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The Effect of Katuk (*Sauropus androgunus (L) Merr*) Leaf Biscuit on Increasing Prolactine Levels of Breastfeeding Mother

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Abstract

Prolactin is one of the important hormones for increasing the synthesis and secretion of breast milk. Katuk (Sauropus androgunus (L) Merr) leaf biscuits are standardized and practical processed food products that are substituted with katuk leaf extract and have met the requirements as additional food for breastfeeding mothers. In addition to nutritional content, katuk leaf biscuits also contain phytochemical compounds, namely steroids and alkaloids. The purpose of this study was to determine the effect of katuk leaf biscuits on increasing serum prolactin levels of breastfeeding mothers. This research was conducted in the city of Bandung. The design used was a randomized controlled trial. The sample was 45 primiparous postpartum mothers who gave birth at the public health center for Obstetrics and Neonatal Basic Emergency Services (Puskesmas PONED) in Bandung City, consisting of 22 treatment groups and 23 control groups. Sampling is conducted by block randomization. Data were analyzed using the Independent T-test. The results showed that there was an effect of katuk leaf biscuits on increasing serum prolactin levels in breastfeeding mothers. It is suggested that katuk leaf biscuits be used as an alternative as an effort to increase breast milk production so that it can support the success of exclusive breastfeeding.

Introduction

Breastfeeding is a physiological process to provide optimal nutrition to babies. Breast milk (ASI) is the best nutrition for babies because it contains all the nutrients, antibodies, hormones, and immune factors as well as antioxidants that babies need to grow and develop especially during the first six months of life. Breastfeeding is the main source of nutrition for babies to achieve normal growth, development and immunological protection, (Eidelman et al., 2012). UNICEF in 2005 reported that there were 30,000 infant deaths in Indonesia and 10 million toddler deaths in the world every year but this could be prevented by exclusive breastfeeding, (Yulidasari et al., 2017). Optimal breastfeeding has been shown to be effective in reducing the risk of infectious diseases and preventing the death of infants and toddlers. Infants who are exclusively breastfed have been shown to have a lower risk of various infectious diseases such as diarrhea, respiratory infections, ear infections, pneumonia, urinary tract infections and other diseases such as obesity, diabetes, allergies, inflammatory gastrointestinal diseases, and cancer in the future, (Eidelman et al., 2012). Meanwhile, babies who do not get breast milk, they have a greater risk of death from diarrhea compared to babies who get exclusive breastfeeding, (Lamberti et al., 2011).

The problem that often occurs in

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breastfeeding mothers and is a predictor of decreasing exclusive breastfeeding is the lack of milk production. This problem of breastfeeding mostly occurs in primiparous, women who give birth to babies for the first time (Gunanegara et al., 2012). Inadequate milk production is caused by various factors such as nutritional and non-nutritional factors including hormonal problems, parity, pregnancy, age and psychological factors. Nutritional factors are required by breastfeeding mothers. Nutrients are required for the synthesis of milk and for stimulating the production of hormones that play a role in the production and secretion of milk. The hormones that play a role in this process are the hormones prolactin and oxytocin (Penagos Tabares et al., 2014, Zuppa, 2010).

One of the main hormones that plays a role in the process of lactation is the hormone prolactin. The hormone prolactin is needed to build and maintain lactation. In the mammary gland, the hormone prolactin specifically stimulates DNA synthesis and epithelial cell proliferation as well as the synthesis of milk proteins (casein, lactalbumin), free fatty acids, and lactose. The prolactin hormone specifically stimulates the transcription rate of the milk protein gene, (Hall, 2010). Low levels of the hormone prolactin can inhibit the synthesis and secretion of milk. This has been proven by a study from Hill et al which states that the secretion of milk in mothers stops within three to four days after a decrease in prolactin levels (Hill et al., 2009), whereas an increase in the hormone prolactin occurs during the first week of the puerperium that triggers it. increased milk production (Mortel and Mehta, 2013). Thus, the hormone prolactin is essential for the initiation and secretion of milk at the beginning of lactation and for the maintenance of milk production during lactation. Increased levels of the hormone prolactin are influenced by several factors such as frequency of breastfeeding, previous breastfeeding experience, milk production, and pharmacological drugs including the use of *galactogogues,* (Srinivas et al., 2014). *Galaktogogue* is a synthetic substance or plant molecule that is used to induce, maintain and increase milk production through a complex process involving the interaction of physical and physiological factors. The most important factor in the lactation process is the prolactin hormone (Mortel and Mehta, 2013, Srinivas et al., 2014).

Katuk is a *galactogogue* that is trusted by the public to increase breast milk production. Katuk (*Sauropus androgynus (L) Merr*) is a shrub that belongs to the Euphorbiaceae family. Katuk contains nutrients and several compounds that are useful for the synthesis and production of breast milk. Katuk contains nutrients and several useful compounds. The nutritional content of katuk leaves can increase milk production by increasing glucose metabolism for lactose synthesis, (Suprayogi, 2012). In addition, the phytosterol levels in katuk leaves are higher than other types of vegetables (Arista, 2013). Phytosterols have hormonal effects that are estrogenic so that they can increase prolactin and milk production (Penagos Tabares et al., 2014). Another component contained in katuk leaves is papaverine. Papaverin can stimulate the release of prolactin. The papaverine content of old katuk leaves has the effect of relaxing smooth muscle and widening blood vessels, causing an increase in circulating oxytocin and prolactin hormones in the bloodstream (Susan Soka, 2011). A study showed that giving katuk leaf extract was proven to increase the expression of prolactin and oxytocin genes in breastfeeding mice (Soka et al., 2010). Inappropriate processing of katuk leaves can reduce the beneficial effects of katuk leaves, even if too much use or incorrect processing can cause side effects (Bunawan et al., 2015). Therefore, it is necessary to develop alternative preparations for processed katuk leaves which are more practical and standardized with proper and permanent processing so that they can provide beneficial effects without causing side effects.

Katuk can be processed in various forms of processed foods that are more practical and standardized. There are many studies on processed katuk such as biscuits or plain bread without reducing nutritional content and can be accepted by the community (Setyaningsih DN, 2014). Biscuits are snacks which are usually made from wheat flour or other types of flour. Usually, in the process of making biscuits, it is necessary to add fat or oil which functions

to soften or make it crispy so that it becomes more delicious, (Pangaribuan, 2013). Katuk leaf biscuits are standardized and practical processed food products that are substituted with 900 mg of katuk leaf extract. These katuk leaf biscuits have been tested for the quality of biscuits and the results have met the requirements of the Indonesian National Standard (SNI) for biscuits. In addition, organoleptic tests have been carried out on katuk leaf biscuits so that they are suitable for consumption by nursing mothers. Apart from having protein, fat and carbohydrate nutritional content, these katuk leaf biscuits also contain phytochemical compounds (steroid and alkaloid compounds). Research from Mutiara 2016 shows that giving katuk leaf biscuits to mice has proven that katuk leaves can increase the volume of breast milk, (Mutiara, 2016). This study aims to determine the effect of katuk leaf biscuits on serum prolactin levels of breastfeeding mothers.

Method

This research was conducted at the public health center for Obstetrics and Neonatal Basic Emergency Services (Puskesmas PONED) in Bandung City. These locations are Puskesmas Garuda, Puskesmas Pagarsih, Puskesmas Puter, Puskesmas Padasuka, and Puskesmas Ibrahim Adjie and were conducted from March to May 2016. The population in the study were all postpartum mothers in those five public health center (Puskesmas PONED) in Bandung City. The samples were postpartum mothers who fulfilled the inclusion and exclusion criteria. The sample in this study were 45 people, consisting of 22 people in the treatment group and 23 people in the control group. The inclusion criteria in this study were mothers who gave birth for the first time (primiparous), did not use other drugs to increase milk production, exclusively breastfed their babies, their babies were full-term, single babies, healthy, birth weight babies around ≥ 2500 grams , and willing to be a respondent. Meanwhile, the exclusion criteria were mothers who had breast problems such as drowning nipples, a history of breast surgery, diabetes mellitus and / or hypertension, smoking and or drinking alcohol, mothers and / or babies who had severe complications and needed treatment and babies with congenital abnormalities. Research subjects will be excluded from the study (dropout) if during the study they experience one or more of the following criteria, namely the mother does not consume the recommended biscuits for at least two consecutive days and / or the baby is given formula milk and / or nutritional intake other than breast milk.

This study used a Randomized Controlled Trial (RCT) design. The independent variable was the provision of katuk leaf biscuits while the dependent variable was the serum prolactin level. The sampling technique used block randomization, to determine each sample in the treatment and control groups. Randomization was performed by the enumerator and was unknown to the researcher. The treatment group was given katuk leaf biscuits while the control group was given katuk leaf biscuits. The treatment was given for 14 days and research subjects had to eat 9 biscuits a day. The data obtained are primary data based on the measurement results of basal prolactin hormone levels of breastfeeding mothers using the ELISA (Enzym-linked Immunosorbent Assay) method which was conducted at the Molecular Genetics Laboratory of the Faculty of Medicine, Padjadjaran University. The basal prolactin hormone is obtained within 3-4 hours after the patient wakes up, which is around 8-10 am. This time is the most accurate sampling time for the hormone prolactin.

The research procedure was started by selecting the research subjects according to the inclusion and exclusion criteria. After that, the researcher provides information by explaining the objectives and research procedures to the research subjects. Then, ask for consent to be a research subject in the form of a signature on the informed consent sheet provided. The next step, researchers took blood samples which were carried out at a time span of 07-10 AM to obtain basal serum prolactin levels for nursing mothers. Blood was drawn on the median cubital vein with 3 cc. The researcher coordinated with the enumerator to give biscuits based on randomization results. The types of biscuits provided by the enumerators were not known by the research subjects or researchers. Enumerators provided counseling on how to eat biscuits and told the research subjects to record the number of biscuits

consumed each day. This is recorded in the form posted on the research subject's house provided by the researcher. The research subjects had to consume one packet of biscuits containing the nine biscuits within 24 hours during the 14 days of the puerperium. Biscuits were given by the enumerator every two days and then monitoring was carried out including health conditions, frequency of breastfeeding, complaints experienced by research subjects, and compliance with biscuits. On the 15th day, researchers took back a venous blood sample with 3 cc to measure the basal serum prolactin levels of the mother after giving biscuits for 14 consecutive days.

After the data was collected, the researcher performed data processing including editing, scoring, data normality testing and coding. In this study, data analysis using the help of a computerized program includes univariate and bivariate analysis. Univariate analysis was performed to describe the characteristics of the variables studied. Bivariate analysis to test the effect of katuk leaf biscuits on increasing serum prolactin levels of breastfeeding mothers using the Independent T-test statistical test is a form of statistical test used to test the comparative test hypothesis of numerical categories. The significance value or indication that there is a difference in serum prolactin levels in the treatment group and the control group is shown if the p value is <0.05.

Result and Discussion

Table 1. below provides an overview of the characteristics of the research subjects who participated in this study. The results showed that there were no differences in terms of education, occupation, nutritional status, age, frequency of breastfeeding, stress levels, and compliance between the katuk leaf biscuit group and the control biscuit group (p> 0.05). In this study, all respondents were primiparous with an average age of 21 years and an age range of 16-28 years. Breastfeeding problems such as milk production are less common in primiparous. The results of previous studies showed that 56.4% of delayed lactogenesis occurred in primiparous (Larasati, 2014). Respondents in the treatment group and the control group had no differences in terms of age, education,

Table 1. Characteristics of respondents

Characteristics	Group		P
	Treatment (%) (n=22)	Control (%) (n=23)	
Education Level			0.956[a]
Primary School	2 (9.1)	2 (8.7)	
Junior High School	7 (31.8)	7 (30.4)	
Senior High School	9 (40.9)	11(47.8)	
University	4 (18.2)	3(13.0)	
Occupation			0.722[b]
Work	4 (18.2)	6 (26.1)	
Don't work	18 (81.8)	17 (73.9)	
Nutritional Status			0.559[a]
Low	5 (22.7)	7 (30.4)	
Medium	17 (77.3)	16 (69.6)	
High	0	0	
Obesity	0	0	
Frequency of breastfeeding			0.626[a]
< 8x	0	0	
8-12	14 (63.6)	13 (56.5)	
>12	8 (36.4)	10 (43.5)	
Stress			0.672[a]
Light	9 (40.9)	8 (34.8)	
Moderate	13 (59.1)	15 (65.2)	
Weight	0	0	
Age			0.850[c]
x (SD)	21.7(3.4)	21.9(3.2)	
Range	17-28	16-28	
Compliance			0.978[d]
Median	100	100	
Range	92.9-100	92.9-100	

Test description: [a] *Chi Square*, [b] *Fisher Exact,* [c] *Independent T-test* [d] *Mann Whitney*

Table 2. The relationship between katuk leaf biscuits and prolactin levels

Characteristics	Group		p
	Treatment (n=22)	Control (n=23)	
Prolactin levels - Pre			
x (SD)	139.7 (46.6)	143.3 (40.45)	0.394[c]
Prolactin levels - Post			
x (SD)	149.1 (44.9)	118.5 (50.5)	0.019[c]
Increase Prolactin x (SD)	9.37(51.2)	-24.73 (67.3)	0.032[c]

Test description: [c] *Independent T-test*

occupation, nutritional status, frequency of breastfeeding, stress levels and compliance with biscuits. Thus, the research subjects in this study were homogeneous. The following is a table of respondent characteristics. While the results of research on differences in prolactin levels in the treatment and control groups can be seen in Table 2.

Table 2 shows that on the first day of the puerperium, before the intervention administration, there was no significant difference in serum prolactin levels between the two groups (the katuk leaf biscuit group and control biscuits) but after the end of the study, the 15th day of the puerperium or after administration. The intervention showed that there was a difference in serum prolactin levels between the group given katuk leaf biscuits and the control biscuit group ($p < 0.05$) and there was a significant difference in the increase in serum prolactin levels between the katuk leaf biscuit group and the control biscuit group. The result of statistical test shows that the value is $p < 0.05$. After 14 days of giving katuk leaf biscuits, the treatment group experienced an increase in prolactin levels by 9.37 ng / ml while the control group experienced a decrease in serum prolactin levels by 24.73 ng / ml. Based on the statistical test, it shows that there is a significant difference in the increase in serum prolactin levels between the katuk leaf biscuit group and the control biscuit ($p < 0.05$), it can be concluded that the provision of katuk leaf biscuits has an effect on the increase in serum prolactin levels for brastfeeding mothers. This is consistent with the results of research by Soka (2013) which showed that giving 173.6 mg / kg of katuk leaf extract to lactating wistar rats for 12 days increased 14.65 times the expression of the prolactin gene and 22.2 times the expression of the oxytocin gene compared to the group control, (Soka et al., 2010).

Prolactin hormone levels in breastfeeding mothers fall by around 50 percent during the first week after giving birth. The basal level of the hormone prolactin in nursing mothers averaged 90 ng / ml at 10 days after delivery. This level slowly decreases over the 180 postpartum days, 44.3 ng / ml. Thus, to maintain breast milk production, it is necessary to have high levels of the hormone prolactin. Basal prolactin hormone levels need to be increased within the first week of breastfeeding to stimulate the initiation and secretion of milk. It is proven that in the case of mothers with premature babies with gestational age ≤ 36 weeks, there is no milk production and it turns out that the basal prolactin hormone level is 45 ng / ml. Whereas for mothers who deliver term babies and are able to express breast milk, it turns out that the level of the hormone prolactin reaches 90-110 ng / ml. Thus, giving galactogogue to mothers who give birth preterm is very useful to induce an increase in prolactin hormone levels up to the equivalent of mothers who give birth at term so that this can increase milk production (Hill et al., 2009). This is in line with research conducted by Mortel et al. Which shows that galactogogue herbs can increase serum levels of the hormone prolactin, oxytocin, breast milk volume, infant weight, and breast milk composition (Mortel and Mehta, 2013).

Katuk is a galactogogue herb that is trusted by the people of West Java to increase breast milk production. This is supported by the results of research which show that giving katuk leaf extract to wistar rats for 12 days can increase prolactin gene expression by 14.6 times compared to the group without katuk leaf extract (Soka et al., 2010). This happens because katuk leaves contain the alkaloid papaverine which has a relaxing effect on

smooth muscle and dilates blood vessels. It also causes the circulating hormone oxytocin and prolactin to increase blood flow. In addition, the phytosterols contained in katuk leaves have a hormonal effect from chemical sterols which are estrogenic. This molecule induces the expression of the prolactin hormone receptor. A study explains that phytoestrogens are compounds that can increase the hormone prolactin and milk production. Phytoestrogens are one of the phytosterols. Phytoestrogens have an action similar to estrogen (E2). This triggers the expression of the prolactin gene through 2 independent pathways and an unknown pathway in the pituitary lactotropic cells as a producer of the prolactin hormone. The first pathway through the intracellular receptor E2 (E2R) which ultimately increases prolactin gene expression and increases milk secretion. This effect is mediated by the triggering pathway of the α isoform of the estrogen receptor membrane (mE2R). The second pathway is blocking the activation pathway by dopamine D2R receptors, stimulating the production of the hormone prolactin, proliferation of lactotropic cells in the pituitary by increasing the cAMP pathway in PKA phosphorylase which triggers expression of the prolactin gene. Therefore, the secretion of the prolactin hormone into the vasculature increases and affects the mammary alveoli cells which contain lots of prolactin receptors and ultimately can increase milk production (Penagos Tabares et al., 2014, Susan Soka, 2011). This is also supported by Setyaningsih's research which states that the katuk plant can increase breast milk production, presumably based on the hormonal effect of chemical sterols which are estrogenic. Katuk leaves contain steroids and polyphenols which can increase prolactin levels and the content of other micronutrients found in katuk. 100 g of katuk leaves contain 204 mg of calcium and 200 mg of vitamin C, in addition to fiber and other nutrients such as protein, carotene, vitamins A and B and clhoropyll, (Setyaningsih et al., 2017).

Although katuk leaf biscuits had an effect on increasing serum prolactin levels, in this study there were still research subjects in the treatment group who experienced a decrease in serum prolactin levels and conversely, there were research subjects who experienced an increase in serum prolactin levels in the control group. This happens because many factors can influence this. This is because each individual has different biological characteristics so that the response to stimuli is different even though in this study it was limited that the research subjects were primiparous who had never breastfed before. It is expected that the research subjects have the same prolactin receptors so that the number of prolactin receptors circulating in the blood is not much different. Another condition that causes this is the baby suction during each breastfeeding (duration of breastfeeding). The strength of the babies' suction was different, although in this study the frequency of breastfeeding in the control and treatment groups was not different. This has limitations because only the quantity of suction is assessed without considering the strength of the suction which describes the quality of the baby's suction. In addition, the secretion of the hormone prolactin is very complex, which is influenced by other hormones and may have different characteristics for each individual. Based on related sources, the secretion of the prolactin hormone is also controlled by Prolactin-Releasing Factors (PRF) such as Thyrotropin-Releasing Hormone (TRH), Vasoactive Intestinal Peptide (VIP), oxytocin, angiotensin II and serotonin, (Hall, 2010). In this study, the hormones involved in the secretion of the hormone prolactin were not examined so that it could not explain in detail the relation of these hormones to the secretion of the hormone prolactin. Further research is required to explore the exact mechanism of action at the molecular level in relation to the factors that influence the increase in prolactin.

This study has a research limitation, namely the examination of prolactin hormone levels is only conducted twice at the pre and post time which is conducted on the first day of childbirth and the 15th day of the puerperium. In this study, no midterm observation of prolactin levels was carried out so that it could not assess the trend of the increasing pattern of prolactin hormone in breastfeeding mothers.

Conclusion

Based on the results of the study, it can be concluded that there is an effect of giving

katuk leaf biscuits during the first 14 days of the puerperium in primipara on an increase in serum prolactin levels. Suggestions in this study are the provision of katuk leaf biscuits is expected to be used as an alternative to increase milk production so that it can support the success of exclusive breastfeeding.

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Violence Determinant on Teenagers in Yogyakarta

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Abstract

Violence can adversely affect teenagers. Teenagers rarely report violence to their friends or family. Teens who are experienced with violent outbreaks have symptoms such as depression and anxiety, deviant behaviours such as smoking, drugs and alcohol and even attempted suicide. This Study used a cross-sectional design. The sample of the study were student aged 15-19 years who came from 18 Junior High School in Yogyakarta City. The study was conducted during August 2017. Sample size is 481 adolescents. Technique sampling used multistage random cluster sampling. The instrument used questionnaires on violence, knowledge, attitudes, self-confidence, family roles, peer roles, teacher roles and information sources. Data analysis used univariate and bivariate analysis used chi square test. Results showed that 77.5% of adolescents were violent and 68.4% were physically abused. Peers are a risk factor for adolescents to engage in violence (PR: 1.335; CI 95%:1.205-1.479) and families also play an important role for adolescents engaged in violence (PR: 1.179; CI 95%: 1.079-1.292). The existence of teen counseling services such as Youth Information and Counseling Center to increase adolescent insight about juvenile delinquency especially violence and impact on adolescents.

Introduction

Teenage is a period when ones are faced with various conflicts that occur due to changes that exist in themselves. Such physical, emotional, and social changes, the changes can conflict with the surrounding environment. Teenager has many problems and pressures experienced related with these changes. Violence is one thing that is common among teenagers. Violence is a big problem, because it can have both short and long term impacts. Teenagers rarely report the violence they experience to friends and family. Among high school students, 21% of female and 10% of male have experienced physical or sexual violence. Among teenagers who experienced rape and physical violence committed by their partners, 22% of female and 15% of male who experienced it came from couples aged between 11-17 years. A national survey conducted by (Finkelhor *et al.*, 2015), found that 40% of teenagers aged 17 years or younger had been exposed to at least one form of violence during their lives such as assault or physical abuse.

Teenagers who are experienced with violent incidents have symptoms such as depression and anxiety, deviant behavior such as smoking, drugs and alcohol even trying to commit suicide (World Health Organization, 2015). The results of the study mentioned that the symptoms of depression are a result of violence that occurs in the family environment. Good communication between mother and teenager gives a positive impact in reducing violent behavior in teenager (Eisman *et al.*, 2015). Research (Heinze *et al.*, 2018), found a positive and strong relation between violence in teenagers with depressive symptoms as adults. Teenagers living in low-income environments are more likely to be exposed to violence and

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increase their risk of mental health (Voisin *et al.*, 2016). Children who experience violence or witness violence have a higher risk of such behavior during adulthood (Fulu et al., 2013; Fleming et al., 2015; Jennings et al., 2015).

Based on the fact sheet annual records (Catahu), in 2015 the number of cases of violence against women reached 321,752 cases. One of the perpetrators who committed violence against women was carried out by intimate relations with the victim. A total of 11,207 cases were committed by those having close relation with the victim, 2,734 cases (24%) of which were dating violence. Kind of violence against women included physical as many as 4,304 cases (38%), followed by sexual 3,325 cases (30%), psychological 2,607 cases (23%), and economic 971 cases (9%) (Komisi Nasional Perempuan, 2016).

Violence by teenagers is a serious problem that must be a concern for all people. The impact is short term and long term which can affect physical and psychological conditions for the victims. According to (Green and Kouter, 2000), there are several factors that affect behavior namely predisposing factors (knowledge, beliefs, values, attitudes and faith), enabling factors (availability of health resources, easy access to health resources, community / government regulations, priorities and commitment to health and health-related skills) and reinforcing factors (parents, teachers, peers). Based on the background that has been described, it drives the attention of researcher to examine the relationship between predisposing, enabling and reinforcing factors with violence by teenagers in the city of Yogyakarta.

Method

This research was an observational analytic cross-sectional design. It was conducted in August 2017. The population were all students from 80 Senior High Schools in Yogyakarta with a total of 36,360 people. The research sample was students aged 15-19 years. The sample size was 481 students drawn from 18 schools. The sampling technique used multistage random cluster sampling.

The instrument used was a questionnaire about violence, knowledge, attitudes, self-confidence, the role of family, the role of peers, the role of teachers and sources of information. The research questionnaire was tested for validity at the PIRI Vocational High School in Yogyakarta City and was tested for validity and reliability using corrected item-total correction. Some of the questionnaires used in this study were modifications of several studies. Modified violence questionnaire from (Ayu, Hakimi and Hayati, 2012) and (Sulistyowati, 2014) with a Cronbach α value of 0.887; Knowledge modification of (Sulistyowati, 2014), with a Cronbach α value of 0.602; Modification of attitude (Lubis, S, 2012), with a Cronbach α value of 0.819; Modified confidence from (Pratama, 2016), with a Cronbach α value of 0.604; The role of the family (α Cronbach: 0,612); The role of the teacher (α Cronbach: 0,671); The role of peers modification from Lubis (2010) and (Susanti, 2012), with a Cronbach α value of 0.697.

Data analysis included univariate and bivariate analysis. Univariate analysis was carried out to describe the variables studied, namely knowledge, attitudes, self-confidence, family roles, peer roles, teacher roles and information sources with results in the form of frequency distributions, percentages and narratives of these variables. Bivariate analysis was carried out on two variables to determine the relation between variables, namely the independent variables and the dependent variables. This analysis used the Chi-Square test ($p < 0.05$). Prevalence Ratio (PR) was used to calculate the risk of the independent variables and the dependent variables.

