. It supports significantly in completing tasks efficiently and safely. Although, a recent study found that increased knowledge is not always in line with good attitudes. It could be why more than 50% of healthcare workers experienced exposure to the patient's blood and body fluids. A study in New Zeeland showed that one out of three nurses experienced violence in the first year of their working period. It is possible because an individual with less work experience tends to experience direct confrontation. However, a study in Iran reported no significant effect on the length of work and the incidence of violence against nurses (Chalosthari & Ghodousi, 2017). There are limited studies regarding violence at work among healthcare workers. Therefore, more in-depth management and studies are needed.

Conclusion

Healthcare workers in this study generally experienced occupational accidents with various frequencies and types. Exposure to patient blood and body fluids and punctures with sharp objects, such as needles, are types of occupational accidents with the highest frequency. Meanwhile, occupational accidents resulting from exposure to chemicals or drugs via splashes, inhalation, or ingestion are the incidents with the lowest frequency. The length of work and gender had a significant correlation with high occupational accidents. Further studies that consider a balanced proportion of gender are necessary to provide more accurate results. Further studies and concerns on low-frequency occupational accidents are needed to explore any certain hidden phenomena.

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Nutrition Awareness: Family Practices in Indonesian Borderland

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Abstract

Poor family nutritional practice is one of the major leading causes of stunting in children aged 0-59 months. Good family nutrition practices are one of the primary keys to stunting prevention. It can also reduce the prevalence of stunting and the impact it has on families, which are included in the category of stunting risk families. This study aimed to investigate nutrition-aware family practices at Haliwen Health Center, Atambua-one of the border areas of the Republic of Indonesia (RI) and Democratic Republic of Timor Leste (DRTL). It is a descriptive study with a cross-sectional design that took place at the Haliwen Health Center, Belu Regency, East Nusa Tenggara Province, Indonesia, from September 1 to October 30, 2021. A total of 147 families with children aged 0-59 months, were selected by purposive sampling. Most mothers (60%) gave exclusive breastfeeding to infants aged 0-6 months. Most mothers (78%) firstly gave complementary feeding to infants at the age of >6 months, most families and children (94%) ate a variety of nutritional sources, most families (56%) used iodized salt, most infants (95%) aged 6-11 months and children 12-59 months received vitamin A supplements, most (88%) pregnant women received iron supplement at least 90 tablets during pregnancy, most postpartum women (72%) received two capsules of vitamin A supplements. 58.5% of families at the Haliwen Health Center had implemented >75% nutrition-aware family indicators. However, none of them had performed 100% nutrition-aware family indicators. Sustainable assistance needs to be improved to reach 100% nutrition-aware family and implemented in all families.

Introduction

Good family nutrition practices are one of the primary keys to stunting prevention (Danaei et al., 2016). In addition, it can also reduce the prevalence of stunting and the impact it has on families, which are included in the category of stunting risk families (Pemerintah Republik Indonesia, 2021). Globally, the prevalence of stunting has decreased. However, stunting is still a major nutritional problem in poor and developing countries such as Indonesia (Aguayo and Menon, 2016; Danaei et al., 2016; de Onis and Branca, 2016; Dewey, 2016; Prentice, 2017; Torlesse et al., 2016). Good family nutrition practice becomes one of the vital keys to reducing stunting prevalence and its impacts (Torlesse et al., 2016). According to the Ministry of Health of the Republic of Indonesia, in 2018, the stunting rate in Indonesia was 30.8% (Kemenkes RI, 2018). This number is spread across all provinces in Indonesia. The results of national basic health research showed that the province with the highest prevalence of stunting in Indonesia is the East Nusa Tenggara Province, with a stunting majority of 51.7% in 2013 (Kemenkes RI, 2013), decreasing to 42.6% in 2018 (Kemenkes RI, 2018), and increasing to 43.8% in 2019 (Pusat Data dan Informasi Kementerian Kesehatan RI, 2020). According to the secondary data from the Health Office of East Nusa Tenggara Province, the prevalence of stunted children in Belu regency in 2019, 2020, and 2021 are 21.3%, 21.2%, and 17.9% respectively. This figure is still far from the 14%

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reduction target set by the Ministry of Health of the Republic of Indonesia. (Kemenkes RI, 2020).