Result and Discussion

The number of respondents in this study were 481 students taken from 18 high schools in the city of Yogyakarta. Respondents' characteristics were based on age, sex, parental past education and types of violence. Of the 481 respondents, the age of most respondents was 16 years as many as 231 students (48%). The minimum age of the respondent was 15 years and the maximum age of the respondent was 19 years. The number of female respondents were 245 (50.9%) and the number of male respondents were 236 (49.1%). The highest level of parental education was High School with 216 people (44.9%) while the lowest of parental education was Elementary School with 26 people (5.4%). The most common type of

Table 1. Characteristics of respondents

Characteristics of respondents	Frequency	Percentage (%)
Age		
15	85	17,7
16	231	48,0
17	118	24,5
18	41	8,5
19	6	1,2
Gender		
Male	236	49,1
Female	245	50,9
Parent education		
Unknown	62	12,9
Elementary	26	5,4
Junior High	36	7,5
Senior High	216	44,9
Graduate	141	29,3
Form of Violence		
Physical	329	68,4
Psychological	292	60,7
Economical	73	15,2
Sexual	18	3,7
Total	481	100

Source: Primary Data, 2017

violence perpetrated by teenagers was physical violence (68.4%) while the least type of violence was sexual one (3.7%). The data can be seen in Table 1.

From 481 respondents, 70.7% have high knowledge about violence. Respondents with negative attitudes to violence were 245 students (50.9%). Some respondents had self-confidence as many as 346 students (71.9%). Respondents with access to low sources of information were 239 students (49.7%). As many as 341 respondents (70.9%) stated that the family's role was not to commit violence. A total of 308 respondents (63.6%) stated that teachers have a role for respondents not to do violence. Respondents who were influenced by peers to commit violence were 308 students (63.6%). As many as 77.5% of teenagers have experienced violence. Univariate analysis results can be seen in Table 2.

Bivariate analysis in this study used the chi square test. The results of this study indicate that there is a relationship between the role of parents (p = 0.003) and the value of PR 1.179 (95% CI: 1.079-1.292) which means that teenagers who have less family role have a risk of 1,179 times to commit violence greater than teenagers who has a family that plays a good role. The role of peers has a relationship with violence in teenagers (p = 0,000) and a value of PR 1,335 (95% CI: 1,205-1,479) which means that teenagers who have a peer who have a high role have a risk of 1,335 times greater for violence than teenagers with Peers with less role. While there is no relationship between knowledge (p = 0.136), attitudes (p = 0.740), self-confidence (p = 0.174), teacher's role (p = 0.213), information sources (p = 0.055) and violence by teenagers. The results of the chi square analysis can be seen in Table 3.

Good knowledge should encourage teenagers not to commit violence. In this study,

Table 2. Distribution of variables frequency

Variables	Frequency	Percentage (%)
Knowledge		
Poor	141	29,3
Well	340	70,7
Attitude		
Negative	245	50,9
Positive	236	49,1
Self Confidence		
Lack	135	28,1
Confidence	346	71,9
Family Role		
Less	239	49,7
Have a role	341	50,3
Teacher role		
Less	140	29,1
Have a role	341	70,9
Peer Role		
Less	175	36,4
Have a role	308	63,6
Source of information		
Low	243	50,5
High	238	49,5
Violence		
Yes	373	77,5
No	108	22,5
Total	481	100

Source: Primary Data, 2017

teenagers knowledge is only limited to know. This is in line with the notion of knowledge according to (Notoatmodjo, 2010), which stated that knowledge is the result of human sensing or the result of knowing the object through its senses. Teenagers are only limited to knowing the related types, rules and effects of violence without applying it in real life so that they still continue to commit violence. This is likely caused by other factors that affect it.

Previous research showed that there is a relation between knowledge and violence, meaning that the higher the level of knowledge of teenagers about violence, the lower the incidence of violence. Conversely the lower the level of teenager knowledge about violence, the higher the incidence of violence. Thus teenagers with high knowledge are expected to become protectors for themselves from violence (Sulistyowati, 2014). Research (Hidayangsih et al., 2011), stated there is a negative relation between knowledge and risk behaviors of teenagers where the higher the knowledge, the higher the drive for risky behavior, one of which is violence.

Based on this research it can be seen that teenagers with high knowledge are not necessarily ones who are positive about violence by not doing violence to others. Negative attitudes in this research are various perceptions, opinions, judgments and desires to commit violence. But in teenagers attitudes toward violence both negative and positive attitudes have a not much different percentage

Table 3. Chi Square Test Result between independent variables and dependent variables

Variable	Violence				Total		P value	PR (CI 95%)
	Yes		No		n	(%)		
	n	(%)	n	(%)				
Knowledge								
Poor	102	21,2	39	8,1	141	29,3	0,136	0,914 (0,814-1,027)
Well	269	55,9	71	14,8	340	70,7		
Attitude								
Negative	191	39,7	54	11,2	245	50,9	0,740	1,022 (0,927-1,127)
Positive	180	37,4	56	11,6	236	49,1		
Self Confidence								
Lack	98	20,4	37	7,7	135	28,1	0,174	0,920 (0,818-1,034)
Confidence	273	56,8	73	15,2	346	71,9		
Family Role								
Less	121	25,2	19	4	140	29,1	0,003	1,179 (1,079-1,292)
Have a role	250	52	91	18,9	341	70,9		
Teacher Role								
Less	141	29,3	34	7,1	175	36,4	0,213	1,072 (0,973-1,181)
Have a role	230	47,8	76	15,8	306	63,6		
Family Role								
Have a role	214	44,5	29	6	243	50,5	0,000	1,335 (1,205-1,479)
Less	157	32,6	81	16,8	238	49,5		
Information Source								
Low	175	36,4	64	13,3	239	49,7	0,055	0,904 (0,820-0,997)
High	196	40,7	46	9,6	242	50,3		

Source: Primary Data, 2017

for violence. Thus affecting the results of research with no relation between attitude and violence found. Researchers assume that there are other factors that affect the formation of attitudes, namely knowledge. Research (Sumiati and Lailan, 2012), states that if teenagers knowledge is good, it produces good attitudes. This means that if teenagers have a high level of knowledge about violence, their attitudes to non-violence are also high. Vice versa, if the knowledge of teenagers is low then the attitude to violence is high.

Violence committed by teenagers is also affected by self-confidence. Based on the result, teenagers who feel valued or have high self-confidence are not necessarily non-violent. The researchers' assumption of the result is because teenagers assume that one who commit violence is something that is natural in everyday relation. Another assumption is that there are no complaints from victims of violence as a result of the actions of the perpetrators, so that the perpetrators remain confident and enjoy doing violence against the victims. The results of a study (Fatchurahman and Pratikno, 2012), stated that there is a significant negative relation between self-confidence and juvenile delinquency, where the higher the teenager's self-confidence the lower the juvenile delinquency. Vice versa, the lower the confidence of teenagers, the higher the juvenile delinquency. One's self confidence is affected by self-esteem. Research (Hidayati, 2015), stated that self-confidence has no significant effect on juvenile delinquency. Self-confidencr is a factor related to an individual's internality, how the individual respects himself, the similarity between how a person sees himself positively and the reality that exists.

Other factor that may influence teenagers to commit violence is the role of peers. The intensity of interaction that is more with

peers and the existence of information shared among them becomes a reinforcing factor for adolescents to commit violence to proof the information they received. The more they interact with at-risk peer, the more likely they are to get involved in the behavior. Research (Lestary and Sugiharti, 2011), suggested that one of the determinants of risk behavior in teenagers is the presence of friends who behave risky. The encouragement and experience together with peers increases teenagers' confidence in committing violence.

The results of a study (Septiyuni, Budimansyah and Wilodati, 2015), stated that there is an effect of peers on student violence at school with a contribution of 13%. The role of peers in violence aims to make these teenagers acceptable in their communities. Other research (Fitriani and Hastuti, 2016), obtained significant result between the influence of peers on juvenile delinquency, one of which is violence. Teenagers have a tendency to do violence if their friends also do it (Bond and Bushman, 2017).

The result of a study indicated that there is a relation between the role of peers with violent behavior where the behavior shown is increasingly strengthened by the praise given by friends and teenagers who dare to commit violence so teenagers feel more valued in their peer groups and respected by other groups of friends (Shofia and Sari, 2016). Peers play a very important role in the formation of teenagers attitudes and behavior. Teenagers who are friends with someone who often acts violently tend to follow that behavior. If a group of peers shows a positive value then the teenager will also show a positive attitude and behavior. Vice versa, if the peer group show negative values, teenagers will show negative attitudes and behaviors (Sulistyowati, 2014).

Family is one of the reinforcing factors in risk behavior. A family with a good relation can affect the behavior, personality development and emotions of teenagers (Sriyanto *et al.*, 2014). Interpersonal communication of teenagers with parents has proven to be influential, good interpersonal communication that is built between parents and teenagers can result in the low violent behavior (Usman, 2013). Family relationships and prosocial norms independently protect girls from violent involvement. Prosocial norms with friends also function as protectors against violence and victimization. However, girls with strong peer connections have higher levels of violence (Shlafer *et al.*, 2014).

The criminal pattern of the father and mother or a family member can print the criminal pattern of almost all family members. There is a significant difference between male and female teenager, male teenager often get physical abuse from fathers more often than female teenage. Meanwhile female teenager more often get verbal abuse from mothers than male teenager. If this violence continues in the family, it is possible that the teenager can become perpetrators of violence in the future (Berlianti *et al.*, 2016). Teenagers who experience violence in the family system are more likely to abuse their peers and can increase violence in adulthood (Xia, Li and Liu, 2018). Teenagers who have witnessed violence committed by parents are predicted to have a direct impact on violence and victimization when they are adults (Franzese *et al.*, 2017).

A teacher can play a role in preventing and alleviating violent behavior in schools. Among roles of the teacher are to provide services to students according to their needs optimally and efficiently. Then collaborating with parents, principals, vice principals, subject teachers and including residents of surrounding schools to provide good supervision for students so that their attitudes and behavior can be controlled (Yandri, 2014). A research (Sulistyowati, 2014), stated that there is a positive relation between the school environment and violent behavior, if the school environment is good then the behavior of teenager tends to be good. (Johnson *et al.*, 2017), suggested that there is a need for agreement in the awareness of building positive perceptions in individuals and the environment against violence can be protective for teenagers not to be involved in violence. School-based health care education interventions can have a positive impact on preventing violence in teenagers (Neto *et al.*, 2014).

A report (World Health Organization, 2015), stated that 92% of teenagers do not know where to get information and consultations about health, both those in the vicinity of their

homes and schools or Community Health Service Centre (Puskesmas). The most possible source of information at school can be through the Youth Counseling Information Center (PIK R). However, of the total schools used as research sites, only one school has PIK R and the Violence Task Force. One of the roles of PIK R is to be able to act as a face-to-face media between counselors and teenagers to improve youth information about violence in particular. The function should be able to have a positive impact on them not to commit acts of deviation from values and behavior. A research (Hariyadi, 2016), stated that watching TV and playing games with violent content can cause children to imitate these behaviors, so it is necessary to provide knowledge about the effects of violence. Thus they can control the media they consume without being totally dependent on parents.

Conclusion

The parents and peers role variables have a relation with violence by teenagers in the city of Yogyakarta, while the variables of knowledge, attitudes, self-confidence, the role of teachers and sources of information have no relation with it.

Teenagers who are at risk should report various acts of violence that can harm themselves or groups to the school and parents to cut acts of violence chain. Among risk factors of violence by teenagers in the city of Yogyakarta is the role of peers. The results of this research should be considered by the Office of Education to include material about risky behavior for teenagers, especially violence in the education materials or school curriculum. Schools are expected to collaborate across sectors to develop youth counseling services such as the Youth Information and Counseling Center (PIKR) in order to broaden teenager insights about the effects of juvenile delinquency, especially violence on teenagers.

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Qualitative Study on Perpetrator of Child Sexual Violence with the Symbolic Interaction Theory Approach

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Abstract

Based on data from the Jember Resort Police (Polres), the highest case of violence against children is sexual violence. The purpose of this research was to analyze the forms of sexual behavior in perpetrators of child sexual violence. This research was a qualitative research with a case study approach, with purposive technique to 7 perpetrators. Credibility was done by testing source triangulation to additional informants, namely wife behavior and triangulation techniques using observation. Most of the events occurred in the perpetrator's house. Most perpetrators used symbols to commit sexual violence to children with verbal cues and invitations. Most had more than one experience of marriage and other one had not married. There were perpetrators who had risky behaviors that often watched porn videos and had sex with commercial sex workers. Most of the perpetrators had a problem of harmony with their partners. Besides pedophiles, abnormal sexual behavior carried out on victims was incest. The victims were stepchildren who have quiet and weak characters.

Introduction

The meaning of a child according to the Law of the Republic of Indonesia Number 35 of 2014 which is an update of Law Number 23 of 2002 is someone who is not yet 18 years old, including children who are still in the womb. Protection of children is an activity in the form of protecting the rights and lives of children and maintaining the dignity of children as well as protecting children against violence. Protection of children's rights needs to be done and fulfilled by close family (parents), surrounding communities and the State along with the local government (KPAI, 2014). The problems of children are, among others, children in conflict with the law (ABH), children of divorce victims, children with wrong parenting, neglected children (economics, education, etc.), children in bad environments and children who are victims of violence (Erlinda, 2014). Violence is a form of action that results in suffering for someone as a result of beatings or various other physical actions that have an impact on pain (Perppu RI, 2016).

The high rate of sexual violence against children is proven by the total reported cases of children as perpetrators of violence from 2011 to 2016, with a total of 2096 cases with 21.4% cases of physical violence, 6.1% psychological violence and 72.5% sexual violence (KPAI, 2016). Sexual violence is defined as any form of sexual act, an attempt to commit an unwanted sexual act and is aimed at someone's sexuality by using coercion, by anyone regardless of their relationship with the victim and background (Erlinda, 2014).

KPAI Commissioner Jasra Putra, stated that KPAI had found cases of sexual violence against children in 2015 totaling 218 cases, then in 2016 there were 120 cases and in 2017 with 116 cases (KPAI, 2017). Based on data from the National Commission for Child Protection

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(Komnas PA) of East Java from the number of violence in 2012 there were 76 cases of sexual violence against children, in 2013 there were 198 cases, in 2014 there were 47 cases, in 2015 there were 298 cases and in 2016 there were 162 cases (KPAI, 2016).

The city in East Java which has a role in contributing to the number of child sexual violence is Jember Regency. Based on data from the Jember District Police Department the number of sexual violence in the last 4 years was recorded in 2014 from a total of 104 cases there were 52.83% of cases of child sexual violence. In 2015 the number of cases was 73 with 60.27% of cases of child sexual violence. In 2016, there were a total of 74 cases with 74.32% of cases of child sexual violence and in 2017 (January to June) a total of 38 cases with 57.89% of cases of child sexual violence (Kepolisian Negara Republik Indonesia Jawa Timur Resor Jember, 2017).

Most perpetrators of child sexual violence are teenagers and adults who are known to be close to children and have or feel they have power over the child, but the perpetrators can also come from strangers with rare events (Marcdante, et al., 2014). Factors of sexual violence based on research by Fuadi (2011) relating to perpetrators are the lack of morality and mentality. Less development of moral and mental awareness causes the impulse of sexual activity to be carried out improperly.

The cause of someone doing sexual violence based on research by Kurniawan and Hidayati (2017), is an adult situation that makes children as objects of sexual satisfaction by using threats, coercion, bribes or tricks because the perpetrators feel unable to build sexual relations with their peers or can also experience stress thus look for children as impingement.

Factors of sexual violence perpetrators against children, can be classified as abnormal sexual behavior in accordance with the characteristics of "human sexual *ineduancy*" that a person obtains mastery of sexual desires in an abnormal way that is against children (Rismalinda, 2017). Based on these problems, it is important to conduct research to find out the sexual behavior of the perpetrator in sexual violence against children, related to the sexual meaning and sexual script.

Method

The research site was at the Correctional Facility (LAPAS) and the Jember District Police (Polres). Jember is a regency in East Java Province, Indonesia. The majority of the population of Jember Regency consists of Javanese and Madurese. Jember Regency has education centers ranging from elementary schools to state and private tertiary institutions.

Detainees with violations of Law number 35 of 2014 concerning child protection are under the supervision of the Women's and Child Protection Unit (PPA). The Jember District Police detention house has 5 male room cells and 1 female room cell without any distinction by type of case (Kepolisian resot Kabupaten Jember, 2018). The second research site is Class IIA Correctional Facility, Jember Regency. It is a place for guidance for lawbreakers who are convicted by the court and their status has become inmate and some are still detainee.

This research used qualitative research with a case study approach. It was conducted at the resort Police and Correctional Facility Class IIA Jember Regency, in October 2017 to December 2018. The informants were selected based on purposive techniques. Informants consist of key, primary and secondary. The key informants of this study were investigators of the Protection Unit for Women and Children (PPA) and the primary informants consisted of 7 people who were the perpetrators of child sexual violence. The following flow determines the primary and secondary informants.

The criteria for selecting primary informants include: Child sexual violence who was a detainee at the District Police Station and inmates of Jember Correctional facility who had been decided by the police and the court, were in good physical and mental health (could answer the researcher's questions), and were willing to be informants .

The research was conducted with in-depth interview techniques using interview guides. Interview techniques were conducted using semi-structured methods. Questions used during in-depth interviews include: How do you invite the victim to have sexual relations (signals and codes)? What motivates you to sexually abuse children (experience), how close are you to the victim? And how to meet sexual

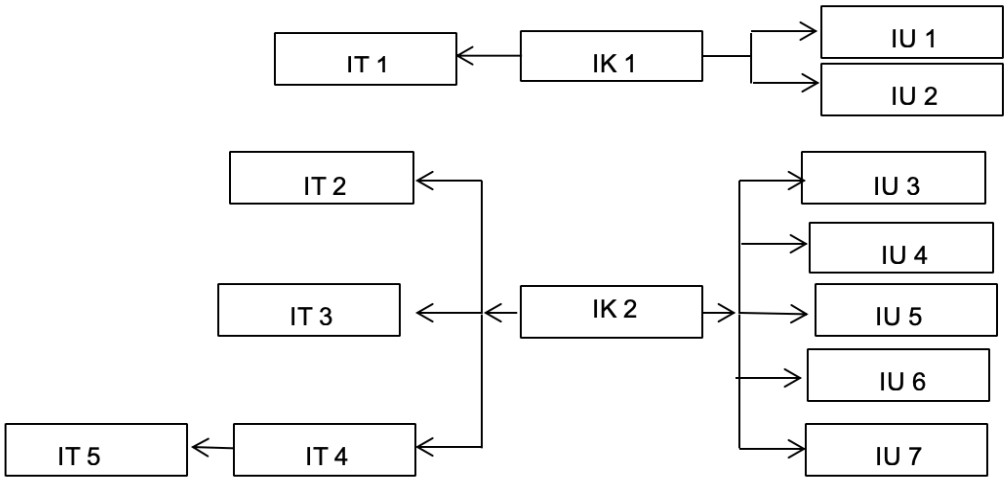

Image 1 Informant Determination Flow

Remark :
IK : Informan Kunci / Key Informant
IU : Informan Utama / Primary Informant
IT : Informan Tambahan / Secondary Informant

needs?

Qualitative data was processed by thematic content analysis (analysis based on themes). The step in data analysis begun with exploring the results of in-depth interviews and research documentation in the form of recordings and photographs. The process of understanding the results of in-depth interviews was by translating the language used by perpetrators in Madura and Javanese to Indonesian to facilitate the reader. The data that had been obtained, studied and analyzed then performed data reduction. The next stage, arranged in units and then categorized in the next step which was coding. The last step was to validate the data.

The credibility test in this research used source triangulation and technique triangulation. Researchers used observation to triangulate techniques. Source triangulation was done by checking the data through several sources, namely with the wife of the perpetrator because they were considered to know the daily life of the perpetrator. In this study the dependability test was conducted by the guiding lecture (expert).

Result and Discussion

Characteristics of Perpetrators and Victims

The results showed the characteristics of the perpetrators who aged between 22 and 57 years while the victims aged 12 to 17 years. All perpetrators were male and all victims were female. The perpetrator's relationship with the victim is mostly a close relative, namely, a step child. The results related to the characteristics of the perpetrators are in line with the research of Bahri and Fajriani (2015), cases of sexual abuse in Aceh Province in children were more experienced by children and adolescents, especially female. The age range of the victim was under 18 years, there were a few cases where the victim was an adult female because the children and adolescents still do not understand about sex education and sexual harassment about behavior that should be avoided and the consequences after immoral acts, the weakness of these victims is used by the perpetrators. Rokhmah (2015), states that the high factor of cases of sexual violence against children, especially those whose perpetrators come from the family (related to parenting) because of sexuality education and reproductive health in adolescents provided in schools and homes as a taboo discussion and controlled through discourse morals and religion. So it is important to understand that

sex education need to be taught at an early age.

According to Peplau in Pieter, et al., (2016), explained that there are differences between men and women related to sexual activity, men will show greater sexual desire and dependence and male sexual concepts are characterized by independence, emphasizing strength and having high aggressiveness. The cause of sexual abuse is high at the age of the child is the impact of the nation's culture that requires children to obey the orders of older people, the dominance of power relations such as father to child so that it causes fear when there is a threat (Nurhayati, 2016). Compared to men, subject to gender injustice, women have a higher portion such as marginalization, stereotyping, double burden and violence against women. The dominating role of men in life will be difficult to be abolished and will have an impact on violations of the human rights of children and women. Girls will be very vulnerable to being targeted by male sexual violence perpetrator (Retnaningrum, 2009).

Most of the perpetrators have marital status, most have been married more than once. The marital status of the majority of the perpetrators is in line with research from Bahransyaf (2015), which states that the status of the marriages of incest perpetrators is 93.33% and the rest are widowers and widows. The following excerpts from interviews with primary informants regarding marriage experiences.

> *… This is the daughter of the third wife, while the status in the Tanggul was divorced, then I marriage again in Pakusari ... then I divorced again and I returned her to the family ... because I work, and return home at least after six months, the second because of the parent in-law. ... (SM, 57 years).*

The status of the primary informants who were mostly married according to the research of Cahyono, et al., (2018), resulted in the majority of child sexual perpetrators are heterosexual, have been married for a relatively long period and are unstable. The perpetrator admitted that he felt it was difficult to make contact with fellow peers of the same age because he felt ashamed and finally behaved abnormally by engaging in sexual satisfaction with children. Sexual activities carried out to children by the primary informant were mostly located at the perpetrator's house while the other small part at the victim's house and the relative's house of the perpetrator are usually carried out to commit immoral acts with the victim. The following is a quote from the main informant.

> *She finished bathing, then got dressed in the room where I was in, and it suddenly happened ... (SM, 57 years).*

The result of this research related to the scene is aligned with research from Karnaji (2017), stated that cases of child sexual violence of 28.5% were carried out at the victim's house and 32.1% at the perpetrator's house. Neighborhood factors also supported the perpetrators of sexual violence because there was no privacy and room restrictions in the house so that children did not have the opportunity to maintain the boundaries of personal space (Ningsih and Hennyati, 2018). Hertinjung in Ningsih and Hennyati (2018), said that the shared use of space and the unavailability of personal space not only make children lose control over themselves but also make personal space boundaries ignored, causing children to be forced to accept the existence of others outside themselves in any condition. The condition of the place will make it difficult for the child to determine someone who is allowed to enter personal space.

Sexual Interpretation

Perpetrators use symbols both verbally and in gesture. Symbols that have the meaning given by the perpetrators in the form of an invitation both verbally and non verbally. Most perpetrators give certain symbols and also verbal words to the victim to express the desire to have sexual relations, as illustrated by the following quote.

> *Usually, I was not directly ask her to the bedroom. It was begun with a fondling*

then it happened just like that. When her mother's around, we winked each other and I said, tonight dear.. like that.. (DK, 47 years)

The statement from the informant is in line with Rukmi's (2012), research on the initiation of intercourse in students that the informant invites to use cues for sexual intercourse and has often previously discussed conversations that allude to sex. Symbols that are given according to symbolic interactions are nonverbal communication, communication that is used not with words but from gestures or body language. Verbal and non-verbal communication (symbols) cannot be separated because non-verbal communication is a supporter of one's verbal communication (Masyitah, 2016). The symbol used by the primary informant belongs to the category of nonverbal gestural messages, that is, messages involving some limbs (Mulyana, 2014).

Sexual Scrip (Intrapsychist Scrip)

Behavioral models created in the surrounding environment will be a material for learning by someone who is exposed to a system of violation models that can also result in imitating acts of violating sexual behavior (Aggreiny, et al., 2016). The results of this research explain that all informants have never had experiences that trigger sexual violence behavior carried out on children, following a quote from the informant.

Never do sodomy. I don't know, I saw on television. At that time not every house had it… (DK, 47 years).

This is aligned with the results of research from Kusumawati, et al., (2014), research subjects who are perpetrators of sexual violence against children carried out on the grounds of perpetrators of lust towards victims who are still children. Nainggolan (2008) explains the impulse of a person to have sexual relations with children can be seen from two sides, namely psychological and biological factors. Psychologically, the cause is that the perpetrators find it difficult to control and balance the desires of their sexual drive, causing distorted relationships or deviations, even encouraging the perpetrator to vent to others. When viewed in biological factors basically humans have sex drive since infancy. The sex drive is very strong and tries hard to be fulfilled. The consequences of not being able to balance and shift to beneficial activities in the form of losing balance and affecting daily activities.

Heyman and Slep in Hikmah (2017) stated that the phases of a person want to vent their conflict because of unpleasant past experiences, if exposed to stimuli such as sexual nuanced media and then will be able to stimulate children to conduct sexual behavior and orientation. Restrained sexual desire will begin to be expressed by looking for subjects with generally younger children, because they think children are still weak and less resist.

Yatimin in Aisyah (2017) also stated that there is a relationship between the frequency of accessing pornographic sites and sexual behavior. Porn readings or pornographic writings, according to norms (religion) can drive to thoughts that can lead to immoral violations and pornographic shows. Sex material can create sexual arousal so as to make people more aggressive. The following excerpts from interviews with primary informants regarding their exposure to pornography.

…I watched porn video with my dating partner, once my ex asked me but I refused.. (NA, 23 years).

The results of Raijaya and Sudibia's research (2017), relating to the role of the media in the form of watching containing pornography will influence the actions of perpetrators similar to research in Denpasar found cases of child sexual violence, that social media plays a role in the formation of behavior from the audience. The results of the study illustrated some perpetrators who often watch porn videos via YouTube, that's why the sexuality stimulation of the perpetrators increased and finally did the action. Research by Suwarni and Selviana (2015), results in a large proportion of respondents exposed to pornographic media

influencing their desire to have premarital sexual relations. The frequency of exposure to pornographic videos will affect the desire to engage in sexual activity, the results show that teens who watch pornographic videos through television are 2,803 times more likely to have premarital sex than those who don't.

Sexual experiences that can be a driving for sexual violence against children is a relationship with a female sex worker. Sexual behavior by hiring commercial sex workers (PSK) according to Sakalasastra and Herdiana, is part of the trauma of victims of sexual abuse during childhood in the form of traumatic sexualization. Another form of trauma that is also shown in the form of disgust with matters relating to sex, but from the research results Sakalasastra and Herdiana (2012), the subject often channeled his sexual desire with sex workers. Based on the results of interviews with additional informants, there was a perpetrator who visited the brothel to have sexual relations with commercial sex workers. The following are excerpts from secondary informants.

> *…His friend said he often went to Puger (prostitution area). There are many prostitutes there, but it had been closed …(DS, 42 tahun).*

The statement from the secondary informant is aligned with Rokhmah's (2014), study that the male incentive to have sex with sex workers can be due to he has more income than the work that is occupied. Rokhmah stated that horizontal mobilization of a man would choose a job in the city and leave a job in the village, with a greater income than the previous job allowing men to have transactions with sex workers to satisfy sexual urges due to the absence of limiting social controls .

Sexual Scrip (Interpersonal Scrip)

The perpetrator met with the victim because of the initial meeting, based on the results of this research most of it began with the relationship with the wife or victim's mother as a married couple and at the same time became the stepfather of the victim. Like the following quote.

> *… I had been taking care the step child since 2.5 or 3 years old (NA, 23 years).*

The perpetrator and the victim has a relationship like parents and children. So the relationship that looks like there is nothing special. Perpetrators who mostly committed sexual violence against one child but with intensity more than once, causing no different meeting techniques. The relationship began with the closeness of the victim to the informant as the following quote.

> *I considered as my own child… we were close and we used to tease each other, probably we thought it just a joke.. used to sleep at home, still sleep at home with the mother after it happened. As usual when went to school I give money to my step child. Nothing change (SY, 48 years old).*

Most of the informants have a very intents and close relationship with the victim. After the initial phase of the approach with child victims, the perpetrator tries to maintain sexual behavior with the child. Margareth in Kurniawan and Hidayati (2017), explained the ways in which perpetrators make children victims while still paying attention. If the victim is another person, then the perpetrator will take the heart of his parents by being polite when attending his house. It would be much easier if the victim's relationship is still family, such as father, stepfather or grandfather because the perpetrator will take the initiative to invite the victim to spend time together outside the house, joking together so that the victim will feel comfortable. The relationship of the victim to the perpetrator who looks like a child and father relationship causes the partner not to know because they think it is natural. According to Yuwono (2015), children are often a means of satisfying sexual lust for adults, especially with pre-puberty children. At this time the child has not experienced menstruation or can not be fertilized for girls and can not be

pregnant. Unlike the case with a small number of informants who were in a dating relationship before sexual intercourse. The comfort felt so that the informant decides to have sex.

Latifatunnikmah and Lestari (2017), stated that in establishing relationships with other people, the factors that someone became interested in were pleasant characteristics such as being able to present personal warmth and also a tendency toward similarities in attitudes, values, interests, backgrounds and personalities between each other. As quoted from the following informant.

> *… At the beginning no intimate feel, yet after we did it such feeling came… since still young probably it feel just the same. Maybe the differences were because she was young and attractive.. haha.. (DK, 47 years).*

According to Baron and Byrne in Azhar (2018), the influence of one's physical condition is very influential on a sense of attraction with others. Physical appearance influences various types of judgments interpersonal, including the arising of sympathy. An attractive appearance is concluded as a positive value characteristic and influences interpersonal attraction and interpersonal selection. Married status of most perpetrators is married and claims to have the intensity of conducting marital relations that are lacking. The following excerpts from the results of the primary informant interview.

> *For a year I had less sex since my wife sick. We still do it sometimes but not when she relapse (SY, 48 years).*

The informant's statement that the wife is a motivating factor for sexual relations with children is in line with the results of Tuliah's research (2018), which found that the perpetrator gave a reason for causing sexual violence against children was the wife was rarely at home so that the opportunity for sexual relations with his wife was reduced. Tuliah concluded that the reason stated by the perpetrator was impingement because the status of the perpetrator who had workers would encourage the perpetrators to commit sexual deviations and be able to restrain their desires compared to workers who did not work. Because many men become pedophiles because of the intensity of masturbation that is often compared to women. Masturbation will stimulate the desire for orgasm if there is a fantasy that arises, the fantasy may continue to develop forms of deviant fantasy (Auliarachmah, 2017).

Sexual Behavior

The result of interview with secondary informant, the relationship of the perpetrator with secondary informant experienced less harmony in the period before the incident. The following excerpts from interview with secondary informants.

> *… I had experienced domestic violence for 11 years yet I still be able to taking it as I still hoping… (AN,35 years).*

History of perpetrators who have been married to adults can be categorized Situational Molester pedophiles. Situational Molesters are normal people and have heterosexual experiences in the choice of adult sexual partners. This indicates the state of sexual drive and normal sexual development because it basically has an interest in sex in adults (Lesmana, 2017). Sexual violence can be impulsive as the response to stress.

Overall, the primary informants have heterosexual normal behavior with shown interest in the opposite sex as evidenced by the majority of the informants have been married to women their age and also other informants have interests with the opposite sex. Based on Sarwono (2015), normal sexual behavior in the form of all the behaviors that are motivated by sexual desires, which are poured out by the opposite sex or same sex. Forms of behavior that are shown from feelings of attraction to dating behavior, making out and having sex. The following excerpt from the perpetrator related to relations with the opposite sex.

> *…I had done it with my dating partner.*

The point is if someone came here, the person must have done it more than once… (NA, 23 years).

Mohr in Khaidir (2007), stated the perpetrators of sexual abuse in children who have heterosexual behavior are difficult to distinguish from the normal population of people. There is no significant difference between sexual harassers and normal people in terms of intelligence, work or education. Also that the perpetrators generally do not have a criminal background. Mohr and Gebhard in Khaidir (2007), found that some heterosexual offenders suffer from abnormal sexual adjustment even though many of the perpetrators still get satisfaction when dealing with women their age. Forms of sexual violence committed against victims as a whole are not carried out by force, this is based on the result of interview with perpetrators.

…I did not compel it, the child want to do it. I ask first. If the child want to do it, we do it. If not, then we don't. And I was the one who clean the dirt after we do it before we came out of the room. After we clean it, we directly wear our pants (SM, 57 years).

According to Noviana (2015), forms of sexual violence against children can also be without threats but by using psychological manipulation. Children are deceived, so they follow their desires. Children as individuals who have not reached the level of maturity, have not been able to judge something as a trick. Most forms of sexual violence committed by perpetrators are incest because they are carried out on victims who still have family relations with the perpetrators.

Forms of sexual violence against children committed can consist of two sexual behaviors at once. Forms of child sexual violence can also occur indirectly such as showing children to pornography, showing children to sexual activities such as intercourse, showing genitals to children (exhibitionism), peering and spying on children while bathing (voyeurism), photographing the child is naked, and spreading the child naked. Actions such as these occur at one of the primary informant also recording sexual activity that took place while performing with the victim (Sugijokanto, 2014). The following is a excerpt from the primary informant.

She let me caressed her and let me kissed her cheek. Then we go further.. I never forced her to do it. If I forced her, it won't be last for three years.. I recorded it.. maybe 4 times.. just for fun.. then I watched. And wow… it's like in the western porn movie.. haha.. (DK, 47 years).

Based on the intensity of the perpetrators of sexual relations with victims who mostly stated doing repetitive can be related to the pedophile criteria according to Farihin in Hidayati (2014) which discusses "The Concept of Nursing Care for Children in Pedophilia". Pedophilia is an act of sex because of repeated sexual urges in the form of genital relations with prepubertal children or more attracted to children. Repeated encouragement to have sex with children lasts at least six months and ranges of children aged 13 years or younger. Another criteria is sexual drive causes interpersonal pressure or personality disorder and the age of the perpetrator is at the youngest 16 years or at least five years older than the child.

The purpose of recording video during the action is to watch it again and the informant feels satisfied. But the informant did not disseminate the contents of the video. Acts of sexual violence committed repeatedly in line with the results of research Ulum et al., (2010) subject experienced sexual violence for 3 years. This is because of the close relationship with the perpetrator and the authority so that the subject does not dare to tell and the possibility of threats, trying to maintain honor, even an explanation from the perpetrator that the act is a form of affection. The intensity of sexual relations that often do not rule out the possibility of pregnancy. As an excerpt from the following interview.

4 times within two months. From the first time to second one was less than one month… then when her pregnancy reached 7 months we meet, at that time she had it checked on Patrang...(SM, 57 years).

The statement represented the majority of the informants' answers that they had engaged in sexual activity with the victim more than once. Perpetrator have special techniques to create comfort for perpetrator. According to Dimala (2014), the process of perpetrators of sexual violence against children usually there are phased done, the possibility of the perpetrator trying to measure the comfort of the victim. If the comfort of the victim is obtained, the perpetrator will engage in sexual activity with the victim.

Overall, cases of sexual violence against children before puberty are mostly classified as pedophilia, but can not only see the physical characteristics and the number of children who are victims. There should be a standard examination of clinical diagnoses and psychological tests related to pedophilia in more depth. According to Indragiri in Probosiwi and Bahransyaf (2015), there are differences between pedophilia and child sexual violence. Pedophilia is a form of sexual deviation, in contrast to child sexual violence which is usually carried out because the perpetrator does not have the opportunity or choice to vent generally his sexual desire. So that sexual behavior with children becomes impingement.

Sexual behavior that deviates from someone who is sexually abusing children, can be categorized as pedophiles and also perpetrators of sexual abuse. Based on Hidayati and Kurniawan (2017), pedophiles have an impulse and fantasy that are more focused being attracted to children with a long time. While sexual abuse in children can occur due to the absence of an adult partner.

Conclusion

Based on this research results, the perpetrators aged 22-57 years, with the overall male gender with married and single status. The perpetrator and the victim have a familial relationship. Most perpetrators have more than one marriage experience. The perpetrators invited the victim by giving a symbolic gesture and also a verbal invitation. The perpetrators claimed to have no experience of sexual violence in childhood. A small number of perpetrators had been exposed to pornographic content and had experience in visiting brothels to deal with commercial sex workers. One of the perpetrator stated that it was because of the physical condition of the stepchild who still young made him do sexual violence to her. Sexual behavior of the majority of informants is abnormal in the form of pedophiles and incest with more than one intensity. The DP3AKB agency is an agency in the Youth Family Development program by strengthening family functions and parenting skills for divorced families. Media education can be a support for implementing the program and can also collaborate with educational institutions in the delivery of information and media outreach to the community. So that people, especially parents, are more attentive and always maintain communication with children, introduce and teach children about sexual education as early as possible and provide education for children to be vigilant when establishing relationships with family, friends and new people.

Limitation of the Research

Researchers had not been able to involve victims to carry out triangulation of sources due to their trauma based on the interview with perpetrators' wives.

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Knowledge and Attitudes with HIV/AIDS on Adolescent Behavior in Senior High School

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Abstract

In East Sumba 2016 there were 111 HIV / AIDS patients. Of that number, majority is 25-35 years old (51.4%) and the most is in Kambera District (28.8%). These studies are to know the relationships between knowledge and attitudes with HIV/AIDS behavior adolescent in senior high school in Kambera District, East Nusa Tenggara Regency. Cross-sectional design. The samples are 132 students of Public Senior High School 1 Kambera, Christian Senior High School Payeti and Public Senior High School Vocational 5 Waingapu. The independent variables are knowledge and attitude and the dependent variable are behavior. Analised data use univariate, bivariate and multivariate. Majority of sample from Public Senior High School Vocational 5 Waingapu (37.9%), technical majors (37.9%), male (55.3%), 17 years old (50.8%), number of sources of information from one source (25.0%). Most of the students had less knowledge (68,9%), less attitude (63,6%) and less behavior (62,1%). Bivariate analysis showed good knowledge related 4 times to good behavior (PR=3,621;95% CI=2,341-5,601; p-value <0,001); good attitude related 3 times to good behavior (PR=3,111;95%CI=1,972-4,907;p-value <0.001). Multivariate analysis showed that knowledge was the most relationships with behavior (PR:8,659;95%CI: 3,315-22,618; p-value<0,001) and then attitude (PR:3.075;95% CI: 1,162 - 8,136;p-value 0,024). Schools, government and health services should improve students' knowledge and students are more active in finding information about HIV/AIDS.

Introduction

East Nusa Tenggara (NTT), which is one of the provinces in the eastern part of Indonesia which ranks 17th out of 33 provinces with the number of HIV cases: 1,751 and AIDS: 496. HIV / AIDS cases in East Sumba Regency which is one of the districts in NTT continue has increased from year to year, namely in 2012 the number of cases of HIV: 16 and AIDS: 9, in 2013 the number of cases of HIV: 23 and AIDS: 13, in 2014 the number of cases of HIV: 10 and AIDS: 15 and in 2015 the number of cases of HIV: 10 and AIDS: 19 number of HIV cases (Health Office of East Sumba District, 2015). From this number of cases, it was found that as many as 51.4% of cases occurred in productive ages, namely 25-35 years (Yuneti, 2016). This trend shows that age 20-35 years are mostly affected by HIV / AIDS. This shows that sufferers have been exposed to the HIV virus at the age of 15-17 years old because AIDS takes 8-10 years to show clinical symptoms since being first infected (Hutapea et.al, 2012). These ages are a category of adolescents who are still pursuing high school education (SMA). The results showed that in East Sumba, the most cases occurred in Kambera Subdistrict as many as 32 cases out of 111 cases or 28.8% (Yuneti, 2016). In this sub-district there are 3 Senior high schools namely Senior high school 1

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Kambera, Senior high school of Cristian Payeti and vocational high school 5 Waingapu.

Knowledge is a predisposing factor that can influence a person's behavior to change. The correct knowledge about HIV and AIDS in adolescents can help adolescents avoid behaviors that are at risk of contracting HIV / AIDS. Knowledge of adolescents in general about health, especially reproduction, can be influenced by their education, personal experiences of adolescents, their culture and the mass media they are exposed to. Adolescents who have good reproductive health education especially will have good behavior also related to HIV / AIDS compared to negative attitudes (Lou et al., 2012). Adolescents are vulnerable to HIV / AIDS because, in general, adolescents are sexually active, but teenagers often get insufficient information about maintaining reproductive health, difficulty negotiating sex with a boyfriend and often difficulties in getting reproductive health services such as HIV / AIDS. If from an early age, adolescents do not receive accurate and correct information about HIV / AIDS, it can cause adolescents to become a sub-population who behave at high risk of HIV / AIDS. Based on this, a study was conducted on the relationship of knowledge and attitudes with adolescent attitudes about HIV / AIDS in Senior high school in Kambera District, East Sumba Regency.

Method

This type of research is an analytic study with a cross-sectional design. The sample of this research was 132 students at Senior high school in Kambera District, East Sumba Regency, namely Senior high school 1 Kambera, Senior high school Christian Payeti and Vocational high school 5 Waingapu. The research was conducted in August 2017. The independent variables measured were knowledge and attitudes. The knowledge that is measured is the knowledge of students about the meaning, mode of transmission, prevention, treatment and clinic of VCT. The attitudes measured were students' attitudes about pornography, free sex, drug use, stigma and discrimination against people with HIV / AIDS. The dependent variable is student behavior related to HIV / AIDS in the form of student sexual behavior. Data collection was carried out by interview using a questionnaire that has been tested for validation. The criteria for respondents were high school students in class XI and willing to be interviewed. The sampling technique was simple random sampling. Data analysis was performed univariate, bivariate using the chi-square statistical test and multivariate using the Binary Logistic Regression test with the Enter method.

Results and Discussion

A total of 132 students were interviewed and continued with analysis. Based on the analysis results obtained the most students came from vocational high school 5 Waingapu (37.9%), most from the engineering department (37.9%), males (55.3%), aged 17 years (50.8%).

The results of the univariate analysis showed that most of the 132 students had poor knowledge of HIV / AIDS in Senior high school in Kambera District, East Sumba Regency (68.9%). This result is in accordance with research in Senior high school in Banjarmasin which shows that most students, namely 82.10%, have a low level of knowledge about HIV / AIDS (Ningtyas, 2014; Dewi, 2017), and research at Senior high school of Cristian Eben Haezar Manado which states that of students, namely 50.5% have less knowledge about HIV / AIDS (Reynaldi, 2013). This result is also in line with research in Saudi Arabia which showed 64.5% of respondents had poor knowledge of HIV / AIDS (Alawad, 2019).

Students at SMA of Kambera Regency, East Sumba Regency, the most lack of knowledge about the clinic of Voluntary Counseling and Testing (VCT), anti-retroviral drugs given to HIV / AIDS sufferers and when a person is infected with HIV until someone develops symptoms of HIV / AIDS. This low knowledge does not match the age of the students, most of whom are 17 years old (50.8%), which should be that at these ages adolescents try to find new experiences and new information (Pawesti, 2013). This low knowledge can be influenced by gender, where in this study most were males (55.3%). Women are psychologically more motivated and more diligent in learning and seeking information than men. This is supported by research that shows young women have a better level of knowledge about HIV-AIDS than young men

Table 1 Distribution of Respondents based on School Origin, Department, Gender and Age of Senior High School Students in Kambera District, East Sumba Regency

Characteristics	n (N=132 People)	%
Schools		
Senior high school 1 Kambera	37	28,0
Senior high school of Cristian Payeti	45	34,1
Vocational high school 5 Waingapu	50	37,9
Department		
Natural science	25	18,9
Social science	37	28,0
Language	20	15,2
Engineering	50	37,9
Gender		
Male	73	55,3
Female	59	44,7
Ages		
15 Years old	8	6,1
16 Years old	24	18,2
17 Years old	67	50,8
18 Years old	29	22,0
19 Years old	4	3,0

Source: Primary Data, 2017

Table 2. Univariate Analysis of Knowledge and Attitudes with Adolescent Behavior Related to HIV / AIDS in Senior high school in Kambera Subdistrict, East Sumba Regency

Variable	n (N=132 People)	%
Knowledge		
Good	41	31.1
Less good	91	68.9
Attitude		
Good	48	36.4
Less good	84	63.6
Action		
Good	50	37.9
Less good	82	62.1

Source: Primary Data, 2017

(Nurwati, 2018). This low knowledge could also be caused by the fact that most students only received information from one source, namely health workers (25.5%), this could be due to a culture of taboo in talking about sexual behavior. The fewer sources of information, the less information obtained because exposure to information will affect knowledge about AIDS / IMS (Lou et al., 2012). Another thing that causes low knowledge is that in various HIV / AIDS counseling, it is still about the definition, risk factors, prevention but lack of information about HIV treatment and also places where people can get checked out if they have HIV / AIDS symptoms.

The results of the univariate analysis also showed that most of the students had unfavorable attitudes regarding HIV / AIDS in Senior high school in Kambera District, East Sumba Regency (63%). This result is the

same as the study in Manado which showed 44% of students had a bad attitude towards HIV / AIDS (Manafe, 2014). This result is also in line with research in Saudi Arabia which shows 67.4% of respondents have a bad attitude towards HIV / AIDS (Alawad, 2019). This lack of attitude can be influenced by a lack of knowledge. Good knowledge can have a positive effect on the formation of adolescent attitudes. This was stated in the study which showed that there was a significant relationship between the level of knowledge about sex with the attitudes of students at Senior high school 1 Kandanghaur toward free sex outside of marriage (Handayani, 2015). Knowledge, apart from influencing attitudes to prevent free sex outside of marriage, knowledge also affects adolescent attitudes towards people living with HIV / AIDS (ODHA). In this research, it was found that students with low knowledge had a higher stigma against ODHA than students with high knowledge. This is in line with research on adolescents in Surakarta (Sosodoro, 2009).

The majority of adolescent behaviors behave poorly (62.1%). The results of this study are in line with research showing poor adolescent behavior towards HIV / AIDS (Zeth, 2010; Sofni, 2015; Afritayeni, 2018). Risk behavior is any behavior or action that increases a person's chances of contracting or transmitting a disease such as HIV. Some examples of risky behavior in the context of HIV include having unprotected sex, especially with multiple partners and sharing injections.

Table 3. Distribution of Number of HIV / AIDS Information Sources Providing Knowledge to Senior High School Students in Kambera District, East Sumba Regency

Number of sources of information on HIV / AIDS that provide knowledge	N (N=132 People)	%
1	33	25.0
2	12	9.1
3	9	6.8
4	22	16.7
5	18	13.6
6	18	13.6
7	12	9.1
8	8	6.1

Source: Primary Data, 2017

Table 4.Bivariate Analysis of Knowledge and Attitudes with Adolescent Behavior Related to HIV / AIDS in Senior High Schools in Kambera District, East Sumba Regency

Variable	Behavior			PR	95%CI	p-value
	Good	Less good	Total			
	n (%)	n (%)	n (%)			
Knowledge				3,621	2,341-5,601	<0,001
Good	31(75.6)	10 (24.4)	41(100)			
Less good	19 (20.9)	72 (79.1)	91(100)			
Total	50 (37.9)	82 (62.1)	132(100)			
Attitude				3,111	1,972-4,907	<0,001
Good	32(66.7)	16(33.3)	48(100)			
Less good	18(21.4)	66(78.6)	84(100)			
Total	50(37.9)	82(62.1)	132(100)			

Source: Primary Data, 2017

This behavior can occur due to many factors, including the adolescent's knowledge of the causes of HIV / AIDS, modes of transmission and how to prevent HIV / AIDS itself. This lack of knowledge and understanding can lead adolescents to unhealthy behaviors that put them at risk for contracting HIV / AIDS because bad behavior can be caused by a person's lack of knowledge.

Chi-square test results showed that good knowledge was 4 times related to good behavior related to HIV / AIDS in Senior high school, Kambera District, East Sumba Regency and this relationship was statistically significant (PR = 3,621; 95% CI = 2,341-5,601; p-value < 0.001). This is in line with several studies which state that there is a relationship between knowledge and premarital sexual behavior in adolescents (Indratmoko, 2013; Kumalasari, 2016; Rahayu, 2017; Aziz, 2018). The results of overseas research also found that there was a low relationship between awareness and negative HIV / AIDS behavior (Thanavanh, 2013; Salman, 2018; Seo Min, 2018). This shows that the higher the knowledge of adolescents, the lower the sexual behavior before marriage, conversely, the lower the knowledge, especially about sexual health in adolescents, the higher the sexual behavior before marriage.

Reproductive health knowledge is very important for adolescents because adolescence is an age stage that experiences a lot of development, both biology and psychology. One of the factors that influence adolescent knowledge is information received from parents, friends, closest people, the mass media or from discussions. The low level of knowledge among adolescents is due to the lack of information received by adolescents. Teenagers receive more information from electronic media such as television, via cellphones, etc. Most of the information on television is limited to premenstrual syndrome and HIV-AIDS, while information on sexual and reproductive health is still rare. The assumption that talking about sexual health is shameful and taboo for families and society makes young people who lack information try on their own to find information on their own, sometimes the information obtained is actually wrong and misleading. Half-assed sexual knowledge not only encourages teenagers to experiment, but can also lead to misperceptions. A person's level of knowledge can influence a person to take action (Nubed, 2016; Jaelani, 2017), because knowledge is the foundation for the formation of behavior so that the higher the level of one's knowledge, the less likely it is to engage in sexual behavior outside of marriage (Notoadmojo, 2010). Behaviors that are carried out based on good knowledge will last longer than behavior carried out by not using the correct knowledge base.