The focus of stunting reduction interventions in Indonesia has been recently stipulated in Presidential Regulation Number 72 of 2021, namely family-based interventions (Pemerintah Republik Indonesia, 2021). It means the intervention focuses on changing behavior and practices for families at risk of stunting. Those included in the category of stunting risk families are families whose teenage girls, pregnant women, postpartum women, babies aged 0-6 months, and toddlers. This improvement is to gain optimal nutritional status.

Optimal nutritional status is a requirement for the quality of human resources (Aguayo and Menon, 2016; Owino et al., 2016; Atsu, Guure and Laar, 2017). Children who experience stunting can cause various negative impacts such as impairment in brain development (Muhammad, 2018), low learning abilities (de Onis and Branca, 2016; Owino et al., 2016; Mahmudiono, Sumarmi and Rosenkranz, 2017; Shekar et al., 2017; Vonaesch et al., 2017; Muhammad, 2018), and long-term impairment such as an increased risk of poor health status, short adult stature and is linked with a high risk of developing degenerative disorders like diabetes mellitus (Santos et al., 2010) and hypertension (Sawaya et al., 2005). Adult obesity is also proven to be a long-term impact on childhood stunting (Hoffman et al., 2000; Muhammad, 2018).

Stunting is caused by various factors such as low-income family parenting practices (Torlesse et al., 2016), poor access to health services (Singh, Upadhyay and Kumar, 2017), economic socio-cultural factors (Ahmad et al., 2015; Mosites et al., 2016; Owino et al., 2016; Vir, 2016; Fregonese et al., 2017; Jackson and Black, 2017; Mal-ed Network Investigators, 2017; Rakotomanana et al., 2017; Sarma et al., 2017; Campos, Vilar-Compte and Hawkins, 2020; Pacheco, Picauly and Sinaga, 2017), poor environmental sanitation (Nkurunziza et al., 2017; Iftikhar, 2018; Campos, Vilar-Compte and Hawkins, 2020), and lack of family access to nutritious food (Rakotomanana et al., 2017; Gleason et al., 2016; Owino et al., 2016; Fregonese et al., 2017; Schrijner and Smits, 2018). Multifactor causes stunting, but family health practices determine the nutritional status of children under five (Singh, Singh and Ram, 2014; Mahmudiono, Sumarmi and Rosenkranz, 2017).

Various research results report that stunting is commonly caused by a lack of family awareness of imbalance nutrition in the first 1,000 days of life (Singh, Singh and Ram, 2014; Torlesse et al., 2016; Mahmudiono, Sumarmi and Rosenkranz, 2017; Li et al., 2020; Abbag et al., 2021). For people in border areas, this problem is worsened by poverty (Dewey and Begum, 2011; Aguayo and Menon, 2016; Demirchyan et al., 2016; Vir, 2016; Gleason et al., 2016; Sarma et al., 2017; Nkurunziza et al., 2017; Perkins et al., 2017; Prentice, 2017; Rakotomanana et al., 2017; Iftikhar, 2018; Perumal, Bassani and Roth, 2018), low educational status (Demirchyan et al., 2016; Rakotomanana et al., 2017; Schrijner and Smits, 2018), and low family income (Sarma et al., 2017), (Hoddinott et al., 2013; Vir, 2016; Sarma et al., 2017).

This study is essential to support the regional action plan to accelerate stunting reduction in Belu Regency. It is because the study of family nutrition practices can be used as a reference in policy formulation. In addition, this study can provide family-based interventions in the context of accelerating stunting reduction. This study aimed to investigate the practice of nutrition-aware families in Haliwen Health Center, Belu Regency, the border areas of the Republic of Indonesia (RI), and the Democratic Republic of Timor Leste (DRTL).

Methods

It is a descriptive study with a cross-sectional design. This study was conducted on 147 families with children aged 0-59 months at the Haliwen Health Center, Belu Regency, East Nusa Tenggara Province, Indonesia. The study took time from September 1 to October 30, 2021. The sample selection began with selecting a village in the working area of the Haliwen Health Center, which had the highest stunting cases in Kakuluk Mesak District, and obtained 9 Posyandu in Kabuna Village in the active site of the Haliwen Health Center. In the

Indonesian language, Posyandu is an acronym for Pos Pelayanan Terpadu. Posyandu is an integrated service post providing integrated essential health services in maternal and child health, including nutrition, family planning, vaccine, and disease control. The posyandu was selected in Kabuna village by stratified random sampling, and five posyandu were selected, namely Manubaun, Weraihenek 1, Weraihenek 2, Haliwen, and Bautasik.