Chi-square test results also showed that a good attitude was three times related to good behavior related to HIV / AIDS in Senior high school in Kambera District, East Sumba Regency and this relationship was statistically significant (PR = 3.111; 95% CI = 1.972-4.907; p- value <0.001). This is in line with research that shows a significant relationship between attitudes and HIV / AIDS behavior (Indratmoko, 2013; Tampi, 2013; Kumalasari, 2016; Aziz, 2018;). The results of overseas research also found that there was a relationship between negative attitudes and negative behavior with HIV / AIDS (Thanavanh, 2013; Seo Min, 2018). The more permissive is (unfavorable attitude) to sexual behavior, the greater the behavior of adolescents in having physical relationships with their boyfriends. This means that the less good the adolescent's attitude towards sexual behavior, the greater the chance for adolescents to engage in HIV / AIDS risky behavior, on the contrary, the better the adolescent's attitude, the less the chance for adolescents to engage in HIV / AIDS risk behavior. Attitudes are important not only because they are difficult to change, but because attitudes greatly influence thinking and have an impact on individual behavior, especially when attitudes are strong. Attitude is a predisposition (determinant) that gives rise to behavior in accordance with the attitude. This is also in accordance with the theory that predisposing factors in this case are related to one's behavior (L. Green, 1999). Attitudes are preceded by understanding and knowledge that is perceived through something that is good and true or not good and then internalized into him (Dalimunthe, et al, 2012). Knowledge, thoughts, beliefs, and emotions play an important role in determining a complete attitude. For example,

Table 5.Multivariate Analysis of Knowledge and Attitudes with Adolescent Behaviors Related to HIV / AIDS in Senior High Schools in Kambera District, East Sumba Regency

Variable	B	SE	Wald	p-value	PR	95%CI
Knowledge	2,159	,490	19,415	<0,001	8,659	3,315 - 22,618
Attitude	1,123	,494	5,262	0,024	3,075	1,162 - 8,136

Source: Primary Data, 2017

a teenager has heard of HIV / AIDS (its causes, consequences, prevention, and part of it) then this knowledge will lead the teenager to think and try so that he does not contract HIV / AIDS. In thinking, the components of emotion and belief come to work so that the teenager intends to take precautions so that he does not contract HIV / AIDS. This teenager has a certain attitude towards objects in the form of HIV / AIDS. Therefore, the knowledge of adolescents needs to be improved and the results of this study can be used as a basis for increasing the provision of information to students on a regular basis, both by the school and by the health service regarding the knowledge of HIV / AIDS as a whole and students can be more active in seeking information. especially about health in the existing media, so they can have good and correct knowledge and understanding of HIV / AIDS so that the risks of contracting HIV / AIDS can be avoided.

The results of the multivariate analysis showed that the variable most associated with the behavior of students related to HIV / AIDS was knowledge, namely good knowledge was 9 times related to the good behavior of students related to HIV / AIDS (PR: 8,659; 95% CI: 3,315-22,618; p -value <0.001), then the attitude variable, namely a good attitude, was three times related to the good behavior of students related to HIV / AIDS (PR: 3.075; 95% CI: 1.162-8.136; p-value 0.024). Therefore, knowledge and attitude factors must be improved to reduce HIV-related behavior. This is in line with Notoadmojo's (2010), which states that knowledge or cognition is a very important domain for the formation of one's actions (overt behavior). Good knowledge will form a good attitude and a good attitude will form good action too. Improved education is needed to produce adolescents who behave well towards HIV / AIDS.

Conclusion

Knowledge and attitudes are related to adolescent behavior related to HIV / AIDS in Senior high school in Kambera District, East Sumba Regency. Respondents who have good knowledge are related 3,621 times with good behavior and good respondent attitudes are related 3,111 times with good behavior. Schools, government and health services must continue to strive to improve student knowledge and students are more active in seeking information about HIV / AIDS.

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Gadget as Risk Factor to Speech and Language Delay in Autism Children

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Abstract

Users gadgets not only among adults but the age of adolescence and early age as a kindergartner and a toddler was already using the gadget. The child's brain at the age of 0-5 years is in the golden development period (golden age). Toddler is the most important period in optimally increasing children's development because it can influ-ence and determine children's development going forward. The use of gadgets from an early age will have an im-pact on children's development that can trigger the incidence of autism. The purposed of this studied was to de-termine the effect of using gadgets on developmental delays in speech and language aspects in children with au-tism. This type of research is an observational analytic studied used a cross sectional approach. Respondents numbered 33 people. This research was conducted at the Autonomous Service UPTD of Southeast Sulawesi Edu-cation Office. Bivariate analysis showed that the intensity of the use of gadgets was related to the development of speech and language (p value = 0.011; OR = 16,000). In this case, parental supervision is very important in providing limits and controlling the playing time of the gadget to optimize the growth and development of children.

Introduction

Technological developments occur very rapidly in the field of information and communication technology. In the current era of globalization, a person's media to conduct social interactions, especially to make social contacts and communicate only using gadgets. At this time, gadget users are not only among adults, but teenagers and young people such as kindergardens and toddlers are already using gadgets (Rozalia, 2017). Based on data from KOMINFO (2013-2018) the number of internet users reached 3.6 billion people. Indonesia is ranks 6th as an active country in accessing the internet after China, the United States, India, Brazil and Japan. Most of the gadgets for children aged under five years in Indonesia reaches 27%, in the year 2014 increased to 73%. 29% of them already have a personal gadget given by parents.

The introduction of children to gadgets usually starts from the wrong way of transferring from parents or family by showing games or videos in the gadget so that children do not fuss or stop crying and parents are more free to do activities without having to accompany children to play (Pebriana, 2017).Toddler is the most important period in optimizing child development because it can influence and determine children's development going forward (Gunawan et al., 2016). At this time the use of gadgets is one of the parents' shortcuts in the companion as a caregiver for their children. With a variety of interesting features and applications, children more often use gadgets to play games than to study or play outside the home with their friends. The use of gadgets in infants will have an impact on children's

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development. In one study by Novitasari (2016) in (Pebriana, 2017), said that the use of gadgets in early childhood is more fun than playing with peers. Children who play gadgets tend to be silent in front of their respective gadgets regardless of the world around them. Unconsciously, children have experienced the dependence of using gadgets and this is one of the impacts that is very influential on children's development.

The results of another study are conducted by (Fajariyah et al., 2018), in Surabaya who said that the use of gadgets has a great influence on the development of speech and language. Gadgets addiction causes children to be lazy to move and not sensitive to the environment so that it can affect the child's development. The use of gadgets can make the family's role replaced by gadgets so that individuals prefer to be alone and do not make social contact, while psychosocial impaired children can cause children to stutter and talk too late. Every year around the world, cases of autism have increased. In 1990 cases of autism ranged from 1: 2,000 births. In the United States in 2000 this figure increased to 1 in 150 children who have a tendency to suffer from autism. Whereas in the United Kingdom, the latest data from the United States Center for Disease Control and Prevention in 2002 showed that the prevalence of autism is growing, at least 60 sufferers in 10,000 births and occurs in 6,000-15,000 children under the age of 15 years (Wardani, 2009). In 2013 the Director of Mental Health Development at the Ministry of Health had estimated the number of autistic children in Indonesia around 112,000 with a span of 5-19 years. This figure comes out based on a count of autism prevalence of 1.68 per 1000 children under 15 years. If the number of children aged 5-19 years in Indonesia reaches 66,000,805 people based on BPS data in 2010, it is estimated that there are more than 112,000 autistic children aged 5-19 years in Indonesia (Wahyu, 2017).

Autism is usually detected before the age of 3 years. But there are also symptoms since the age of the baby with a delay in social interaction and language (progression) or have reached normal but before the age of 3 years the development stops and retreats, and there are signs of autism. Age of Kids of early (childhood) has a critical time period/golden period which is a period of growth and development of the most rapid in the human brain. At this time the brain is plastic compared to adults so that toddlers are very open and sensitive in accepting various kinds of learning and enrichment both positive and negative. Toddler growth and development will be optimal if the environment provides positive support or conversely. Over time, it has become commonplace that children already have gadgets in the form of smartphones, tablets, cellphones, laptops. Children who are in the golden period are experiencing inculcation of character, character and morals, should get serious attention.

Kendari city is the top area for autism sufferers in Southeast Sulawesi, as many as 120 people are undergoing therapy at the autism care center (UPTD-Education and Culture Office, 2018). According to Violence & Gore (Dewanti et al., 2016), states that antisocial behavior is a negative impact of gadgets caused by gadget abuse. This happens when someone feels that the gadget is the single most important thing in his life, so the child does not care about the circumstances around him, which results in the child becoming less interacting with people around him and will have difficulty socializing and establishing relationships with people around him. The purposed of this studied was to determine the effect of using gadgets on developmental delays in speech and language aspects in children with autism at UPTD Autism Services Dikbud Southeast Sulawesi.

Method

This research is an analytic observational studied used cross sectional approach. The studied was conducted at the Autonomous Service UPTD of Southeast Sulawesi. The sample in this studied were mothers who have autism children who were treated in UPTD autism services as many as 33 people. This research was conducted in April to June 2019. The sampling technique in this study was simple random sampling. Data collection in this study was obtained directly from respondents through interviews using a questionnaire guide/questionnaire list, and filling in the pre-screening developmental questionnaire (KPSP). Statistical analysis uses bivariate

analysis to analyze the significant effect between independent and dependent variables using the Chi Square test. Also note the odds ratio (OR).

In addition, this study looked at respondent characteristics such as mother's education, mother's occupation, age of the child, gender, age of the child introduced / used gadget, type of gadget used. Mother's education is categorized into 3 groups namely higher education, secondary education, and basic education. Occupational mothers are categorized into groups that work and do not work. The age of the child is grouped into five (5) groups. The age grouping of children by age at KPSP is 24-36 months, 37-48 months, 49-60 months, 61-72 months, and > 73 months. The sex of the respondents was divided into 2 groups, namely male and female. The age of the child to introduce / use the gadget is starting from the age of <1 year, 1 year, 2 years, 3 years. 4 years, up to ≥ 5 years. While categorizing the types of gadgets that are commonly used are smartphones, tablets, and laptops. Children's speech and language development variables are measured using the KPSP form which contains 3 questions for children aged 24 months, 36 months, 54 months, and 60 months. While the number of questions on the KPSP form for 30-month-old children is 4 questions.

Result and Discussion

Based on table 1 shows that the majority of parents of highly educated children amounted to 22 respondents (66.7%). In the characteristics of work there is no significant

Table 1. Frequency Distribution of Respondent Characteristics

Characteristics of Respondents	Category	Frequency	%
Mother/Level of education	High	22	66.7
	Intermediate	10	30.3
	Basic	1	3.0
Occupation of Mother	Does not work	17	51.5
	Work	16	48.5
Age of Child (Month)	24-36	5	15.2
	37-48	12	36.4
	49-60	5	15.2
	61-72	2	6.1
	> 73	9	27.3
Gender of Children	Male	29	87.9
	Girl	4	12.1

Source: Primary data, 2019

Table 2. Distribution of Respondents Answers on the Use of Gadgets

Item Questions About Using Gadgets	Parameter	Frequency	Percentage
The age of the child is introduced / using the gadget	<1 year	4	12.12%
	1 year	4	12.12%
	2 years	18	54.54%
	3 years	2	6.06%
	4 years	2	6.06%
	≥ 5 years	3	9.09%
Types of gadgets commonly used by children	Smartphone	25	75.75%
	Tablet	4	12.12%
	Laptop	4	12.12%
The response given by children when using gadgets	Do not turn when called		
	Do not care about the environment		
	Likes to be alone		
	Not answering when spoken to		
	Angry when you are disturbed or the gadget is taken		
	Rarely playing with friends		

Source: Primary data, 2019

difference between working mothers and non-working mothers. There were 17 respondents who were unemployed (51.5%). While working mothers were 16 respondents (48.5%). Parents who work include civil servants and entrepreneurs. Patients undergoing therapy in UPTD Autism-Education and Culture Office of Sultra are children whom are in the age range of 37-48 months (3-4 years) as many as 12 children (36.4%), aged > 73 months (≥ 6 years) as many as 9 children (27.3%). Whereas most of the therapeutic patients were male, amounting to 29 children (7.9%).

Table 2 shows that the majority of children were introduced / used gadgets at the age of 2 years (24 months) as many as 18 children (54.54%). While the types of gadgets which are comonly used by children are smartphones as many as 25 children (75.75%), when using gadgets, the majority of responses given by children are not turned away when called, do not care about the environment, like to drive, do not answer when invited to talk, angry when disturbed or the gadget is taken, and rarely play with friends.

Based on the results of the study, the intensity of the use of children's gadgets seen based on the age of the child being given a gadget can be seen in table 3.

Table 3 shows that the intensity of the use of gadgets majority is high category, by 78.8 %. This is illustrated by the number of respondents who said that children can spend time in front of the gadget that is about one hour or more per day, there are even respondents who say that children use gadgets for hours and fall asleep. The average child uses a gadget every day per week and at least 30 minutes per day. While the intensity of the use of gadgets lower categories by 21.2%. For children with low-intensity gadget usage, parents limit the duration of gadget usage to a minimum of 15 minutes and 1-4 times per week.

The results of the bivariate statistical analysis showed that the variable of speech and language development had a p value of 0.011 ($p < 0.05$), meaning that there was a relationship between the intensity of the use of gadgets on the of speech and language delay. Table 5 shows an odds ratio of 16 so that children with low intensity of gadget usage have a chance of 16 times to develop in normal aspects of speech and language compared to children who use gadgets with high intensity. This means that the lower the intensity of the use of gadgets, the lower the opportunity to experience developmental delay in aspects of speech and language.

Development is a pattern of change that starts from conception, which continues along the life span which includes progressive addition to skills and abilities in various aspects, namely motoric (rough and smooth), language or communication (reception, expression, articulation), cognitive, and social adaptation Santrock in (Zulaekah et al., 2014). The

Table 3. Intensity of Gadget Usage

Intensity of Use of Gadgets	Frequency	Percentage
Low	7	21.2
High	26	78.8
Amount	33	100.0

Source: Primary data, 2019

Table 4. Intensity of Use Gadgets on the Development of Speech and Language

Intensity Use of Gadgets	Speech & Language Delay				Amount		OR	P Value
	Well		Less					
	n	%	n	%	n	%		
Low	4	12.1	3	9.1	7	21.2	16	0.011
High	2	6.1	24	72.7	26	78.8		
Amount	6	18.2	27	81.8	33	100.0		

Source: Primary data, 2019

aspect of children's growth and development is something that needs special attention in children, because it is an aspect that explains the process of forming someone both physically and psychosocially (Solikah & Suminar, 2017). One aspect of development that needs to be monitored according to the Ministry of Health (2013), is the ability to speak and language that is related to the ability of children to respond to voices that are heard, speak, communicate, follow orders given, and so on.

Autism can be classified based on grouping of conditions. Based on the results of most studies classified as autism fixation that is autism children whom at birth are in normal condition, signs of autism appear later after two or three years old. This is in accordance with the theory that says that the important period in child development is the toddler period. Age at 2 years is known as the toddler years past golden age once the critical period for the growth and development of the most rapid in the human brain. Normal language development in toddlers involves the left hemisphere in the brain. The left hemisphere is the center of language skills and starts functioning in the womb, but functions perfectly after a few years later. At this time the brain is plastic compared to adults so that toddlers are very open and sensitive in accepting various kinds of learning and enrichment both positive and negative so that necessary stimulation/stimulation is useful for potential growth (Usman & Sukandar, 2014). The process of growth and development of children is often regarded as a natural process and left alone without any special attention from parents. This is supported by the lack of knowledge, education, and attitudes of parents, especially mothers in supporting the growth and development of children, especially in terms of the quality of care (Tjandrajani et al., 2016).

Language development is one indicator of the overall development of children's cognitive abilities related to success in school. Delay in the development of early language skills can affect various functions in daily life and also affect social personal life (Hartanto et al., 2016). Child's growth and development is greatly influenced by stimuli provided by the surrounding environment. If the stimulus goes well, it can make the child have cognitive abilities, motor skills, and language that develops very well too. Conversely, if there is a developmental disruption during that period there will be a developmental disorder that is autism (Artanti, 2012). The exact cause of autism is unknown but autism can occur from a combination of various factors, including environmental factors. There are various theories that explain the factors that influence the occurrence of autism, one of which is psychosocial theory. Some experts consider that the incidence of autism is considered as a result of a cold/unfamiliar relationship between parent and child. When children use gadgets, children become difficult to communicate, do not care and do not respond when parents ask them to talk. In addition, children also do not make social contact and do not get stimulation because children are only focused on gadgets.

The prevalence of autism in children ranges from 2-5 sufferers out of 10,000 children is under the age of 12 years (Siyoto, 2015). The most vulnerable age is in infancy because at this time is the formation of a child's personality. Based on the results of the study it can be seen that the majority of children who suffer from autism are male. This is consistent with the theory that the prevalence of autism ranges from 1-2 per 1000 population with the distribution of men more than women with a ratio of 4: 1. Autism is more dominant in male children because they have lower brain function endurance than female. In males the development of the right hemisphere is responsible for abstract tasks and requires skills (Dewanti et al., 2016).

The results showed that the majority of patients undergoing therapy in the Southeast Sulawesi Regional Autonomy UPTD were children in the age range of 37-48 months (3-4 years). Age 3-6 years is the age range of preschool children. At this time, children who initially only get informal education from parents/family, will begin to get to know the environment outside the home and will meet with their peers. So that at this stage children will play more often, are more active, have more curiosity. By playing it will provide stimulation that can stimulate the child's brain so that it can improve the growth and

development of children such as the ability of movement, speech and language, socialization, and independence of children. If at this time children use gadgets in excess, it can interfere with the development of empathy, social, and problem solving skills because gadgets have replaced the role of limbs in the development of sensory and visual motor skills.

The results of this study are supported by research conducted by (Mulyantari et al., 2019), in Bandung who said that there is a relationship between the habit of using gadgets based on duration and mental emotional status. Where at preschool age physical activity develops and skills increase as well as thought processes. The way to learn at preschool age is to play. The use of gadgets with a long duration can limit the physical activity of children to play, so that children lack the stimulus to be able to develop motor and social skills. The American Academy and Pediatrics (AAP) does not recommend giving gadgets to children under 3 years of age because in this period children have a short concentration range so they are easily bored with excessive stimulation. Adequate and quality sleep actually has a big impact on the development of a child's brain. Stimulation and use of gadgets with excessive intensity can make children experience impaired concentration and damage the ability to control themselves.

The results showed that there was an influence on the intensity of the use of gadgets on children's speech and language development. Most patients undergoing therapy in UPTD Autism- Education and Culture Office of Sultra are children who are in the age range of 37-48 months (3-4 years). The age range is a critical period for the development of speaking and language skills. Children who are learning to speak, will observe closely the faces of the interlocutors and the movements, they do until there is an increase in understanding the verbal signals of hearing. The first 2 - 4 years show a rapid increase in the number and complexity of speech development, vocabulary richness and neuro-motor control. Some of the factors that cause speech delay in children are not given stimulants from the closest people that greatly affect the child's development both motoric, cognitive, and personality development of children. In addition, it does not train children from an early age to communicate as an introduction (Puspita et al., 2019). The use of gadgets with high intensity has a negative impact, one of which is a decrease in psychomotor abilities which results in delayed speech development of children (Sukmawati, 2019). Children who get stimulus directed and regularly will develop faster than children who lack / do not get the stimulus. Children who use gadgets excessively make children only focus on their gadgets making it difficult to communicate, do not interact with peers, and do not get a stimulus that results in impaired speech and language development in children. Failure at this time in the pattern of parenting and education will affect the adult life.

The results showed an odds ratio of 16,000 so that children with low intensity of gadget usage had a 16,000 times chance to develop in speech and language aspects better than children who use gadgets with high intensity. Electromagnetic wave radiation from gadgets is not visible; the effect is not got directly. The danger of gadget radiation to children's developmental power is radiation from the use of gadgets that are classified as RF waves. RF waves are not deadly and dangerous waves, but that does not mean the possibility of side effects does not exist. RF radiation at high levels and intensive intensity can damage body tissue. The radiation can damage body tissues because the body is not equipped with a resistance system to anticipate excessive amounts of heat due to RF radiation. Nonionized radiation (including RF waves) has long-term effects. Diseases that have the potential to arise due to radiation gadgets are cancer, brain tumors, Alzheimer's, Parkinson's, headaches, developmental and behavioral disorders. Data shows that when the radiation from the gadget enters the adult's head absorbs as much as 25%, 12-year-olds as much as 50%, and the highest in 5-year-olds is 75%. The risk of this radiation will be greater in children who have long been exposed to gadgets from an early age (Chusna, 2017).

The results of this study are in line with research conducted by (Fajariyah et al., 2018), in Surabaya who said that the use of gadgets has a great influence on the development of speech and language. Gadgets addiction causes children to be lazy to move and not sensitive to

the environment so that it can affect the level of aggression of children, behavior patterns, and psychosocial children. Interaction and communication with the environment is one way that can stimulate children's speech and language development. Communication can help children increase vocabulary. Stimulation through the visual senses and hearing causes the child's mental becomes unstable and lack of attention to other things. Children who are excessive in using gadgets will become addicted and rarely talk to people around them, so that children become less and even not get stimulation which can ultimately affect the development of speech and language. Barriers to later speech development not only affect children's social and personal adjustments, but can also affect children's academic adjustments.

Based on data from the International Congress on Autism in 2006 recorded 1 in 150 children have a tendency for autism. Autism symptoms in terms of communication disorders in the form of being late to talk or even not developing at all and often using strange language (Usman & Sukandar, 2014). One of the negative effects of excessive use of gadgets is the disruption of brain development so that it inhibits the ability to speak and speak. Failure at this time in the pattern of care and education will affect the maturity. So parents, educators and the community must guide them to avoid negative influences (Febrino, 2017).

Conclusion

Excessive use of gadgets in children has a negative impact, one of which is that it can affect the growth and development of children, especially the development of speech and language. Preventive action that can be taken to minimize the influence of gadgets on children is that parents must play an active role in supervising and assisting children in using gadgets in terms of duration of use, frequency, and selection of game and educational applications. In addition, providing stimulation with various kinds of learning and enrichment that are positive is useful so that the children's potential can develop optimally.

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Is the Frequency of Smoking Affecting the Risk of Abusing Cannabis?

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Abstract

The results of previous study found that teens that had a smoking habit were 14 times more likely to smoke cannabis than those who did not smoke. This study aims to determine the relationship between the frequency of smoking and cannabis abuse done through survival analysis. The research samples were 708 students of cannabis abusers who were previously preceded by smoking. The results of this study found that durability or length of time for abusing cannabis was mostly 1 – 4 years. The Wilcoxon test results concluded that there was a difference in survival to abusing cannabis among the frequency groups of smoking. Multivariate analysis also showed that the more number of cigarettes consumed, the greater the risk for abusing cannabis after being controlled by confounders. Conclusion of this study, the frequency of smoking affects the survival rate and the amount of risk to abusing cannabis.

Introduction

Survey data of the Basic Health Research was found that the proportion of people who smoke every day and occasionally in Indonesia in 2013 was 29.3% of the total population (Indonesian Ministry of Health, 2018). This number declined slightly in 2018, which was 28.8% of the population. However, if the proportion was calculated based on the total population of Indonesia in 2013 which was equal to 250 million people, then there were around 73.25 million Indonesian people who smoke every day and every so often in 2013. That number actually increased to 76.32 million since the population of Indonesia also enlarged to 265 million. Meanwhile, a survey of students in 18 provinces in Indonesia showed that one out of three or four students had ever smoked (National Narcotics Agency of the Republic of Indonesia & Center for Health Research, University of Indonesia, 2017).

Smoking habits are known to be the main cause of lung disease, like chronic obstructive pulmonary disease (Diaz-Guzman & Mannino, 2014). Smoking is said to cause respiratory problems and acute changes in the lung organs, including changes in respiratory flow resistance and pulmonary irritation. In early adulthood, smoking can affect respiratory function. Proper nutritional intake is preventive therapy which is known to prevent inflammation, obstruction, and lung function deficits. But unfortunately, research showed there were differences in nutritional intake between active smokers and nonsmokers (Gates et al., 2014; Indraswari et al., 2018). Smoking habits not only cause negative effects on active smokers but also second hand smoke or those who smoke released by smokers (Öberg, et al., 2011). A study showed a positive relationship between the length of time of other people's smoke exposure per day with urine cotinine levels and also there was a significant relationship between other people's smoke

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exposure by co-workers with urine cotinine levels (Nurjanah & Mufid, 2014).

Smoking habits, based on the results of previous studies, would increase the risk of drug abuse especially cannabis (Astuti, 2016; Badiani et al., 2015; Hindocha et al., 2015; Mayet, Aurelie, 2011). Based on the theory, it is known that there are three theories related to the relationship of smoking with cannabis abuse. First theory is "the Gateway Theory" (GT) which states that the development of consumption of addictive substances follows an advanced process of the habit of consuming prohibited substances, such as cigarettes and/or alcohol. After consuming cigarettes/alcohol, it is predicted that it will continue to illicit substance abuse with types of soft drugs, such as cannabis, and then followed by consuming prohibited types of hard drugs, such as cocaine or heroin (Secades-Villa et al., 2015; Prince van Leeuwen et al., 2011). Second, the theory of the Common Liability to Addiction (CLA) which states that substance consumption both licit and illicit is influenced by genetics and individual vulnerability, such as individual vulnerability to deviations and dependency in family conditions. Unlike the GT theory, CLA theory states that (a) the "choice" of what substances is consumed is first influenced by the factors mentioned above, namely genetics and individual vulnerability; and (b) There is no order in the process of developing substance abuse (Korhonen et al., 2008; Prince van Leeuwen et al., 2011). Third, the theory of "Route of Administration Model" (ROM) which states that the techniques of addictive substances used (for example inhalation or smoked) will affect the type of addictive substances that will be consumed later. This theory provides an explanation for why are smokers at risk of abusing cannabis? Because both smoking and abusing cannabis have the same way in terms of how to consume, this is smoked or inhaled (Prince van Leeuwen et al., 2011).

Survey data in Indonesia showed that cannabis was the most often drug type misused by all students in Indonesia (National Narcotics Agency of the Republic of Indonesia & Center for Health Research, University of Indonesia, 2017). Cannabis was also the most widely used of drug and the last year used of drug by Indonesian students surveyed by the National Narcotics Agency (BNN) and the University of Indonesia Health Research Center (PPKUI) in 2016 (National Narcotics Agency of the Republic of Indonesia & Center for Health Research, University of Indonesia, 2017). Another study using a sample of teenagers living in the French metropolitan city explained the relationship between cigarette smoking habits and cannabis abuse. The results showed that the majority of cannabis abusers were preceded by cigarette smoking, only 2% of adolescent cigarette smokers and cannabis abusers that formerly started by using cannabis (Mayet et al., 2011).

Related to the frequency of smoking, research conducted on residents of Australian twins and siblings aged 12 - 46 years showed that the smoking habits which is routine was associated with an early opportunity to abuse cannabis and their first time to misuse it. Each Hazard Ratio/HR (the risk of a group to experience hazard or failure or event if they were exposed rather than not exposed) was 2.35 (95% CI 2.16 - 2.56) and 3.49 (95% CI. 3.18 - 3.83) (Agrawal et al., 2013).

In this study, researchers analyzed the data from the National Survey on the Development of Drug Abuse and Narcotics Illicit Circulation in Student Groups in Indonesia in 2011 conducted by the National Narcotics Agency (BNN) and the Health Research Center of Indonesia University (PPKUI). There were also three purposes of this study. First, knowing the time of endurance or the length of time (in years) to survive from the first time cigarette smoking until the very first time abuse cannabis. Second, knowing the rate of survival to cannabis abuse based on the frequency of cigarette smoking. Third, knowing the relationship between the frequency of cigarette smoking to the survival of cannabis abuse after being controlled by a variable history of drinking alcohol, families exposed to alcohol and/or drugs, separate from parents at least for six months, and peer influence.

Method

The study design used in this study followed the study design conducted on the data used, namely the National Survey on the Development of Illicit Drug Abuse and

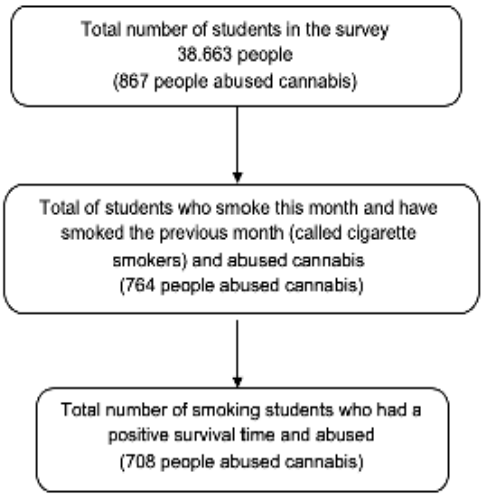

Figure 1. Research Sample Restriction

Circulation in Student Groups in Indonesia in 2011 conducted by the National Narcotics Agency (BNN) and the Health Research Center of Indonesia University (PPKUI). The cross sectional study design was also used in the survey.

The study populations in this research were middle school, high school and college students who became respondents in the National Survey on the Development of Illicit Drug Abuse and Circulation in student groups in 2011 which were around 38,663 people. The samples of this study were students who smoked in the last month/in this month and students who had smoked in previous months, and assumed smoking habits preceded or coincided with misused of cannabis Hence, after being selected only for smokers (smokers this month and smokers in the previous month) and it had a positive survival time (smoking habit preceded or coincided with cannabis abuse), then total sample prepared for the analysis was 708 people (Figure 1).

Based on the large sample formula according to Machin (1997) for survival analysis, then HR = 3.49 and n1 (the proportion of cannabis abusers in routine cigarette smokers) was 55% and n2 (the proportion of cannabis as abusers on non-routine smokers) was 46% (Agrawal et al., 2013). Then the Power of the test in 708 samples analyzed was more than 99%.

Furthermore, to facilitate the interpretation of the analysis results, the researchers did the following related data. First, the value of survival time 0 to less than 0.5 (0 < survival time value <0.5) was recoded to 0.5 (there were 103 respondents with a value of 0 and 332 respondents with a value between 0.0082 to 0.4328). Second, the researchers made changes to the frequency group of smoking from secondary data used. Initially the frequency of smoking was divided into 7 groups, namely rarely smoking, <5 cigarettes/ week, ≥5-7 cigarettes/week, >7 - 35 cigarettes/ week, >35 - 70 cigarettes/week, >70 - 140 cigarettes/week, and >140 cigarettes/week, then the researcher recoded it into four groups, namely rarely smoking, <5-7 cigarettes/week, >7 - 35 cigarettes/week, and > 35 cigarettes/ week. The cut-off determination of the four groups was based on the closeness of the line on the Kaplan Meier curve. The rare definition of smoking referred in this study is those who did not smoke on the month when the interview was conducted.

Results and Discussion

The results of this study indicated that the majority of cigarette smokers who abused cannabis were male (93.4%); the age range of the youngest cigarette smoker was 7 years (2.8%) and the oldest was 21 years (0.1%); the majority started cigarette smoking at the age of 10-14 years (60%). The mean/average age of starting smoking was 13.15 years and the median was 13 years. The average age or

middle age of the first time cigarette smoking obtained in this study was almost the same as the results of the study on a sample of teenagers living in French metropolitan city that showed the average age at first smoking was 13.4 years (Mayet et al., 2011).

Regarding the early age of abusing cannabis, the youngest one was 8 years (0.3%) and the oldest one was 25 years (0.4%). However, the majority began to abuse cannabis at the age of 15-19 years (65.6%). The mean age of starting cigarette smoking is 16.19 and the median age of starting to abuse cannabis is 16 years. The average age of misusing cannabis in this study slightly differed from other studies which got an average age of misusing cannabis was 15.1 years or ranging from 15 years (Mayet et al., 2011)

The researchers then carried out a further analysis of the correlation between the first time age of cigarettes smoking and the first time age of abusing cannabis. Through correlation analysis and linear regression, the value of r = 0.551 and the value of ρvalue <0.0001 was obtained. Thus, it could be concluded that the correlation between the first time age of cigarettes smoking and the first time age of abusing cannabis showed a strong and positive pattern of relationships. These conclusions corroborate predictions obtained from previous studies stating that the age at first cigarette smoking will increase the risk of misusing cannabis (Prince van Leeuwen et al., 2011). Other research also found that cigarette smoking before the age of 13 years is an important and strong predictor of abusing cannabis (Korhonen et al., 2008).

In addition, the results of Kaplan Meier's analysis found that the length of time for abusing cannabis in student smoking who misused cannabis was a minimum of 0.5 years (14.5%) and a maximum of 13 years (0.3%), while the most was 1 - 4 year (61.5%). Whereas the mean time interval was 3.10 years (95% CI: 2.9 - 3.3) and the median (50% sample) was 2.0 years (95% CI: 1.8 - 2.2).

Table 1. Frequency Distribution of Smoker Students that Misused cannabis in Indonesia in 2011

Variable		Total N = 708	Percentage (%)
Age of starting smoking	<10 years	55	8
	10 – 14 years	428	60
	15 – 19 years	219	31
	20 - 24	6	1
Age of using cannabis	5 – 9 years	2	0.3
	10 – 14 years	153	21.6
	15 – 19 years	464	65.6
	20 – 24 years	86	12.1
	25 – 29 years	3	0.4
Smoking frequency	Rarely smoking	64	9.0
	<5–7 cigarettes/week	132	18.6
	>7–35 cigarettes/week	205	29.0
	>35 cigarettes/week	307	43.4
Length of time/survival time from smoking to misusing cannabis	1 – 4 years	435	61.5
	5 – 9 years	159	22.5
	10 – 14 years	11	1.5
	15 – 19 years	103	14.6

Source :Cconducted by the National Narcotics Agency (BNN) and the Health Research Center of Indonesia University (PPKUI), 2011

Table 2. Mean and Median Time Intervals from the First Start of Smoking to Misusing Cannabis of Student Smoking that Abused Cannabis in Indonesia in 2011

Number of Sample (n)		**Mean**	**Median**
708	Value	3.1	2.0
	95% CI	2.9 – 3.3	1.8 – 2.2

Table 3. Mean and Median Length of Time from First Time Smoking to Misusing Cannabis Based on the Smoking Frequency of Smoking Student that Abused Cannabis in Indonesia in 2011

Cigarette Smoking Frequency	Mean		Median	
	Value (years)	95%CI	Value (years)	95%CI
Rarely smoking	3.5	2,732 – 4,331	2	1.4 – 2.5
<5 – 7 cigarettes/week	2.6	2,243 – 3,045	2	1.6 – 2.4
>7 – 35 cigarettes/week	3.7	2,427 – 3,017	2	1.7 – 2.3
>35 cigarettes/week	3.5	3,206 – 3,729	3	2.7 – 3.3
Relatively	3.1	3,926 – 3,282	2	1.8 – 2.2
Log Rank Test (Mantel-Cox)	P<0.0001 Chi-Square : 18,176 ; df = 3			

The results of this study were in line with other studies which showed that cigarette smoking will open up opportunities for abusing cannabis in a relatively short time and have a strong relationship with cannabis drug abuse (Guxens et al, 2007 in (Mayet et al., 2011). Moreover, cigarette smoking habits also has the potential to cause cannabis abuse, where cigarette smoking precedes cannabis abuse (Weinberger et al., 2018; Hindocha et al., 2015). The results of this study also reinforced the awareness of the behavior of cannabis abuse in cigarette smokers. That is, when people start cigarette smoking then it will not be up to five years, they will probably start consuming other types of addictive substances such as cannabis regardless of how fast the process starts from cigarette smoking to abusing cannabis. The outcomes of this study were also in line with the theory of Route of Administration which predicts that the type of addictive substance used today will affect other types of addictive substances consumed in the future. In more detail, it is explained that those who cigarette smoke will have the opportunity to abuse cannabis because the way to consume these two substances is similar, namely by inhalation (Van Leeuwen et al., 2011). Besides, the results of this study were indeed in accordance with "The Gateway Theory" (GT) which states that consuming cigarettes and cannabis is a sequential process. This means that consuming cigarettes or alcohol will potentially be followed by other substance abuse in the hard drug use group, such cannabis (Mayet et al., 2011).

Meanwhile, if it was analyzed based on the frequency group of smoking, the median length of time from first cigarette smoking to abusing cannabis indicated that those who rarely cigarette smoke till cigarette smoke with a frequency of 35 cigarettes/week have a 2-year abuse period, while students who smoke with a frequency of> 35 cigarettes/week have longer time to abuse Cannabis, i.e. 3 years (table 3). The Log Rank Test results showed a value of ρvalue <0, 0001 which means that a difference in the length of survival time to abusing cannabis is based on the frequency of cigarette smoking. Though, it is not known exactly why those who smoke more than 35 cigarettes a day have a longer survival time to abuse cannabis.

The results of life table analysis showed

Table 4. Life Table of Cannabis Abuse Based on Smoking Frequency of Student Smokers in 2011

Smoking Frequency	Time Interval	Number of "Safe" Subjects at the beginning of the interval	Number of Sensors during Interval	Number of Events During Interval	Cumulative Probability at the End
Rarely smoking	0	4,085	3,108	43	0.98
	5	934	807	17	0.95
	10	110	98	4	0.89
	15	8	5	0	0.89
	20	3	2	0	0.89
	25	1	1	0	0.89
< 5 – 7 cigarettes/week	0	3,149	2,552	107	0.94
	5	490	419	24	0.86
	10	47	39	1	0.83
	15	7	5	0	0.83
	20	2	2	0	0.83
>7 – 35 cigarettes/week	0	1,746	1,199	171	0.85
	5	376	291	33	0.73
	10	52	45	1	0.70
	15	6	3	0	0.70
	20	3	3	0	0.70
>35 cigarettes/week	0	1,399	640	217	0.80
	5	542	383	85	0.61
	10	74	54	5	0.54
	15	15	12	0	0.54
	20	3	1	0	0.54
	25	2	2	0	0.54

Source :Cconducted by the National Narcotics Agency (BNN) and the Health Research Center of Indonesia University (PPKUI), 2011

that at intervals of 0 - 4 years, the survival rate of cigarette smoking groups seen as a cumulative probability of survival (End) was 0.98. This meant that at intervals of 0-4 years, as many as 98% of students who rarely cigarette smoke still have not misused cannabis or at intervals of 0 – 4 years there were 2% of students who rarely cigarette smoke though abuse cannabis. The survival rate to abusing cannabis at these intervals was increasing based on the increasing number of cigarettes consumed. Students with a frequency of smoking < 5 – 7 cigarettes/ week was 0.94, the group with the frequency of smoking > 7 – 35 cigarettes/week was 0.85, and the group with a frequency > 35 cigarettes/week was 0.80. Likewise, the next time interval has the same pattern, namely the more the number of cigarettes consumed, the more survival rate for abusing cannabis increased (Table 4).

Unfortunately, the researchers did not get the results of other studies that revealed the value of the survival rate of cannabis abuse based on the frequency of cigarette smoking so that researchers could not compare the results of this study with other studies. However, according to the researchers, the results of this study corroborate previous research which stated that those who cigarette smoke regularly (100 or more cigarettes in life - based on the standards of the CDC USA, 2007) are at higher risk for getting an opportunity to abuse cannabis and more early to abuse cannabis (Agrawal et al., 2013). This condition is increasingly driven by the discovery that those who routinely smoke feel the pleasure faster when they first abuse cannabis than those who do not routinely cigarette smoke (those who have never cigarette smoked or have ever cigarette smoked but

Table 5. Final Model of the Correlation between the Frequency of Smoking and Status of Cannabis Abuse of Students Smoker in Indonesia 2011

Variable	B	SE	Pvalue	HR	95%CI
Cigarette Smoking Frequency					
Rarely smoking				1	
<5 – 7 cigarettes/week	0.910	0.154	<0.0001	2.5	1.8 – 3.3
>7 – 35 cigarettes/week	1.378	0.147	<0.0001	4.0	3.0 – 5.3
>35 cigarettes/week	1.521	0.143	<0.0001	4.6	3.5 – 6.0
History of Drinking Alcohol					
No				1	
Yes	1.341	0.117	<0.0001	3.8	3.0 – 4.8
Family Exposed to Alcohol and/or Narcotics					
No exposure				1	
Middle exposure	- 0.230	0.088	0.009	0.8	0.7 – 1.0
Bad exposure	0.326	0.343	0.343	1.4	0.7 – 2.7
Separated from parents at least for six months					
No				1	
Yes	0.234	0.124	0.059	1.3	1.0 – 1.6
Peer influence					
No influence				1	
Good influence	1.675	0.094	<0.0001	5.3	4.4 – 6.4
Bad influence	1.882	0.124	<0.0001	6.6	5.1 – 8.4
Separated from parents at least for six months*T-Cov	- 0.081	0.031	0.010	0.9	0.9 – 1.0

never more than 100 cigarettes in their lifetime) (Agrawal et al., 2013).

The final model of multivariate analysis showed that the history of drinking alcohol, families exposed to alcohol and/or drugs, separated from parents at least six months, and peer influence were confounding variables on the relationship between the frequency of cigarette smoking and cannabis abuse in 2011 in Indonesia (Table 5).

This final model also showed the pattern that the higher the frequency of cigarette smoking or the more number of cigarettes consumed by student smokers in Indonesia in 2011, the faster the hazard/risk value for abusing cannabis compared to student smokers in Indonesia who rarely cigarette smoking in 2011 (table 5). Overall, the final model explains:

Hazard ratio/risk for the occurrence of cannabis abuse of student smokers in Indonesia in 2011 who smoke with a frequency <5 - 7 cigarettes/week was 2.5 times faster than students in Indonesia who rarely smoke in 2011 after being controlled by variable of drinking alcohol, family exposed to alcohol and/or drugs, separate from parents at least for six months, and peer influence (95% CI: 1,8 - 3,3).

Hazard ratio/risk for the occurrence of cannabis abuse in student cigarette smokers who smoke with a frequency >7-35 cigarettes/ week was 4.0 times faster than students in Indonesia in 2011 who rarely cigarette smoke after being controlled by a history of drinking alcohol, family exposed to alcohol and/or drugs, separate from parents at least for six months, and peer influence (95% CI: 3.0 - 5.3).

Hazard ratio for the occurrence of cannabis abuse in student cigarette smokers who smoke with a frequency of >35 cigarettes/ week was 4.6 times faster than students in Indonesia in 2011 who rarely cigarette smoke after being controlled by a variable drinking alcohol history, family exposed to alcohol and or drugs, separate from parents at least for six months, and peer influence 95% CI: 3.5 - 6.0).

The first confounder found in this study was a history of drinking alcohol. The history of drinking alcohol was indeed found in several

studies as a risk factor for abusing cannabis. Research conducted in Dutch adolescents, for example, showed that teens who drank alcohol at an early age would increase their risk of abusing cannabis with a hazard ratio of 1.43 and 95% CI: 1.2 1.7 (Prince van Leeuwen et al., 2011). Other previous studies also revealed that alcohol and cannabis could occur simultaneously (Brière et al., 2011; Subbaraman & Kerr, 2015), but has been little studied. In this study, we examine predictors and consequences of this behavior in a population-based sample of high school students. Method: Self-reports were obtained from students in Quebec (Canada. The second confounder in the correlation between the frequency of cigarette smoking and canabis abuse was a family exposed to alcohol and drugs. This is in accordance with the Common Liability (CL) theory which states that the use of prohibited or non-prohibited substances is influenced by genetics and individual vulnerability. Including individual vulnerability is the vulnerability of a person to commit deviant behavior and family history of substance dependence (Prince van Leeuwen et al., 2011). Meanwhile, various studies show that a history of parents who experience substance abuse (including drugs and alcohol) is an important risk factor for experiencing drug abuse for someone (Korhornen et al., 2008; Scherrer et al., 2012).

The third Confounder was ever separated from parents for at least six months. Conceptually, students who live separately from their parents will increase their risk of committing deviant behavior due to weak supervision and communication with parents. This weak parental supervision is an important factor in drug abuse and other deviant behavior. The study found that children who do not live with their parents, their mothers or fathers will increase their risk of experiencing emotional distress, doing deviant behavior, and drug abuse, including cannabis although the impact of these conditions does not always occur (Hemovich & Crano, 2009). The last confounder was peer influence. Having peers who use drugs and/or alcohol will surely increase the chances of being offered drugs and/or alcohol. Research showed that friends who experience substance abuse (drugs, smoking, and drinking alcohol) are also risk factors for adolescents to experience drug abuse (Korhornen et al., 2008; Scherrer et al., 2012).

The results of this multivariate analysis revealed that the correlation between the frequency of cigarette smoking and cannabis abuse of student cigarette smokers in Indonesia in 2011 might actually be influenced by other conditions owned by cigarette smokers such as history of drinking alcohol, families exposed to alcohol and or drugs, have lived separately from parents for a minimum of six months, and have peer influence. However, through multivariate analysis that has been done, the four factors have been controlled. This means in the correlation between the frequency of smoking and cannabis abuse, the four confounding variables have been identified by analyzing the differences in the distribution of risk factors/ confounding between the group of cannabis abusers and non-cannabis abusers.

Conclusion

This study concluded that the more cigarettes consumed the more survival rate of abusing cannabis increased. The more cigarettes consumed, the higher the hazard of abusing cannabis compared to cigarette smokers who rarely smoke.

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Comparison of Musculoskeletal Disorder Risk based on Gender in High School Students

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Abstract

In Indonesia, there is a tendency for the emergence of musculoskeletal disorders (MSDs) in school-aged children. MSDs can cause disruption of daily activities, such as lost school time. Individual factors such as sex can be the cause of MSDs. This study aims to determine how much gender differences affect the risk of musculoskeletal disorder. The design of this research was analytic observative with cross-sectional approach. The population is all high school students in the Kec. Kramat Jati East Jakarta as many as 4,708 students. The research sample was 370 class XI students. Samples were taken by simple random sampling. The independent variable is gender while the dependent variable is MSDs. Retrieval of data by filling out the Nordic Body Map questionnaire. Data were processed univariately and bivariately with chi-square test. The results showed that there was a relationship between sex and musculoskeletal disorder. The value of p = 0,000 with a PR value = 1,131 and 95% CI = 1,051 - 1,217 which shows that female are more at risk 1,131 times having musculoskeletal disorder compared to male.

Introduction

Musculoskeletal disorders are very common health problem in all age groups and genders throughout the world (Vos T et al., 2012). Recent evidence suggests that musculoskeletal disorders are very common in school children and adolescents (Dianat et al., 2017). This has become a major health problem and has burdened people and communities (Shan et al., 2013; Scarabottolo et al., 2017). Even WHO puts neck pain and other musculoskeletal diseases as the fourth and tenth health problems, related to disability (Vos T et al., 2015).

In recent decades there has been an increase in complaints of shoulder, neck and back pain in adolescents (Hakala et al., 2002; Gheysvandi et al., 2019). Based on the literature, the incidence of neck, shoulder and spinal pain in school children and adolescents ranges from 7% to 74% (Dianat et al., 2018). Research in Poland showed that more than 70% of adolescents aged 10-19 years experience back pain (Agnieszka, et.al, 2017; Agnieszka & Czaprowski, 2013). Research in Iran shows that the prevalence of symptoms of neck, shoulder, lower back and upper back pain respectively are 27.9%, 20.7%, 34, 3% and 19.0% (Dianat et al., 2018).

Based on data from primary health care in Australia, as many as 5.8 out of 100 children aged less than 18 years are indicated to have musculoskeletal disorder. It can be estimated that there are 880,000 musculoskeletal problems in children and adolescents per year in Australia (Britt et al., 2010; Henschke et al., 2014). In Indonesia alone, there are no national data related to the prevalence of musculoskeletal disorder. From 2013 to 2015, the category of musculoskeletal system diseases

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and connective tissue was ranked second for non-communicable diseases in Bandung (Adhania et al., 2016). Research in Denpasar showed that as many as 36.04% of high school students researched had musculoskeletal disorders (Wiguna & Adiatmika, 2019).

The definition of musculoskeletal disorders (Musculoskeletal Disorders / MSDs) is a disorder of muscles, tendons, joints, vertebrae, and nerves. The symptoms of MSDs that are commonly felt by a person are stiff neck and back; shoulder pain, stiffness or loss of flexibility; hands and feet aching like being pricked; elbows or ankles experience pain, swelling and stiffness; the finger loses mobility, stiffness and loss of strength; feet and heels feel tingling, cold, stiff or hot sensation.

The condition of muscle pain can cause disruption of daily activities, such as lost school time (Michael et al., 2007), as well as an impact on their physical and psychological health (Gheysvandi et al., 2019). Non-disappearing musculoskeletal pain increases the risk of disability and is associated with decreased muscle strength, decreased range of motion problems, and balance (Hunter et al., 2004).

Some factors that cause MSDs are excessive muscle stretching, repetitive activities, unnatural work attitudes (Sumardiyono & Ada, 2014; Agustin, 2012), duration, as well as environmental and psychosocial factors. Individual factors such as age, gender, smoking, physical activity, physical strength, and body size can also be a cause of MSDs. This research objective is to determine how much gender differences affect the risk of musculoskeletal disorder.

Method

This research is an observational analytic research with cross sectional design. It was conducted in March - October 2019 in high schools located in Kec. Kramat Jati, East Jakarta. The population was all high school students in the district Kramat Jati, East Jakarta, totaling 4,708 students. Based on the sampling formula, a minimum sample of 370 students was obtained. Students who were sampled were students of class XI. The method of sampling is simple random sampling. This study has passed the ethics committee with ethical clearance number 232 / KEPK-POLKESMA / 2019.

The independent variable in this research is gender while the dependent variable is musculoskeletal disorder. The instrument was the Nordic Body Map questionnaire. There were 28 parts of the body that were asked in relation to musculoskeletal disorder. The measurement scale used was the Guttman scale, which consists of two choices of answers, there are complaints (yes) and no complaints musculoskeletal disorder. The questionnaire had been tested for validity and reliability. Data collection techniques is by filling out a questionnaire. Before the respondent fills in the questionnaire, the researcher gives an explanation before approval then the respondent will fill in the agreement.

Data analysis was carried out univariately, that is, every variable studied would be seen its frequency distribution and bivariately, namely between independent and dependent variables would be cross tabulated. The statistical test used was the chi square test with a significance limit $\alpha = 0.05$ and a 95% Confidence Interval and the PR (Prevalence Ratio) value is analyzed. The data was presented by narration, cross tables and graphs.