$$n_i = \frac{N_i}{N}\ x\ n$$

$$Stratum\ Sampel\ Size = \frac{Group\ Size\ (Stratum)}{Population\ Size}\ x\ Sampel\ Size$$

$$\text{Posyandu Manubaun} = \frac{54}{235} \text{ x } 147 = 34$$
$$\text{Posyandu Weraihenek 1} = \frac{33}{235} \text{ x } 147 = 21$$
$$\text{Posyandu Weraihenek 2} = \frac{37}{235} \text{ x } 147 = 23$$
$$\text{Posyandu Haliwen} = \frac{85}{235} \text{ x } 147 = 53$$
$$\text{Posyandu Bautasik} = \frac{26}{235} \text{ x } 147 = 16$$

Figure 1. Stratified Random Sampling Formulas (Sugiyono, 2017)

The sample in this study was 147 family members, selected by purposive sampling from a total population of 235 people spread over five selected posyandu. The single variable in this study was the practice of nutrition-aware families determined by the Ministry of Health of the Republic of Indonesia (Departemen Kesehatan RI, 2008), with modified indicators as follows: (1) exclusive breastfeeding for infants aged 0-6 months; (2) the age of the toddler given complementary feeding; (3) families and toddlers eat a variety of nutritional sources; (4) the family uses iodized salt; (5) infants aged 6-11 months and children 12-59 months received vitamin A supplements; (6) pregnant women receive at least 90 iron tablets during pregnancy; (7) postpartum women receive two capsules of vitamin A supplements.

Data were collected by a set questionnaire containing seven nutrition-aware family indicators. The data collection process conside-red the rules and ethics of research by providing information and consent through the signing of informed consent. Respondents involved in this study expressed their willingness before filling out the questionnaire. Data were analyzed by univariate analysis to describe the number and percentage of each indicator of a nutrition-aware family.

Table 1. The Result of Family Characteristics

No.	Family Characteristics	n	%
1.	Mother's age (years old)		
	15 – 25	144	29.9
	26 – 35	82	55.8
	36 – 46	21	14.3
2.	Mother's education level		
	Uneducated	17	11.6
	Primary School	40	27.2
	Junior High School	17	11.6
	Senior High School	51	34.7
	Higher Education	22	15
3.	Mother's Employment Status		
	Unemployment	102	69.4
	State Employee (PNS/TNI/POLRI)	3	2
	Farmer	22	15
	Trader	5	3.4
	Private Employee	15	10.2
4.	Husband's Employment Status		
	Unemployment	12	8.2
	State Employee (PNS/TNI/POLRI)	4	2.7
	Farmer	89	60.5
	Trader	8	5.4
	Private Employee	34	23.1
5.	Family Income		
	≤ IDR 1.950.000	117	79.6
	> IDR 1.950.000	30	20.4

Source: Primary Data, 2021

Table 1 shows that most mothers (55.8%) are 26 – 35 years old, and most mothers (34.7%) have attended Senior High School. Most mothers (69.4) are unemployed. The data about the Husband's employment status also shows that most Husbands (60.5%) are farmers. These conditions are reflected in family income. The data shows that most families (79.6) earn ≤ IDR 1.950.000 monthly.

Table 2. The Distribution of Nutrition-Aware Family Indicators

No.	Nutrition-Aware Family Indicator	Yes		No	
		n	%	n	%
1.	Exclusive breastfeeding for babies aged 0-6 months	88	60	59	40
2.	Infants receive complementary feeding at the age of > 6 months	114	78	33	22
3.	Families and children eat a variety of nutritional sources	138	94	9	6
4.	Families use iodized salt	82	56	65	44
5.	Infants aged 6-11 months and children 12-59 months receive vitamin A supplements	140	95	7	5
6.	Pregnant women get at least 90 iron tablets during pregnancy	130	88	17	12
7.	Postpartum women get two capsules of vitamin A supplements	106	72	41	18

Source: Primary Data, 2021

Table 2 shows that most mothers (60%) gave exclusive breastfeeding to infants aged 0-6 months. Most mothers (78%) first gave complementary feeding to infants at the age of >6 months. Most families and children (94%) ate a var iety of nutritional sources and most families (56%) used iodized salt. Most (95%) infants aged 6-11 months and children 12-59 months received vitamin A supplements. Most (88%) pregnant women received iron tablets at least 90 tablets during pregnancy and most postpartum women (72%) received two capsules of vitamin A supplements. The result of the univariate analysis of nutrition-aware family practice showed that 58.5% of families had performed >75% nutrition-aware family indicators, and 41.5% of families had performed ≤75% nutrition-aware family indicators at Kabuna Village.