Result and Discussion

The total respondents were 370 students, of which 164 students (44.30%) were male and 206 students (55.70%) were female. A total of 334 students consisting of 196 female students and 138 male students said experiencing musculoskeletal disorder (90.30%). While as many as 36 students consisting of 10 female students and 26 male students did not experience musculoskeletal disorder (9.70%).

The most limbs got muscular pain were right shoulder (49.73%), back (49.19%), left shoulder (43.78%), waist (38.92%) and upper neck (37.84%). While the limbs that were the least experiencing muscular pain were the left elbow (7.03%), right elbow (7.84%), buttocks (bottom) (9.73%), left hand (11.08%) and arms bottom left (11.62%). (Image 1)

Female had the highest musculoskeletal disorder in the right shoulder (62.62%), back (62.62%), left shoulder (54.85%), waist (46.60%) and upper neck (42.72%). While the limbs that were least complained were left elbow (7.28%), right elbow (8.25%), bottom (9.22%), left hand (12.14%) and buttock (13.11%). Male had

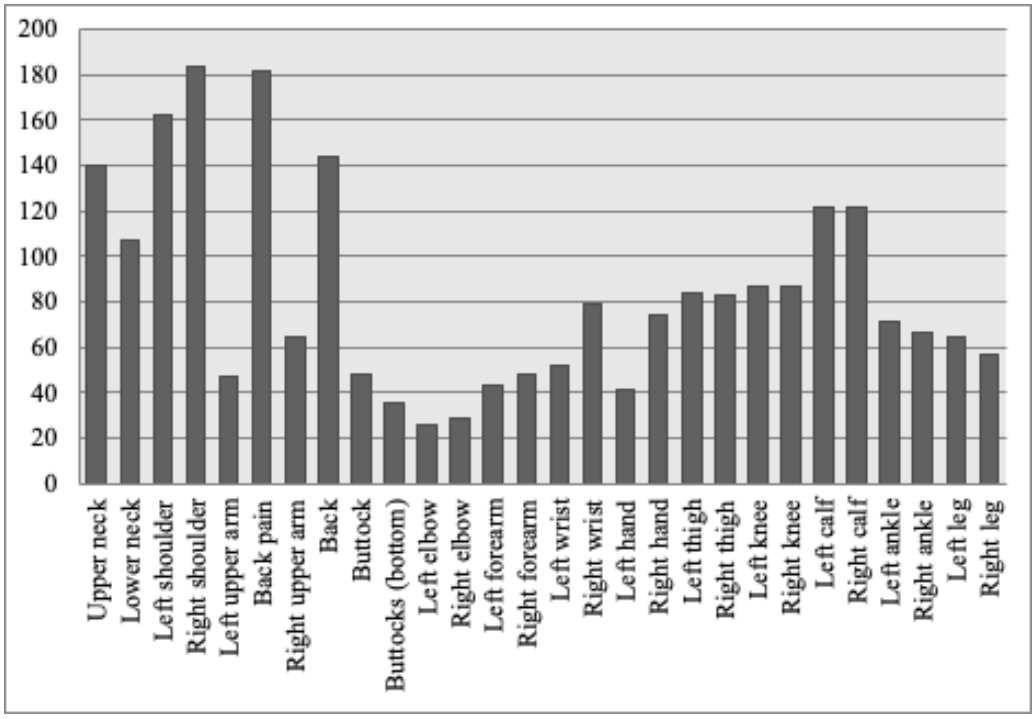


Image 1. Distribution of Limbs Experiencing Musculoskeletal Disorder

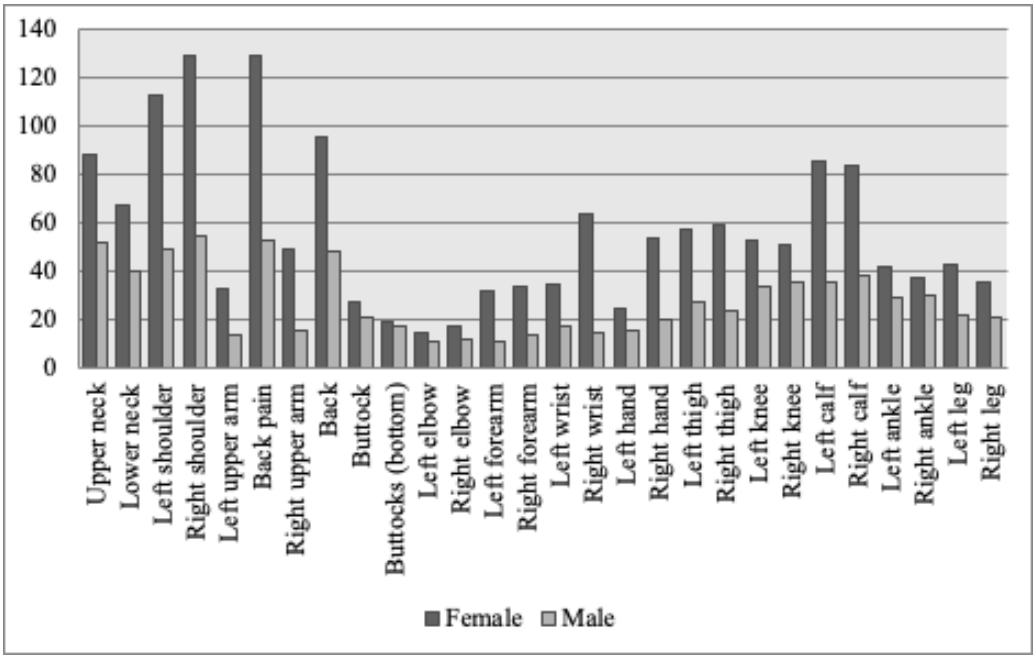


Image 2. Distribution of Limbs Experiencing Musculoskeletal Disorder Based on Gender

the highest musculoskeletal disorder in the right shoulder (33.5%), back (32.32%), upper neck (31.71%), left shoulder (29.88%), waist (29.27%). The least complained body parts for male were left elbow (6.71%), left forearm (6.71%), right elbow (7.32%), right forearm (8.54%), left upper arm (8.54%). (Image 2)

The highest distribution of musculoskeletal disorder for both female and male was the same in the right shoulder, back,

Table 1. Chi Square Analysis Result on Gender and *Musculoskeletal Disorder*

Gender	*Musculoskeletal Disorder*		Total	p value	PR	95% CI
	Yes	No				
Female	196	10	206			
Male	138	26	164	0,000	1,131	1,051-1,217
	334	36	370			

left shoulder, waist and upper neck. However, the distribution of musculoskeletal disorders that is most rarely felt was different. The most rarely complained part of female body was bottom, left hand and buttock. While male rarely felt pain in the left forearm, right forearm, and left upper arm. Both gender stated the right elbow and the left elbow as the limbs that were least complained of having musculoskeletal disorder.

Of the total 206 female students, them who experienced musculoskeletal disorder as many as 196 students and who did not experience musculoskeletal disorder as many as 10 students. From a total of 164 male students, them who experienced musculoskeletal disorder as many as 138 students and who did not experience musculoskeletal disorder as many as 26 people. Based on the chi-square test, the value of p = 0,000 shows that there is a relation between gender and the incidence of musculoskeletal disorder. PR values 1.131 and 95% CI = 1.051 - 1.217, which shows that female have a risk of 1.131 times higher to get musculoskeletal disorders compared to male. (Table 1).

Gender greatly affects the risk level of muscle complaints. This research is in line with Shan's research in Shanghai which showed that gender is a risk factor for complaints of muscle pain (Shan et al., 2013). Female correlates with higher rates of musculoskeletal disorder (Laura et al., 2018). This happens because physiologically, female muscle ability is lower than male. Female has smaller muscle fibers compared to male so that in general female muscle strength is weaker than male. (Barus *et al.,* 2010) Samsoe's research showed that for most muscle groups, male is 1.5 to 2 times stronger than female. The oldest male has powers similar to the youngest female. In all age groups, female has lower muscle strength than men. Male muscle strength decreases with age, while female muscle strength decreases from 41 years (Samsøe et al., 2009).

Other research shows that isometric muscle strength in boys develops more clearly starting at the age of 10 years and peaking at the ages of 14 and 15 years. While the isometric muscle strength of girls is lower when compared to boys, especially starting at the age of 10 years (Maria et al., 2018).

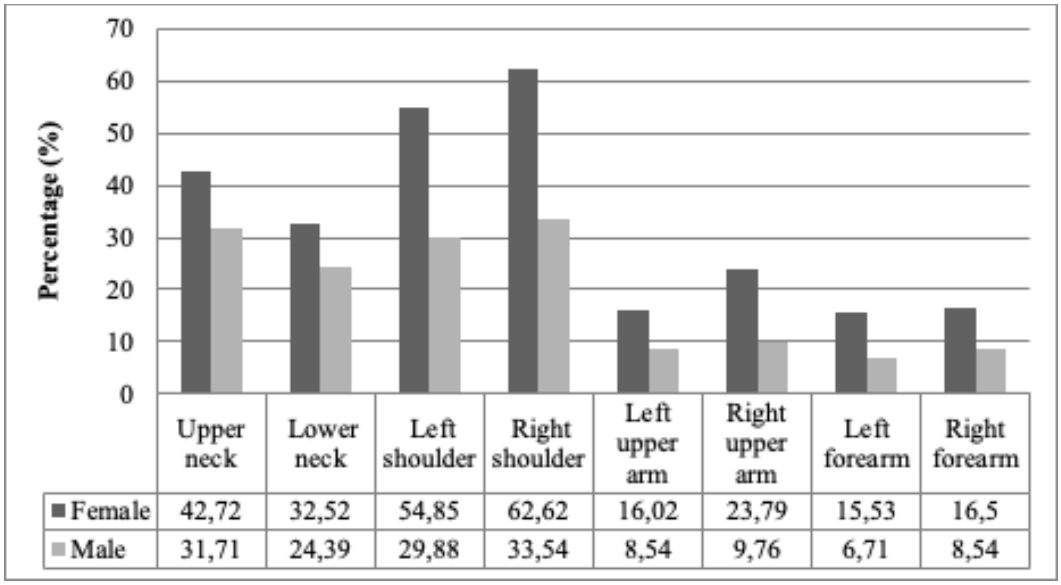
This research shows that in the neck and shoulders, female complain more pain than men. The comparison of musculoskeletal disorders in the neck and shoulders between female and male is 4: 3 for the upper neck, 3: 2 for the lower neck, 5: 3 for the left shoulder and 2: 1 for the right shoulder (Image 4).

Epidemiological studies have identified female as being more prone to developing musculoskeletal disorders in the neck-shoulder area when doing low strength, and repetitive work. Work-related MSDs have consistently been reported to occur at a greater rate among female than male (Schneider and Irastorza, 2010) and especially for the neck and shoulder / arm area (Nordander et al., 2016; Srinivasan et al., 2016; Nordander et al., 2016). Neck and shoulder pain in children is considered a risk factor for health problems in adulthood. Therefore, detecting and understanding pain and treating it early is needed to prevent further effects (Gheysvandi et al., 2019).

This research shows that for the arm, female complain more pain than male. The comparison of musculoskeletal disorders in the arms between female and male is 2:1 for the left upper arm, 5:2 for the right upper arm, 2:1 for the left forearm and 2:1 for the right forearm. Following are the percentages of pain in the neck, shoulders and arms for both. (Image 3)

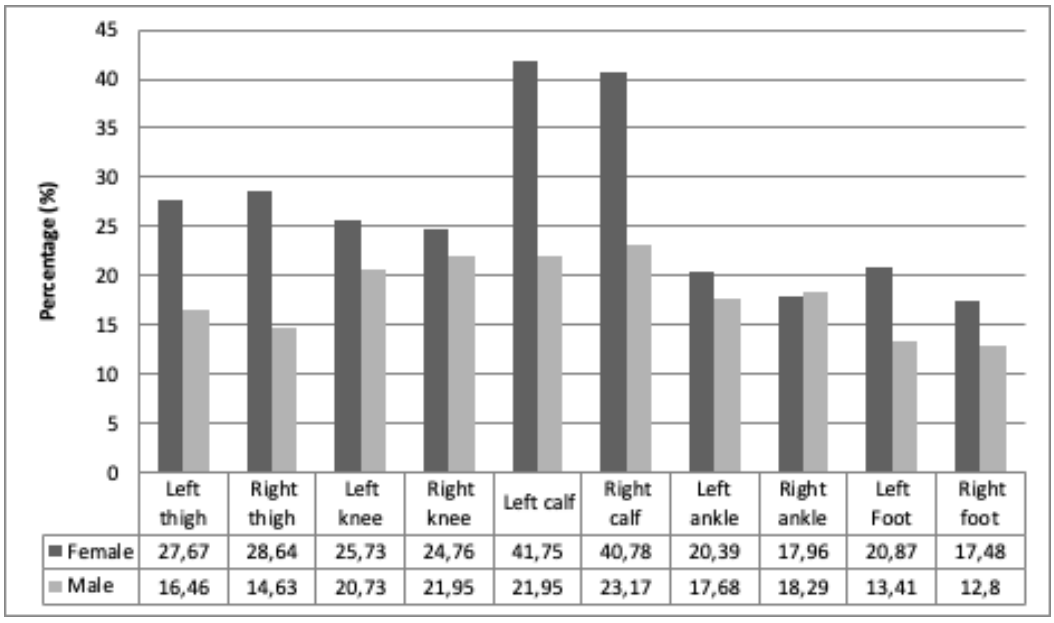
The results of this research indicate that in the lower extremities, female complain more pain than male (Image 4).

Male have larger mCSA (muscle cross



	Upper neck	Lower neck	Left shoulder	Right shoulder	Left upper arm	Right upper arm	Left forearm	Right forearm
Female	42,72	32,52	54,85	62,62	16,02	23,79	15,53	16,5
Male	31,71	24,39	29,88	33,54	8,54	9,76	6,71	8,54

Image 3. Comparison of Musculoskeletal Disorder on Neck, Shoulder and Arms between Female and Male



	Left thigh	Right thigh	Left knee	Right knee	Left calf	Right calf	Left ankle	Right ankle	Left Foot	Right foot
Female	27,67	28,64	25,73	24,76	41,75	40,78	20,39	17,96	20,87	17,48
Male	16,46	14,63	20,73	21,95	21,95	23,17	17,68	18,29	13,41	12,8

Image 4. Comparison of Musculoskeletal Disorder on Lower Extremities between Female and Male

sectional area) in both arms than female. And also have 1 RM (repetition maximum) greater in the dominant arm than female, but there is no difference in the non-dominant arm (Tanton et al., 2009).

Snih Soham's research on lower extremity muscle strength showed that the average muscle strength for male ranges from 9.3 kg for knee extension, 12.8 kg for hip flexion, to 13.0 kg for hip abduction. As for female, the average strength ranges from 6.6 kg for knee extension, 9.5 kg for hip flexion, up to 8.6 kg for hip abduction. The average physical function score was 70.7 for male and 60.6 for female (Snih et al., 2005).

Increasing muscle size is generally parallel with increasing strength, and vice versa decreasing muscle size has very high correlation with decreasing strength. Muscle function and physical ability decrease with the loss of muscle mass (Breuille et al., 2019).

Loss of muscle mass has been linked

to decreased walking speed and reduced leg strength. In addition, reduced muscle strength and size also increase the risk of falls, injury to bones, pain and discomfort, osteoporosis, loss of functional capacity, weakness, disability, obesity, and diabetes (Sowers et al., 2005). Loss of strength and muscle size causes a decrease in overall quality of life, inhibits physical activity, reduces energy expenditure, and increases body fat which can increase dyslipidemia and reduce insulin sensitivity (Hunter et al., 2004). Musculoskeletal pain that does not disappear increases the risk of disability and is associated with decreased muscle strength, decreased range of motion problems, and balance (Hunter et al., 2004).

Some conditions such as repetition, dynamic / static load, attitude / body position, lack of rest and so on contribute a risk factor for the emergence of musculoskeletal disorders. In school students where they spend more time with sitting postures, the risk of experiencing musculoskeletal disorders especially if the chair or table used is not ergonomic. When sitting for a long time, the body's muscles become passive. Therefore stretching is necessary to prevent muscle stiffness. The existence of stretching can increase flexibility, improve posture, maintain physical fitness and reduce the risk of musculoskeletal disorders.

Overall, female has lower muscle strength than male. So it is more susceptible to experiencing muscle pain or musculoskeletal disorders. These complaints are more common, for example when experiencing a menstrual cycle. Female experience an increase in muscle tension suddenly before menstruation and a decrease after menstruation. In addition, the habit of using high heels can also cause low back pain. Therefore, besides stretching, female students are expected to reduce the use of high heels.

Conclussion

There is a relation between gender and the incidence of musculoskeletal disorder. p value = 0,000 with a PR value of 1,131 and 95% CI = 1,051 - 1,217 which shows that female are 1,131 times more likely to get musculoskeletal disorder than men. Corrective action that can be done is to provide education to students regarding risk factors for musculoskeletal disorder. For students who are more at risk of developing musculoskeletal disorder, routinely do exercises to improve muscle strength.

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Socio-Economic and Environmental Risk Factors of Tuberculosis in Wonosobo, Central Java, Indonesia

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Abstract

This study discusses the dominant socio-economic and environmental risk factors for TB disease. The design of this study was a case-control study with 70 case samples and control with a contribution of n = 1. Variables from this study contacted personal, ventilation of the house, humidity, the temperature of the house, density of the house, kitchen, and family earnings. Multivariate data analysis uses multiple logistic regressions. The study notes that from 140 samples, 47% have basic education, and 30% are farmers. People who had a past of contact with TB cases were ten times more likely to contract TB than those who had no contacted (OR = 10.00; p <0.001). Personalities who live in poorly ventilated homes who have a risk of contracting TB are 2.2 times greater than those who live in homes with standard ventilation (OR = 2.20; p <0.018). The moisture increases the risk of TB by four times the low moisture (OR = 4.00; p = 0.001). Living in a house with a higher temperature of TB is 3.8 times higher than a lower temperature (OR = 3.80; p = 0.009). Living in a high population density of the house improves TB five times more than living in a lesser home (OR = 5.00; p <0.001). Kitchen gas enhances the risk of TB 2.5 times greater than gasless (OR = 2.50; p = 0.007). Low family earnings raise the risk of TB three times greater than high family earnings (OR = 3.00; p = 0.002). A past of contact, poorly ventilated homes, high humidity, hothouse temperature, population density, kitchen gas, and low family earnings, are risk factors for TB in Wonosobo, Central Java.

Introduction

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis (Gould and Brooker, 2018). According to Global Tuberculosis Control (WHO, 2011), states that there are 22 countries that approve countries with a high burden of pulmonary tuberculosis, including Indonesia, and in 2017 are still included in the 8 countries that have a high burden of TB. From year to year Indonesia is still the top rank in new TB cases. In 2017 6.4 million reported cases represent 64% of the total an estimated 10.0 million new cases have occurred. Ten countries accounted for 80% of the 3.6 million global gaps, the top three are India (26%), Indonesia (11%) and Nigeria (9%) (WHO, 2018).

The epidemiological situation of TB in Indonesia noted that the prevalence of all types of TB by 285 per 100,000 population or approximately 660,000 cases of all strains of TB (WHO, 2012). The incidence of all TB cases is amounting to 189 per 100,000 population or approximately 430,000 cases. The incidence of smear-positive TB cases 183 366 new cases of smear-positive pulmonary TB, the number of new cases of smear-negative TB amounted to 101 247 cases and intrapulmonary amounted to 11 659. There are 28, 312 cases of child TB cases while TB 27 deaths per 100,000 populations, or about 64,000 deaths. This incidence continues to

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increase in 2018 approximately 319 per 100,000 populations. At present, Indonesia is included in the 8 overlapping countries between TB, MDR / TB and TB / HIV cases in 2018 (WHO, 2018).

In this study the incidence of pulmonary tuberculosis which mostly occurs in the productive age due to a number of risk factors including infections of Mycobacterium, direct contact with the patient, the level of socio-economic conditions seen by economic status with UMR as gold standard but according to (Senanayake *et al.*, 2018). Low socio-economic status negatively affected the lifestyle and social interactions of patients during the treatment period. Though competent treatment programs exist is still important to identify and mitigate risk factors associated with tuberculosis patients.

Acid Fast Bacterial (AFB) + case detection rate in Central Java province in 2010 was amounted to 54.2%, still far below the target of the invention is 75%. In Wonosobo regency morbidity due to TB in 2011 was 42.8%. Of the estimated cases of AFB (+) as many as 811 new cases of the invention is obtained only 347 cases of AFB (+).This figure is still far from the target estimated in Wonosobo regency. The lower the number the invention can increase the risk of incidence of TB were not netted, it has a close relation to the timeliness of TB treatment. Risk factors for TB disease cannot be separated from the geographic and demographic conditions. Environmental conditions are not appropriate health standards is also a good place for the proliferation of bacteria such as TB bacteria (Mycobacterium tuberculosis). So we need an investigation related to environmental risk factors on the incidence of TB in Wonosobo regency to prevent further distribution.

Method

The population examined in this study was all individuals suspected which were found in the first trimester in January to March 2012 in Wonosobo. Cases were patients diagnosed with TB by laboratory confirmation by microscopic examination found AFB (+) in Wonosobo district health centers from January to March 2012. While control are people who are not diagnosed with TB, both clinically and with laboratory confirmation of the activities of daily services in Wonosobo district health center in January to March 2012 in the Wonosobo district.

To avoid confusion, the control will be adjusted by age (≥15 years), the time of diagnosis (within the same month). As for the control of confounding variables, the control will be adjusted (matching) with the case according to the location that is far, far away in the village area.

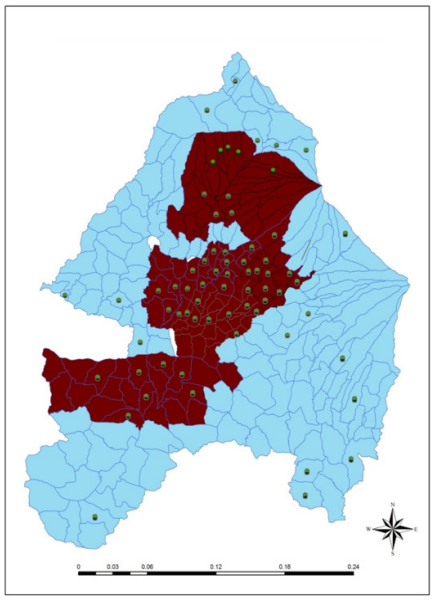

Figure 1. Map of the spread of TB cases AFB (+) Q1 2012 in Wonosobo

Sampling was conducted using the total sample of all TB cases AFB (+) adulthood in Wonosobo district in January to March 2012 as many as 70 cases. Taking control is done by simple random sampling (random) by rotating the pencil in front of the case house. Data was analyzed with univariate, bivariate analysis (chi-square test) and multivariate analysis with logistic regression.

Results and Discussion

Wonosobo regency is one of the districts located in the province of Central Java. Wonosobo regency is geographically located between 7º 11 'and 7º 36' south latitude, 109º 43 'and 110º 04' south longitude. Wonosobo is a mountainous area with an altitude ranging from 275 meters to 2,250 meters above sea level.

The total area of 98 468 hectares of Wonosobo regency, with the following biophysical conditions, slope of 3-8% 54.4 hectares, an area of 24768.1 hectares of 8-5%, 15-40% area of 42173.6 hectares and more than 40% area of 31 829 , 9 hectares. The average air temperature in Wonosobo between 14,30C -26,50C with average rainfall per year ranges between 1713-4255 mm / year. Generally Wonosobo have moisture class.

Based on the survey results revealed that the spread of TB cases AFB (+) 1st quarter of 2012 in the district of Wonosobo most in the middle of the district where there is a large health center health center including Wonosobo 1 Selomerto, Garung, Mojotengah. The following description of the spread of TB cases in Figure 1

A characteristic of respondents in this study is described in the univariate analysis.

Distribution of respondents by Location of Primary Health Care Services (PHC)

Table 1. Overview of respondents by Public health center in the first quarter of 2012

No.	PHC	Case	
		N	%
1	Kaliwiro	7	10
2	Kalibawang	0	0
3	Kejajar I	3	4.3
4	Kejajar II	2	2.9
5	Kepil I	4	5.7
6	Kepil II	0	0
7	I Leksono	5	7.1
8	Leksono II	1	1.4
9	Selomerto	10	14.3
10	Wadaslintang I	0	0
11	Wadaslintang II	1	1.4
12	kretek I	9	12.9
13	kretek II	1	1.4
14	Kalikajar I	2	2.9
15	Kalikajar II	0	0
16	Sapuran	1	1.4
17	Watumalang	0	0
18	Mojotengah	4	5.7
19	Sukoharjo I	1	1.4
20	Sukoharjo II	1	1.4
21	Garung	6	8.6
22	Wonosobo I	12	17.1
23	Wonosobo II	0	0
	Total	70	100

Source: Primary Data, 2012

Distribution of patients with pulmonary tuberculosis at most is in Wonosobo I PHC amounted to 17.1% (12 people). Selomerto PHC with the number of patients reached 14.3% (10 people).

Distribution of respondents by characteristics

Characteristics of respondents viewed from several things including gender, age, educational status and employment status. The following is a description of the characteristics based on respondents in table 2.

Table 2. Overview of respondents by individual characteristics

Characteristics of respondents	Cases (n = 70)	Controls (n = 70)
Gender		
Man	33 (48%)	36 (51%)
female	37 (52%)	34 (49%)
Age (years)		
15-21	16 (23%)	14 (20%)
22-45	49 (70%)	51 (73%)
46-56	3 (4%)	2 (3%)
> 57	2 (3%)	3 (4%)
Level of education		
Primary School	33 (47%)	32 (45%)
Junior High School	26 (38%)	23 (33%)
Senior High School	6 (8%)	13 (19%)
College	5 (7%)	2 (3%)
Job status		
learner	5 (7%)	6 (9%)
House wife	17 (24%)	14 (20%)
farmer	21 (30%)	15 (21%)
Private	14 (20%)	26 (37%)
labor	10 (14%)	9 (13%)
Civil Servant	3 (4%)	0 (0%)

Source: Primary Data, 2012

Based on the survey results revealed that the majority of TB patients is female by

Table 3. Bivariate analysis of environmental risk factors on the incidence of pulmonary TB in Wonosobo

The risk factors	Case n = 70	Controlsn = 70	OR (95% CI)	P-value
Gender				
Man	37 (52.8%)	34 (48.5%)	1.2 (0.39 - 3.4)	0, 782
female	33 (47.1%)	36 (51.4%)		
Education				
basic education	26 (70%)	22 (30%)	1.0 (0.3 - 2.9)	1, 000
further Education	11 (30%)	52 (70%)		
Patients with a history of contacts with				
Yes	56 (80%)	20 (28.57%)	10 (4.29-23.70)	0, 000
No	14 (20%)	50 (71.48%)		
Altitude Region of residence				
> 750 asl	14 (20.71%)	15 (21:43%)	0.9 (0.39-.25)	0, 834
<750 asl	56 (79.29%)	55 (78.55%)		
Humidity Compliant				
Yes	38 (54.29%)	16 (22.86%)	4.0 (1.8-8.9)	0, 000
No	32 (44.71%)	54 (77.14%)		
House ventilation according to the standard				
Yes	39 (55.71%)	25 (35.71%)	2.26 (1.08-473)	0, 0175
No	31 (44.29%)	45 (64.29%)		
Density Residential				
Solid	41 (58.57%)	15 (21:43%)	5.1 (2.3-11.73)	0, 000
Compliant	29 (41.43%)	55 (78.57%)		
Economic Status				
Low	52 (74.29%)	34 (48.57%)	3.05 (1.4-6.6)	0, 0018
Enough	18 (25.71%)	36 (51.43%)		
Room temperature according to standard				
Yes	16 (22.86%)	5 (7:14%)	3.8 (1.2-14.2)	0009
No	54 (77.14%)	65 (92.86%)		
Distance from the house to the Health Facilities				
> 3 km	47 (67.14%)	40 (57.14%)	1.5 (0.7-3.3)	0, 222
<3 km	23 (32.86%)	30 (42.86%)		
Fuel wood use				
Wood	41 (62.1%)	25 (37.8%)	2.5 (1.2-5.3)	0, 006
Oil and gas	29 (39.1%)	45 (60.8%)		

Source: Primary Data, 2012

52%, while in the more control is male. Most respondents are in the age range of 22-45 years of age was 49%, demonstrating the productive age at most risk of TB disease.

TB patients most in Wonosobo regency most have low levels of education are up at the elementary school level by 47%, while in further education is high school and college level by 14%.Based on the status of work at most of the respondents were farmers by 30%. While in control most types of jobs taken are private employees by 37%.

In this study, there are 11 environmental risk factors are thought to cause the incidence of TB. Relationships environmental risk factors with the incidence of TB were analyzed using bivariate analysis; the following is the result of research.

Based on the survey, results revealed that respondents comparison between male and

female are not much different, statistically no significant relationship with the occurrence of pulmonary TB with P = 0.782. Category educational status of respondents were classified into two basic educations (primary and secondary) and Advanced Education (high school and college), from the results of analysis show that there is no statistically significant relationship between education and the incidence of TB is evidenced by the p-value of 1.000.

Most of the respondents claimed to have had direct contact with TB patient before they get sick as many as 73.6%. So after a statistical test to know that there is a relationship between a history of contact with patients on the incidence of pulmonary tuberculosis with p-value 0.000

Environmental risk factors such as altitude area in Wonosobo regency varies based on median calculation of the overall height of the area in Wonosobo is between 450 to 2500 asl above sea level to obtain the value of 750 asl. Based on the characteristic note, there is no significant relationship between the heights of the TB incidence with p-value 0.0834.

Wonosobo regency is an area with high humidity. Values of moisture entry into the health standard is between 40-80%, so in this study is categorized into two humidity standards compliance with a value of 40-80% and is not compliant if the humidity is less than 40% or more than 80%. Based on the results of analysis show that there is a significant relationship between the humidity with a TB incidence with p-value 0.000

Ventilation meet health standards is more than 10% of the floor area of the house, based on the survey results revealed that home ventilation that does not comply with the standards a risk of TB incidence with statistical p-value of 0.0175.

The habit of living with a large family in one house is into consideration elections environmental risk factors in this study. Residential density standards based building a modest home that is at least 10 m 2 occupied by one person. Based on the survey results revealed many respondents who live in crowded house occupants by 58% so that statistically at risk of causing a pulmonary TB with a p-value of 0.000.

Minimum wage employment (UMR) in Wonosobo regency is Rp 834 000, - so as to determine the economic status. This research is categorized into two, above, or below the minimum wage. Based on the survey results revealed that most respondents have incomes below the minimum wage is as much as 74%, so that there is a statistically significant relationship between low economic status with pulmonary TB incidence with p-value of 0.0018 on the other hand this research deference with (Setiarni, Sutomo and Hariyono, 2013), with result there is no relationship between economic status with lung tuberculosis case at adult in Public health center in Tuan-Tuan Ketapang region by p-value 0.082.

The room temperature can be measured by using a thermometer room with classification in accordance with health standards that temperatures between 20-25 0 C. Based on the survey results revealed that the room temperature does not meet the standards that are at a temperature below 20 ^{0}C or above 25 ^{0}C higher risk of pulmonary TB incidence with p-value of 0.009.

Distance from the house to get to a health facility to health services becomes important environmental risk factors where the majority of TB patients have a house range of more than 3 km of existing health facilities, however in this study there was no statistically significant relationship.

More than half of the respondents in this study are still using firewood for cooking. It is a risk factor for the environment duet to air pollution risk of causing pulmonary TB incidence was supported by statistical results p 0.006. OR value of 2.5 indicates that the incidence of pulmonary TB 2.5 times greater in people who use firewood for cooking compared to people that use kerosene or gas.

Multivariable analysis was done to avoid the possibility of risk factors that are not statistically significant but biologically meaningful. The independent variables included in the bivariate analysis results of multivariable analysis is economic status, contact with patients, humidity, room temperature and cooking with firewood by using limit value p = 0:25. To search for a dominant value subsequent

Table 4. Multivariable analysis of environmental risk factors cause pulmonary TB using model 1

Characteristics	OR multi variable (CI)	p-value
Economy	2.33 (0.89-6.03)	0.082
Contact	8.78 (3.35-23.00)	0.000
Ventilation	1.73 (0.68-4.24)	0.248
Density residential	3.18 (1.20-8.14)	0.020
Humidity	5.39 (2.09-14.38)	0.001
Room temperature	7.64 (1.87-31.19)	0.005
Distance	1.23 (0.47-3.18)	0.660
Cooking with firewood	1.56 (0.60-4.04)	0.358

Table 5. Multivariable analysis of environmental risk factors cause pulmonary TB using model 2

Characteristics	OR Multi Variable (CI)	p-value
Contact	10.41 (4.08-26.57)	0000
Density residential	3.95 (1.56-9.98)	0004
Humidity	5.72 (2.16-15.11)	0000
Room temperature	6.66 (1.81-24.45)	0004

LR chi2 = 70.60

regression analysis of factors as shown in Table 4 below.

LR chi2 = 77.56Based on the multivariable analysis known that the risk factors that influence to incidence of pulmonary TB in Wonosobo regency is direct contact with patients with P = 0.000, risk factors residential density with a value of p = 0.020, a risk factor for the air humidity in the house with a value of P = 0001 and the risk factors the temperature inside the house with a value of P = 0.005. and other variables greater than 0.05 were excluded from the analysis of modeling so do multivariable model 2 as follows in Table 5.

Variable dominant with incident infection with TB AFB (+) after the analysis of model 2 is contact with TB patients earlier with a value of p = 0.000 and OR = 10:41 (95% CI 4.08-26.57). From equation generating log likelihood of -61 741, Pseudo R2 = 0.3638 and the overall percentage is 70.60%. By looking at the overall percentage 29.40% of cases are caused by other risk factors that are not netted in this study. The ability to predict the incidence of pulmonary TB infection AFB (+) is approximately 71%.

The results of observational studies study was conducted in 70 cases and 70 control respondents drawn from secondary data TB patients in Q1 2012, primary data collection through questionnaire interviews conducted over two months by using door to door home respondents. It is known that the research on the relationship several risk factors with the incidence of infectious pulmonary TB, there are 3 (three) variable that is in contact with the patient, a room humidity and room temperature have a relationship that was statistically significant with the onset of pulmonary TB variables that do not have a relationship with the occurrence of TB infection lung ventilation is variable, economic status, population density, distance from the house to the health facilities, the use of fuel wood for cooking.

Here is an explanation regarding the 4 dominant factor affecting the incidence of TB such as Contact with patients, density residential, humidity and room temperature

Characteristics of study respondents.

Distribution of gender in all patients with TB in Wonosobo regency has the same ratio that is 51% female and 49% male. Statistically p = 0782, there are no differences between the male and female to develop TB in this study. This is in accordance with the opinion of (Crofton and Miller, 2002), that the events that affect the way the body against the tuberculosis bacillus is virtually no difference between male and female. However, this is not in line with recent research on the effect of age on TB that the prevalence of tuberculosis (TB) disease is higher in males (Fernandes *et al.*, 2018). The risk in men increases with the absence of smoking habits such as research conducted by (Setiarni, Sutomo and Hariyono, 2013), that the most dominant variable that is related to lung tuberculosis case

at adult in Public health center of Tuan-Tuan Ketapang region is smoking habit. Although in this study the level of education and economic status did not pose a risk of spreading TB but other studies said that an increase in economic status and education could improve prevention of the incidence of TB based (Rahayu *et al.*, 2017), on The dominant factors that influence the occurrence of TB are number of suspect, education and income.

Contact with patients

Contact with patients in this study was defined as a contact in one house. The survey results revealed that most of them admit that in one house there family members who have a history of previous TB disease. A total of 80% (56) make contact with people with TB. In bivariate analysis there is a statistically significant correlation with ap value of 0.000. In multivariable analysis contact with patients is a risk factor most dominant with odd ratio 10:41 times greater than those who did not have contact history. Based on research conducted by (Hill *et al.*, 2006), household contact with TB patients conducted in The Gambia Africa had 6.2 times the risk of the p-value less than 0.0001. Active tuberculosis (TB) has a greater burden of TB bacilli than latent TB and acts as an infection source for contacts (Lee, 2016) and (Gil *et al.*, 2018).

History of contact with the patient must be special attention to pulmonary TB disease, because Mycobacterium tuberculosis is a very tiny aerobic bacteria that live in the air and can survive in sputum. Another excreta can be transmitted by the patient through aerosol droplets when cough and remove spark. So contact with patients who are active, especially in the family will be at risk to get greater exposure. The prevalence of smear-positive pulmonary tuberculosis in people with close household contact was 199.5 times more than that of the general population. The TB incidence was positively associated with the temperature, precipitation, and wind speed (all *P*-values < 0.05) (Moosazadeh, Khanjani and Parsaee, 2015). The risk factors for the development of TB, specifically in a high-risk population, should be targeted through the implementation of specialized interventions (Mohidem *et al.*, 2018).

Density residential

Results of univariate analysis showed that most of the respondents of both groups, have a number of occupants that is much in one house, where there are two families in one house or in one family having more than two children. The proportion of the cases as much as 58.57%, while the control group 21:43%. The results of the bivariate analysis showed an odds ratio of 5:18 values with 95% CI: 2.32-11.73 and p = 0.0001 statistically significant, so the variable density of occupancy have a relationship and a risk factor for pulmonary TB infection. Nevertheless the results of this study are different from the research that has been carried out by (Sejati and Sofiana, 2015), there was no relationship between the density of residential with tuberculosis proven by p value 0,422.

On multivariate analysis, earned value model 2 odds ratio of 3.95 with 95% CI: 1.59-9.98 and p.value: 0.004 statistically significant, so the population density variable in this study have a strong relationship and a risk factor for infectious pulmonary TB patient contact pulmonary TB AFB (+). The results are consistent with research (Ruswanto, Nurjazuli and Raharjo, 2012), about the condition of the house as a risk factor for pulmonary tuberculosis in Pekalongan, which concluded that those who stay at home with a high density has a 3.1 times greater risk of suffering from tuberculosis, when compared with no solid occupants. This variable meaningless because most cases and controls to stay at home or a room overcrowded and known to have a significant correlation with p-value 0.003. The TB incidence was positively associated with the temperature, precipitation, and wind speed (all *P*-values < 0.05) in recent population areas (Rao *et al.*, 2016).

Humidity

Tuberculosis is easily transmitted to housing conditions with high humidity levels. Results of univariate analysis showed that the majority of respondents of both groups, staying at home with humidity criteria to qualify. At the population level, we estimated that a small proportion (<20%) of transmission was attributable to household exposure(Martinez *et al.*, 2017). The proportion

of the respondents' case reached 55.29% while the control group reached 22.86%. However, approximately 44.71% of respondents of cases that are in the house with humidity conditions are not eligible. (Prasetyowati and Wahyuni, 2009), shows that there is an influence on the density of occupants against the occurrence of infection in TB with the risk for occurrence is 4.653 times compared to density occupants who meet the requirements

The results of the bivariate analysis showed an odds ratio of 4:07 values with 95% CI 1825-8926 and the value of p = 0.001 statistically significant. In this analysis humidity variables have a relationship with infectious pulmonary TB. Results of multivariable analysis model 2 shows that the value of the odds ratio 5.74 with 95% CI 2:16 to 15:11 and p = 0.000, which means statistically significant. This is in accordance with the opinion of (Nguyen, Schwartz and Dockery, 2014) which states that the humidity in the room needed to obtain comfort, where the optimum humidity range of 60% with a room temperature 22-30^{0}C. Pulmonary TB germs will die quickly when exposed to direct sunlight, but can survive for several hours in the dark and damp (Mead, 2008).

The discomfort in a room strait caused by the increased air humidity, air movement that does not exist, where all of them that occur because of ventilation (Singh, Kashyap and Puri, 2018). To prevent the transmission of tuberculosis bacilli by (Lestari *et al.*, 2011), is recommended to reduce the discomfort in the room was crowded due to the humidity by providing adequate ventilation because if the house there is a pulmonary tuberculosis patient AFB(+) along with humid air, then people who are in contact with patients, 25-50% will be easily infected and total 5-15% of infected individuals with pulmonary tuberculosis mikrobacterium develop into active pulmonary tuberculosis.

Room temperature

This study measured the room temperature by using a thermometer room. It is known that the respondents lived in the indoor air temperature is not eligible health standards where the temperature is below 20 ^{0}C, but none exceeds 30 ^{0}C. Wonosobo regency has a fairly high humidity of 75-90%, which means the sun shines is very little to the region of Wonosobo, accompanied by low temperatures.

Most respondents live in homes with an average room temperature below 20 ^{0}C or above 25 ^{0}C in the case of as much as 77.14% (54 people) and in control as much as 89.4% (65 people). With the odd ratio 3.8 times more likely to develop TB infection. Based on multivariable analysis model 2 is known that risk factors for ambient temperatures can cause unpropriate health by 6.60 times greater. This study related to (Fernandes *et al.*, 2017) that temperatures between 20 ^{0}C and 23 ^{0}C (72.4%; p = <0.001) Temperatures above 25 ^{0}C is the temperature of dry air which is closely related to patient contact, here bacteria mycobacterium tuberculosis will develop optimally at temperatures of dry, easily germs that enter the body through the nose of healthy people. While on the air subu under 20 ^{0}C can affect humidity levels where the higher the temperature, the humidity will decrease . More and more solar radiation in an area causing temperatures to rise and fall of air humidity. In the state of wet air temperature Mycobacterium tuberculosis will flourish (Gould and Brooker, 2018).

Conclusion

Age characteristics of the respondents are located mainly in the productive age (22-45years) amounted to 72.85% (51 people), by Gender has the same ratio between male and female. Status, most are primary school education 47% (33 people), and most work are as much as 30% of farmers (21people). Environmental risk factors influence statistically the incidence of TB include patients with a history of contact with p = 0.000, spacious house ventilation with a value of p = 0.0175, density residential home does not comply with the standard value of p = 0.000, room humidity is not appropriate standard with p = 0.000, room temperature is not in accordance with the standards, with p = 0.009, use of firewood for cooking, with p = 0.006.The risk factors of TB most dominant after multivariate analysis were contacts of patients with p = 0.000, density with a value of p = 0.004, humidity, with p = 0.000, temperature with p = 0.004 with the ability to predict the incidence of pulmonary tuberculosis if it is found to 4 risk factors proficiency level is at 71 5.

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Collaboration Network Model of HIV/AIDS Prevention and Control: Case Study in Subang District, Indonesia

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Abstract

This study was conducted due to the increasing trend of people living with Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) (HIV/AIDS) in Subang Regency, West Java Province. This phenomenon was marked by high population mobility. Thus, this study aims to analyze the network model for HIV/AIDS prevention and control in Subang Regency. In this study, a networking approach by collaboration was adopted using six dimensions, namely, governance, administration, organizational autonomy, mutuality, norms and leadership. A qualitative approach is applied to explain a dataset which was a collection of observation and in - depth interview and supported by secondary data from relevant informants who are involved in preventing and reducing HIV/AIDS in Subang Regency. These informants were the actors who represent government agents and non-government organizations. Result showed that all dimensions of collaboration occur on an iterative, cyclical and dynamic process. However, on a practical approach, this model is implemented on a linear and causality basis and can explain a system towards problem-solving and new values forming.

Introduction

For more than 3 decades, HIV/AIDS prevention and control has been implemented in Indonesia with various dynamics of its development. Initially, prevention and mitigation focused more on medical aspects in the health sector. However, recent developments indicate a shift in government intervention that is not only open to medical aspects and the health sector alone but also involves cooperation between sectors, including non-governmental institutions (KPAN, 2014). This shift is due to the tendency of an increase in the cases of this disease, and the spread observed from the regional aspect is relatively even. In the 2007–2013 period, this case was spread evenly in nearly 80% of all occurrences and cities in Indonesia (*PKMK UGM*, 2015)

Subang, West Java is a district with high case rates. It has an infrastructure that enables the mobility of people through the high North Coast Path. Mobility is a component that causes a region to have many people and hasten the spread of HIV/AIDS.). The high level of human mobility and the spread of prostitution in numerous points in the North Coast region make Subang a region with a HIV/AIDS epidemic in West Java (Hugo, 2011)

Until 2018, the number of people living with HIV/AIDS in Subang has reached 1,618 people from various backgrounds and professions. These secondary data are considered an iceberg phenomenon because the amount not reported is estimated to be higher. Classification of people based on age shows an alarming situation. The majority of sufferers are classified in the age group of 20–29 years (46.54%), followed by the age group of 30–39 years (28.12%). The sufferers who are categorized as children under 5 years (2.36%)

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generally contract the virus while in the womb. This concern is related not only to health problems but also to a lost generation threat.

Subang Regency Government responded to this problem by enacting Subang District Regulation Number 5 of 2013 concerning HIV/AIDS Prevention and Control in Subang District. One agendum is to develop partnerships and collaborations between government and non-government institutions. Then, the HIV/AIDS Prevention and Control Program Design was prepared by the Health Office. In the design, HIV/AIDS prevention and control efforts were emphasized to involve government and non-government institutions in the form of collaboration. The present study aims to (1) explore the practice of HIV/AIDS prevention and control in Subang District, West Java and (2) to model collaborative methods for HIV/AIDS prevention and control in Subang, West Java.

Method

The practice of collaboration basically refers to two things, that is, the limited resources owned by the government and the desire to solve problems and realize common goals in certain fields. Through collaboration, benefits will be gained by utilizing and developing shared potential.

Collaboration between government and non-government organizations is a new chapter in public administration; this chapter leads to governance models (McNabb, 2009). Gajda and Koliba (2009), stated that collaboration is a form of relationship arrangement between organizations which are involved in a collective work. Various terminologies arise from the term, collaboration which refers to the existence of a network between organizations, including joint ventures, consolidations, networks, partnerships, coalitions, collaboratives, alliances, consortiums, associations, conglomerates, councils, task forces and groups.

Thomson et al. (2007), define collaboration as a process in which autonomous and semi-autonomous actors interact through formal and informal negotiations, develop rules and structures that will regulate the relationship between them and solve problems that they faced together. In this interaction, a process of sharing values and mutual benefits occurs.

According to these various definitions, collaboration can be stated as a joint effort that is multidimensional. Firstly, two or more actors who do not constantly have full autonomy are involved. Secondly, the interactions are performed formally and informally through negotiations between participants. Thirdly, the form of cooperation that exists in a network of work occurs in a relationship structure that becomes a vehicle for them to solve common problems. Finally, in collaboration, a process of sharing values and benefits together is realised. These ideas are consistent with the opinion of Gray (1989), who illustrates that collaboration is a thinking process where the parties involved find a shared solution to the differences and limitations of their views on the solutions that can be implemented.

Various factors of collaboration success are available. Thomson et al. (2007), Vangen and Huxham (2007) and Huxham and Vangen (2009) offer a theoretical framework for determining and exploring the success of collaboration through the following dimensions: governance, administration, organizational autonomy, mutuality, norms and leadership.

Governance is related to involving participants in decision-making, rules of behavior, relations that will occur and the choice of solutions to solve problems collectively. In this stage, the steps to be taken, the type of information required and the costs and benefits to be distributed are determined.

Administration focuses on institutional aspects and implementation and practical management that leads to the objectives to be achieved.

Organizational autonomy refers to the two aspects faced by organizations involved in collaboration. These aspects are maintaining initial identity and achieving organizational goals whilst sharing values with other organizations. In this context, organizational autonomy must 'succumb' to long-term interests by sharing authority with other organizations.

Mutuality indicates that organizations that collaborate must benefit from the dependence that occurs on the dynamics of interest in the group.

Norms refer to the principle of

reciprocity and mutual trust. In collaboration, the participation of organizations to be involved in achieving common goals shows a mentality of shared feelings and obligations on the basis of the principle of reciprocity.

Leadership, in the collaboration setting, is the ability to influence the entire participant organization, not just individuals or organizations.

This study used a qualitative approach in the form of exploratory studies in collaborative HIV/AIDS prevention and control efforts in Subang Regency. Primary data were collected through in-depth interviews and non-participatory observations. In-depth interviews were conducted with three groups of informants as follows: Firstly, organizational bureaucrats in the regional apparatus have the main tasks and functions that directly or indirectly over HIV/AIDS prevention and control efforts. Secondly, activists from non-governmental organizations are concerned about HIV/AIDS prevention and control efforts as representations of non-governmental institutions. Finally, people with HIV/AIDS are the target group of HIV/AIDS prevention and control policies through collaboration.

Risk groups were observed, whilst secondary data were collected through documentation studies. To test the validity of the data, an examination was performed by comparing each datum and information obtained from the three methods of data collection. To overcome informants' bias, efforts were exerted to maintain the validity of research data by applying the principles of triangulation.

The process of data analysis was conducted on three concurrent activities, namely, data reduction, data display and conclusion writing. Data reduction occurred simultaneously with the stage of data collection in the form of reviewing interview transcripts, observation notes and documents and making notes on the data. Display data are discussion steps on a narrative text which ends writing conclusions.

Results and Discussion

HIV/AIDS prevention and control efforts in Subang Regency are 1 of the 11 activities in the Disease Prevention and Control Program. Thus, the Regional Regulation No 5 of 2013 concerning HIV/AIDS prevention and control efforts in Subang Regency has been implemented. The main efforts in the form of prevention, mitigation and protection are executed by implementing agencies whose existence demonstrates the characteristics of governance.

Facilities to support this policy have been provided as follows: hospitals for Care, Support, Treatment referrals and Prevention of Mother-to-Child Transmission of HIV referrals; 3 units of Centre of Public Health with comprehensive services; 12 satellite health centers; 5 Centre of Public Health units with harm reduction services; 1 Centre of Public Health unit with the Methadone Maintenance Therapy Service (PTRM) service and 1 Centre of Public Health unit with a service unit as a Reporting Obligatory Recipient Agency.

Governance

The involvement of actors in the collaboration network, that is, government and non-government organizations, departs from a collective agreement which began in the phase of general policy formulation and structure design in the Regional Regulations. However, the formulation of the general policies is dominated by regional government institutions, especially the Health Office. The preparation of Regional Regulation No. 5 of 2013 is fully taken by the legislative and executive institutions, without public hearings or by involving other actors outside the government.