Kabuna is the working area of the Haliwen Community Health Center (Puskesmas). Kabuna is a village in Belu District, one of the border areas between Indonesia and East Timor. This study shows the characteristics of border communities, especially mothers, most of whom have completed high school education but there are still mothers who have never attended formal education. It has an impact on the type of work done. The data shows that more than half of the mothers involved in this study were unemployed. The job in question is a type of work that makes money. It is not supported optimally by husbands, most of whom have a livelihood as farmers. This condition causes a lack of income that can be generated to support family life, including health matters, and fulfill family nutrition adequacy. Low income also has an impact on poor nutrition practices in the family.

This study shows the practices of Kadarzi. Kadarzi is an acronym for Keluarga Sadar Gizi. It means nutrition-aware family, a program initiated by the Ministry of Health of the Republic of Indonesia as one of the solutions to the nutritional problem in Indonesia (Departemen Kesehatan RI, 2008). A Nutrition-aware Family is a family that can recognize, prevent, and overcome nutritional problems in every member of their family (Departemen Kesehatan RI, 2008).

This study shows that most mothers gave exclusive breastfeeding to infants aged 0-6 months. Based on the characteristics of the occupation of the border areas, most married women choose to take care of the household, so they have plenty of time only to give breast milk until the baby is six months old. In addition, breastfeeding mothers continue to be given health education by Posyandu officers to increase the coverage of exclusive breastfeeding. This finding also shows a small proportion of mothers who do not provide exclusive breastfeeding. It is caused by several conditions in the research location, which are related to

the low level of education. It makes it difficult to find decent work, forcing women, including nursing mothers, to look for work outside the Kabuna Village. This condition causes the mother to leave her child in the care of her grandmother or family. Most children who do not get exclusive breastfeeding are children born and raised by other family members, so children do not get exclusive breastfeeding.

Exclusive breastfeeding means only breast milk without additional food until six months (Campos, Vilar-Compte and Hawkins, 2020). Exclusive breastfeeding is proven to be effective in reducing the risk of stunting (Campos, Vilar-Compte and Hawkins, 2020). Breast milk contains carbohydrates, water, fat, protein, and essential nutrients that contribute to the growth and development of toddlers (Ahmad et al., 2015; Oliveira, Allert and East, 2016; Akombi et al., 2017; Mahmudiono, Sumarmi and Rosenkranz, 2017).

The age of toddlers being given complementary feeding for the first time also contributes to the growth and development of toddlers (Binns et al., 2020). This study shows that most mothers gave complementary feeding at the age of >6 months. The existence of regular health education at the time of Posyandu implementation causes most mothers to have a good understanding of the importance of giving complementary feeding. It is manifested in positive behavior in giving complementary feeding when the baby is >6 months old. This finding also shows that a small proportion of infants get complementary feeding at the age of <6 months. Previous cultural practices trigger this: breastfeeding for four months does not harm the baby. It is mainly practiced on babies whose grandmothers or families raise them because their mothers work outside the village or even farther.

At the age of >6 months, breast milk cannot meet children's daily nutritional needs (Oliveira, Allert and East, 2016). The results of previous studies reported that toddlers who get complementary feeding at the age of >6 months showed a lower risk of stunting (Dewey, 2016; Abdulahi et al., 2017). Contrarily, giving complementary feeding at the age of <6 months may have a negative impact because the digestive system of babies <6 months is still not perfect, so it disturbs the absorption of the nutrients (Owino et al., 2016).

This study shows that most families and toddlers ate a variety of nutritional sources. They are consuming various sources of essential nutrients to maintain body functions. One of the characteristics of rural communities is that they have a residence with a large yard so that even though family income is below the district minimum wage, they still consume various sources of nutrition obtained from their yard. This finding also shows a small proportion of families who do not consume a variety of nutritional sources. This condition partially occurs in ex-refugee families who occupy communal lands shared with fellow ex-refugees. It causes limited access to various dietary sources. Children under five are the golden period. It is the most important stage of growth and development, where the brain and physical growth occurs rapidly (Deki, 2016). Lack of nutritional intake at this age will impact growth failure and is irreversible, so adequate nutrition is needed to support children's growth.

Another factor that impacts stunting is the consumption of iodized salt (Danaei et al., 2016). The results of this study showed that most families consume iodized salt. Until now, iodized salt has been sold freely at an affordable price. Continuous education that Puskesmas officers always give increases public awareness of using iodized salt. However, a small proportion of people do not consume iodized salt. It is due to the assumption that coarse or non-iodized salt gives a more delicious taste to dishes, so a small number of people prefer non-iodized salt.

Iodine is an important micronutrient that plays a vital role in synthesizing the hormone thyroxine by the thyroid gland (Rakotomanana et al., 2017; Abbag et al., 2021). Thyroxine hormone plays a role in metabolic control and growth processes, so iodine deficiency will interfere with the growth process of toddlers (Rakotomanana et al., 2017; Abbag et al., 2021). Previous findings proved that the lack of consumption of iodized salt increased the risk of stunting in children under five by 3% (Krämer et al., 2016). The absence of iodine in food had an impact on the growth failure of children.

Among the micronutrients that play a role in children's growth is vitamin A. Most infants aged 6-11 months and children aged 12-59 months have received vitamin A supplements. Vitamin A is routinely given to infants, according to their age, who attend the Posyandu. A small proportion of babies who do not receive Posyandu are babies who do not regularly come to the Posyandu every month. Vitamin A plays a role in metabolic processes, but the body itself does not produce vitamin A (Iftikhar, 2018). Vitamin deficiency can cause growth failure, manifested by stunting (Ssentongo et al., 2020). The results of previous studies had proven that vitamin A deficiency is a determinant of stunting in toddlers (Ssentongo et al., 2020).

Maternal factors also play a role in causing stunting, especially during the pregnancy process. The results of this study indicate that most pregnant women receive at least 90 iron tablets during pregnancy. It is due to the high participation rate of pregnant women in each Posyandu and visits to the Puskesmas. In addition, the increased coverage of giving iron tablets in the Kabuna Village is supported by home visits that Puskesmas officers and health cadres always carry out care to ensure pregnant women get iron tablets. This finding shows that only a small proportion of women did not receive iron tablets during pregnancy because they did not attend the Posyandu and had changed their domicile but did not report it to health workers. Consumption of iron is necessary for pregnant women to pass the pregnancy process healthily. Regular consumption of iron tablets is proven effective in supporting optimal growth and development of the fetus in the uterus and minimizes adverse effects after the baby is born. Iron tablet supplementation was significantly associated with a reduced risk of stunted and severe stunted in children (Nisar, Dibley and Aguayo, 2016). A study in South Asia showed that receiving supplemented iron tablets earlier in pregnancy increased the growth of toddlers living in poor and developing countries (Nisar et al., 2020).

This study implies that most women obtain two capsules of vitamin A during the period. Postpartum women receiving two capsules of vitamin A is one of the essential services for women who gave birth at puskesmas or hospitals. However, there are a small number of postpartum women who missed two capsules of vitamin A during the postpartum period due to cultural practice in Kabuna village. This condition is experienced by women who gave birth assisted by a traditional birth attendant. In addition, there are cultural beliefs that women should be at home for the first 40 days after delivery.

Two capsules of Vitamin A supplementation in postpartum women is also one of the determinants of reducing stunting in toddlers (Gwavuya et al., 2014). The only source of nutrition for infants aged 0-6 months is breast milk, so women with vitamin A deficiency will not be able to provide enough food for their babies (Oliveira, Allert and East, 2016). It will impact growth failure will be seen at the age of toddlers.

Conclusions

This study showed that most families had implemented nutrition-aware family indicators. However, none of them had performed 100% nutrition-aware family indicators. The efforts to assist and promote health at the Haliwen Health Center need to be improved so that the nutrition-aware family indicator can be 100% implemented by all families.

It was a descriptive study. Continuous research needs to be conducted to get complex situations and to analyze the determinant factors of nutrition-aware family practices in the Indonesian borderland area.

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