Furthermore, the nature of these regional regulations binds all stakeholders to realize and becomes the main driving factor for compliance with the regional device organizations in implementing this policy. This role is inherent in their main tasks and functions, whereas the involvement of non-government organizations in collaboration is implemented on the supporting aspect.

Collaborative efforts are certainly necessary if they refer to the complexity of problems that cannot be solved by a single unit of government organization or even by various governments, thus requiring the involvement of other parties outside the government. A suitable work pattern is the multiagency of actors who have a common interest in solving the problem (Thomson et al., 2007; Haynes, 2003)

However, the results of the study show that the Subang District Government still dominates the policy process and does not open the involvement of actors outside the government to solve common problems. McNabb (2009), emphasized that collaboration with informal ties is a driving factor in the public sector to implement changes to respond to environmental changes

The description above shows the phenomenon of weak bonds between participants woven through legislation. Therefore, the involvement of participants who have diverse backgrounds, visions and strengths of resources must be encouraged. Formal legal instruments have not become a foothold in establishing the convergence of actors in this collaboration. This case is also evidence that commitment among actors remains weak. Furthermore, numerous actors, especially collaborative regional government organizations, tend to simply '*carry out of obligations*' to the mandate of regulation not to solve problems.

Administration

The administration dimension is related to using formal communication formats among participants, understanding of roles and responsibilities, organizing tasks and supervising participating organizations. The research findings show that dimensions are the bases and means for participants to achieve common goals, although self-administration is ignored in some cases (Thomson and Perry, 2006).

In this collaboration, the participants apply a decentralized structure, where the organization of origin delegates authority to apparatus and activists to make technical decisions, despite interests of the original organization that they maintain in certain cases. Communication activities as a feature of administrative processes become an important part and follow the structure and authority. However, in practice, communication between participants does not rely heavily on formal communication channels. This aspect is prominent when overcoming technical problems in the field where the participants perceive the absence of subordinate positions.

Collaborative activities in the context of administration are generally divided into two parts, namely, medical and non-medical aspects. In general, these medical and non- medical roles represent institutional technical functions where the role of the participants is dynamic in non-medical activities. This condition is due to the fields of activity are broad and require further intensive interactions in addition to the considerable number of participants involved. This situation is different from the role and authority of the actors who are focused on medical activities. The scope of activities is narrower but more detailed in medical activities than in non-medical activities. Moreover, in the former, the perpetrators are relatively limited, and the technical activities are relatively 'closed'.

Institutional relationships between participants in this collaboration are characterized by decentralization among participants. However, a structure which requires a central position for coordination, communication, information flow regulation and efforts remains necessary. In addition, resource management can protect participants who hold mutual agreement through social coordination.

Integration of administrative capacities is pursued through coordination and utilization of elements inherent in the hierarchy and social capacity, as stated by Thomson and Ferry (2006); this idea essentially builds institutional relationships between participants. However, given abundant resources, the Health Office remains the dominant actor. In fact, Bryson et al. (2006), opine that configuring the collaborative structure that runs dynamically is tied to the collaboration strategic goals that are woven.

Organizational Autonomy

During the collaboration, all participants from government and non-government institutions maintain their independence, at least from the aspect of their institutional identity. The strength of the interests of every participant can be observed from the strength of the identity and resources possessed by the participants. In this collaboration, the participant who has the strongest identity and interests is the Health Office because this institution has excess resources. Nevertheless, in various activities in the field, the Health Office still requires the presence of other

institutions, that is, other governmental and non-governmental organizations.

This exchange of information generally occurs without obstacles. For participants from the government, especially the Health Office, information about the sites of People with HIV/AIDS (PWHA) and their conditions from the participants of non-government institutions is crucial because these non-governmental organizations have considerable time in assisting PWHA. Moreover, for participants from non-governmental institutions, information from work partners of government institutions is considered important for medical follow-up on the assistance efforts they made to PWHA.

Although, in some cases, the dynamics of dissent and concepts are observed among participants, and the attachment of participants to one another within certain limits remains intertwined. The technical involvement in collaboration is performed without overlapping of activities among the participants. In this collaboration interaction, the participants are faced with the condition of the identity and integrity of the parent organization vis-a-vis identity and collective integrity. Thomson and Perry (2006) refer to this condition as self-interest versus collective interest, where the identity of the organization origin is at stake. In the collaboration on HIV/AIDS prevention and control efforts in Subang Regency, the output of the conflict between self-interest versus collective interest depends on the resources possessed by the participants.

Participants who have limited resources currently place themselves to disregard the interests of the organization where they come from and priorities collective interests in collaboration, whereas participants who have excess resources become the leading sector for other participants. Thus far, the participants who have different interests have aimed to maintain a balance when faced with the interests of other participants who frequently act in the name of collective interests.

According to Helmke and Levitsky (2004), the model of interaction between participants in this collaboration is included in complementary typologies; in these typologies, filling the gap occurs among the participants when a participant suffers from a shortage of resources or is filled by excess resources owned by other participants, regardless of the original identity of the organization and characteristics of participant partners. Efforts taken to maintain the balance of interests by exploring the common goals of this collaboration are efforts to redesign the organizational structure; the application of the structure is designed for flexible interaction, as mentioned by Beyerlein et al. (2003). Through this balance of interests, this collaboration method can be avoided through collaborative inertia, which is a condition in which a partnership in the form of collaboration has difficulty making changes that refer to the dynamics of the external environment (Huxham and Vangen, 2007).

Moreover, interdependence among participants is relatively strong, although it depends on the character of the activities performed by the participants. Weak interdependence is observed in medical activities which are dominated by the Health Office and its medical service units. By contrast, the level of tendency to prioritize the original organization is quite high, where the original identity of the organization becomes visible. However, nearly all participants acknowledge the benefits of this collaboration.

Mutuality

In collaborating, participants who have identities, resource capabilities, structures and forms of accountability interact dynamically. This interaction also occurs between individual and collective organizations in collaboration with their ever-changing environment. In conducting this interaction, all participants do not only constantly reach a consensus but also conflicts caused by differences in identity and availability of resources. The differences in institutional status, resource capacity and work methods possessed by participants have implications for emerging strong and weak participants who influence each other when interacting.

The process of public health Office is used as a reference by other participants. The strong influence of the Health Office is also felt by non-government institutions because the Health Office's work programs, including dissemination and assistance, frequently leads to medical treatment whose resources

are only owned by the Health Office and its service unit network. Another interesting thing is that the aspect of communication between participants is the most important element in maintaining togetherness despite the gaps among participants in the ability of resources. Constructive communication which leads to competency transformation among participants occurs in technical activities in the field in the form of horizontal communication with cargo using an all-channel network model. The advantage of using this model is that participants have the freedom for reciprocal interactions without noticing the central figure. All communication networks between participants are unlimited, and each participant is relatively free to interact with various parties or vice versa (Robbins et al., 2018).

Based on field observations, the ways of thinking and the works among the participants who came from government and non-governmental organizations are certainly different. Activists prioritize work outcomes, rather than take or utilize aspects of governance in their activities. The different ways of working between participants from government and non-governmental organizations are feasible because the identity between the two participants is different from one another. According to the theory of government failure, the role of non-governmental institutions initially provides public goods in certain areas where the government is unable to respond to the requirements of certain community groups (Feiock and Andrew, 2006).

In the context of collaboration on HIV and AIDS prevention and control, this role of the relationship between non-government and government institutions tends to shift and form a complementary model, in which this institution establishes partnerships as equal partners with government institutions (Feiock and Andrew, 2006), In the relations between government and non-government institutions, three typologies of relations are available. These typologies are presented as follows: (1) supplementary, where the role of non-governmental institutions arises when a 'vacant role' of the government in providing public goods influence public disappointment; (2) complementary, where non- governmental institutions and the government collaborate to provide public goods; and (3) adversarial, where non-government institutions encourage 'from outside' to enable the government to provide certain public goods (Feiock and Andrew, 2006).

However, the difference between the participants' roles based on institutional status can be reduced because the participants in this collaboration from government and non-governmental institutions have a 'burden' of interdependence with one another. According to Thomson et al. (2007; Thomson and Perry, 2006), the sense of togetherness in collaboration is rooted in the dependence between actors; in the collaboration process, these participants share interests based on homogeneity and mutual respect for each other.

Another difference that appears in the interaction of participants is their perspective of professionalism in performing their functions. Actors from the elements of government organizations generally tend to show their status as a state civil apparatus with all their attributes. These actors are different from the activists who are members of non-government institutions. In general, they tend to ignore formalities in performing their activities, although they still explain the identity of their original organization when communicating with the target group. These activists tend to lead to voluntarism that is not marked by formality. However, given the scale of small organizations with limited resources, they have encouraged them to join collaborative networks and reduce their autonomous content (Jang, Feiock and Saitgalina, 2016). The existence of these differences within certain limits creates conflict in the context of quality; therefore, the main problem lies in power imbalance (Anshell and Gash, 2007).

Norms

Complex problems and diverse institutional backgrounds and resource capabilities impact the dynamics of aspects of trust and reciprocity. At the level of policy formulation, the dynamics are invisible. The participants in this collaboration acknowledge that mutual trust between them is an important aspect of establishing a network.

In general, statements that arise from

government actors tend to be macro and normative. Furthermore, the actors state that preventing HIV/AIDS is not solely the responsibility of the government but a joint responsibility. Such expressions of the legislature, regional heads and the heads of OPD on various occasions and the media, including mass media.

In fact, the imbalance in ownership of these resources results in distrust of the ability of co-workers to impact the acceptance of all decisions. Trust in these participants is finally formed, as marked by the continued implementation of a collaborative network. Resource limitations among numerous participants are finally accepted by other participants who had excess resources as an item that is given and unavoidable. The distrust of the existence of weaknesses in co-workers is also accepted as an unavoidable entity and still maintains the collaboration.

In field activities, these participants continue to collaborate with the data in which, in certain activities, participants with the power of excess resources are the dominant ones. This phenomenon can be observed in the role of the Health Office which is dominant in the aspect of care. By contrast, in the dissemination activities for certain vulnerable groups that are difficult to access, such as homosexual groups, activists from non-governmental institutions dominate the activities. The discussion on the aspects of norms is closely related to the dimension of mutuality which emerges from the interdependence between actors (Thomson et al., 2007; Thomson and Perry, 2006).

This pattern of dependence and exchange of resources subsequently lead to mutual recognition and acceptance as work partners, and trust between participants is built. The important thing in this dimension of norms is that the dynamics for forming mutual trust and reciprocity in the exchange of resources occur extensively and take a repetitive and continuous process (Thomson et al., 2007). In particular, in this collaboration, norm dimensions are formed through institutionalization, thereby indicating the application of rules and procedures that regulate interactions between actors (Helmke and Levitsky, 2004). The level of trust in fellow partners is high because of interdependence. This high trust among participants slightly suppresses the collaborative inertia.

Leadership

The meaning of the dimension of leadership in collaboration is different from the terminology similar to a single organization but approaches social leadership. Subordination of the leadership dimension to collaborative practice is the entirety of the participatory collaboration organization, not just individuals or organizations (Vangen and Huxham, 2003).

Leadership in HIV/AIDS prevention is divided into two domains, namely, political and managerial. In the political domain, collaborative efforts among stakeholders are not very prominent. Political actors from the executive and the legislature show concern for HIV/AIDS prevention and control at the stage of policy formulation in the form of Subang District Regulation No. 5 of 2013. This regulation is an initiative of the legislature. The formulation went smoothly without debate. However, in the formulation, no discussion transpired among relevant stakeholders.

In the managerial domain, the highest leadership aspect is the Regent of Subang, who is an ex officio of the KPA District Head. As the chairperson of the KPA ex-official, the Regent of Subang does not have much involvement in operational technical activities of prevention and mitigation. His role is very tiny, but his power is great. Therefore, this role is not well-implemented, as reflected in the very small budget allocation for HIV/AIDS prevention and control.

The position of a regional head occupies a quadrant in the category of high importance and power position and has the freedom to formulate and implement a program. In the HIV/AIDS prevention in Subang Regency, this role is only formally legal in nature and has no real impact among others, as indicated by inadequate budget support.

In the managerial context, collaborative activities are technical in nature. The situation is dynamic because it is faced directly with real problems in the field. This aspect of leadership at the technical level is prominent in controlling participants in teamwork because leadership in individual organizations that oversee the work unit is felt differently when performed in

numerous participant organizations outside the work unit environment. In fact, collaboration leaders, that is, political and managerial, are required to understand that the efforts influence not only individuals but also other organizations that have no hierarchical relationship, as found in individual organizations.

In the present study, two leadership groups, namely, managerial and facilitative, emerged. The leadership that has been conducted is managerial leadership. Although the Regional Head has high interests and power, this position is not comparable to the complexity of the problem. Managerial leadership does not work effectively, thereby encouraging different participants because it remains a single organization.

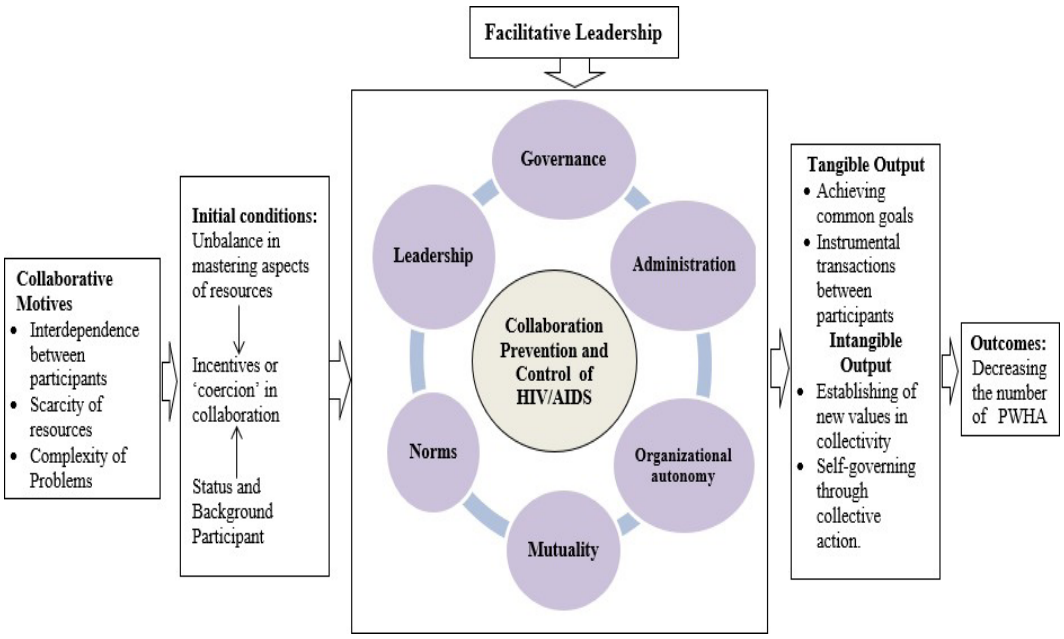
Collaborative HIV/AIDS Prevention and Control Model in Subang Regency

Collaborative activities in a model, although understood as an iterative process and are in the format of a cycle, are part of a system process that has elements of input, transformation and output. This part has implications for the emergence of integration in the manifested elements of interpersonal relations, psychological attachment among participants, mutual understanding with informal frames and commitment to share in a network, thus forming a synergic process. In this designed model, a series of activities is depicted, with the main focus on collaboration, which illustrates the problem, the problem-solving process and the expected results of the process. Thus, models that are designed are practically oriented to problem-solving.

In general, the collaborative prevention and control model of HIV/AIDS in Subang Regency is represented in the form of an activity flow which consists of elements, namely, collaborative motives, initial conditions, facilitative leadership, collaborative processes, tangible and intangible outputs and outcomes.

Collaborative activity in the image is the dynamic interaction of the participants in the six dimensions that are presented in a system model. The input to this system consists of the motives of the participants and the initial conditions before the collaboration begins. The main motive for collaboration is the complexity of the problem and scarcity of resources and cannot be solved by one work unit individually. The implication is that interdependence occurs among the participants. Bryson, Crosby and Stone (2015), refer to the motivations of actors to become participants as general antecedent conditions.

In the initial conditions, the collaborative



Source: Adapted from Thomson and Perry (2006); Bryson, Crosby and Stone (2015)

Figure 1 HIV/AIDS Prevention and Mitigation Model

design is performed by the participants with the mandate of each institution. Two difficulties are encountered at this stage, that is, the imbalance of capacity and capacity of the resources owned and the diverse status, background and interests of each participant (Ansell and Gash, 2007). At this stage, the participants who bear the burden of other partners have weaknesses in terms of power and resources. This condition is called disincentive. The participants are forced to perform their roles while blocking their resources. This form of disincentive is experienced by participants who have large power and resources. However, for the sake of mutual commitment, resources must be allocated to 'close' the lack of other participants.

Conversely, certain participants benefit from obtaining transfers of power and resources from partners who have a surplus. This condition is called an incentive given the freedom to perform its functions and the support of other participants. This incentive is obtained by participants who have high interests but are low in resources.

In the transformation phase, the effort taken is to form a collaboration network that involves government and non-government institutions with various aspects of differences (O'Leary and Vij, 2012). At this stage, the participants interact to form joint actions to achieve mutual benefits and reduce the obstacles experienced. In this process, collaboration activities are cyclical and iterative over a long period.

The research findings show that the transformation process is strongly influenced by facilitative leadership in the regional heads. In collaboration, regional heads are not directly involved. However, with their position as holders of power, they have high interests and power in mobilizing resources at the stage of program formulation, monitoring and evaluation.

This role can be observed in the form of regional regulations, regional medium-term development plans and regional government work plans. The facilitative role of the regional heads as stakeholders is a new finding in this study. Previous studies have not discussed the role of facilitative leadership in applying collaboration in the practice of regional autonomy. At the output stage, the two forms of collaboration are tangible and intangible outputs (Bryson, Crosby and Stone, 2015). A tangible output refers to achieving goals with participants in a collaboration; that is, a network that leads to efforts for reducing the number of people living with HIV/AIDS to a zero case must be implemented as outcomes of the model. In addition, instrumental transactions between participants in social relations exhibit an effort to balance resources among participants through the transfer of capacity to avoid collaborative inertia. An intangible output is realized in the context of forming new values in developing resource capacity and self-governing through collective action. The planting of new values in solving public problems by producing public goods no longer places the government as the dominant actor but involves non-governmental elements and decision-making based on togetherness and equality.

Conclusion

Research on collaborative models theoretically points to the dimensions of governance, administration, organizational autonomy, mutuality, norms and leadership that occur in a cyclical and iterative process. Practically, this model is obtained in linear processes and causality which describes a system that leads to forming new values.

Autonomous regional heads become an important element with facilitative leadership roles as a typical Indonesian phenomenon that complements the collaboration model. Facilitative leadership includes the ability to mobilize various capacities across organizations that are considered participants and forming a work environment which accommodates various organizations with different backgrounds, interests and resource capabilities.

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Long Bean Leaf Extract for Improving Haematological Status of Female Adolescent with Anemia that Gets Fe Supplementation

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Abstract

The incidence of anemia among female adolescent in Indonesia is 48.9%, due to menstruation, poor nutrition intake and worm investment. Long-term effects of anemia in female adolescent can occur stunting. Pharmacological anemia management by taking Fe supplements but these supplements can cause nausea. Nausea can be avoided by non-pharmacological anemia treatment by consuming Fe-containing foods such as long bean leaves. Long bean leaf contains Fe which can accelerate the absorption process of it in the body. The objective of the research was to analyze the effect of long bean leaf extract on changes in anemia status of female adolescent given Fe supplementation. Quasy experiment research design with pretest posttest with control group design. Data was collected for 14 days with 38 respondents. The treatment group was given 200 mg / day long bean leaf extract and Fe supplement, while the control group was given Fe supplement. Hemoglobin, hematocrit and erythrocyte levels were measured before and after the intervention. Data analysis used paired and independent sample t tests. The results showed the treatment group experienced increased levels of hemoglobin, hematocrit and erythrocytes by 1.45 gr / dL (p: 0.02), 3.61% (p: 0.019) and 0.53 x 106 / µl (p: 0.013). 200 mg / day long bean leaf extract given to young women with anemia who received iron supplementation for 14 days improved hematological status as indicated by an increase in hemoglobin levels, hematocrit and erythrocyte counts.

Introduction

Anemia is a condition where the number of red blood cells or hemoglobin concentration falls below the normal threshold value so that it can damage the blood's capacity to carry oxygen throughout the body (Aulia et al., 2017). There are several classifications of anemia according to the causes such as Fe deficiency, vitamin A deficiency, vitamin B12 deficiency, folate and anemia due to chronic diseases. Fe deficiency anemia is the most common cause of anemia globally (Wulandari, 2015). Fe deficiency anemia is caused by a lack of Fe in the body which can be affected by insufficient Fe in the body, improper absorption of Fe to the body, being pregnant, having surgery and experiencing bleeding. The prevalence of anemia in women of reproductive age in the world is around 32.8% and had increased from 2010 to 2016 (The World Bank, 2016). The World Health Organization (WHO) targets a 50% reduction in women of reproductive age as one of six nutritional targets for 2025. Basic Health Research in 2018 reported that the incidence of anemia among female adolescent in Indonesia was 48.9% with the proportion of anemia in the age group of 15-24 years and 25-34 years (Balitbangkes, 2018). The prevalence of anemia in Central Java in 2013 was 57.1%, Fertile Age Women (wanita usia subur/WUS) reached 39.5% and in pregnant women by 43.5% (Dinas Kesehatan Jawa Tengah, 2014).

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In 2015, the District Health Office of Sukoharjo conducted an examination of 1,200 young women, with 28.08% suffering from anemia (Dinas Kesehatan Kabupaten Sukoharjo, 2015). From these data, anemia mostly experienced by women so we need to take care of it since adolescence.

Women have a higher risk of anemia than men because women menstruate every month and many want ideal body shape so that they go on a diet that results in malnutrition (Yulaeka et al., 2017). Diets containing Fe inhibitors such as drinking iced tea and eating soybeans are associated with the incidence of anemia in female adolescent (Masthalina, 2015). Signs and symptoms of anemia such as hemoglobin levels are lower than normal, weak, lethargic, headaches, tinnitus, dizzy vision, gastrointestinal disorders and weak pulse. Anemia can be known by measuring hemoglobin levels, hematocrit and erythrocytes of the female adolescent (Khaidir, 2017). The effect of anemia causes a decrease in human immunity so that the disease easily attacks the body and the long-term impact of stunting can occur. Anemia can cause pregnant women to experience abortion, low birth weight, preeclampsia in primigravida and can cause perinatal death (Yulaeka et al., 2017). Anemia also affects the growth and development of children (Zulaekah et al., 2014). In order to avoid complications in the future, anemia must be overcome as early as possible.

There are two ways to overcome anemia in female adolescent, namely pharmacologically and non-pharmacologically. Pharmacological anemia prevention by consuming Fe tablets. The Indonesian government has conducted a program to control anemia in female adolescent by administering Fe tablets. One tablet contains 200 mg of ferrous sulfate or 60 mg of elemental Fe and 0,400 mg of folic acid. Female adolescent get iron Fe with a preventative dose of 1 tablet a day for 10 days during menstruation and 1 tablet every week (Kemenkes RI, 2014). This program does not go well because female adolescents do not know the importance of taking the tablets and cause nausea. Lack of knowledge of female adolescent resulting in stopping consuming Fe tablets (Permatasari et al., 2018).

Non-pharmacological ways can be done by consuming foods that contain Fe which are easily found and can be processed in various ways. Examples of these foods are nuts, long bean leaf, papaya leaf, kale, spinach, moringa leaf, and others. These foods can increase haemoglobin if consumed regularly. Many researchers study about non-pharmacological treatment to overcome anemia by consuming it directly, made into food or extracts. Spinach and kale have been consumed by many people to overcome anemia but these plants are widely planted in areas that are exposed to pollution so that the nutritional content that should be beneficial is switched to be cautioned (Prastika et al., 2016).

Long bean leaf (Vigna sinensis L.) is one of the methods to overcome anemia that is easy for the people to obtain and is often consumed. The contents in long bean leaf are vitamins A, B, C and phosphorus. The Fe value of long bean per 100 grams is 0.7 mg while the Leaves are 6.2 mg. Long bean leaves that contain Fe can increase hemoglobin levels, hematocrit levels and the amount of erythrocytes and vitamin C content can help facilitate reducing ferrous iron (Fe3 +) to ferrous (Fe2 +) so that it is easily absorbed in the intestine (Andarwulan & Faradilla, 2012). Pharmacological and non-pharmacological methods can be combined with consumption of Fe tablets and long bean leaf extracts in order to accelerate Fe absorption.

Method

The design of this research was an experimental Quasy with a pretest posttest with control group design. The population of this research was young women who were in SMA Negeri (Senior High School) 3 Sukoharjo. A sample of 38 respodents was determined by purposive sampling. Inclusion criteria were female adolescent, willing to drink long bean leaf extract and Fe tablets or Fe tablets only for 14 days, anemia between 9-11 g / dL and not sick. The exclusion criteria in this study was being ill when the study was in progress. The sample was divided into two groups, namely the intervention group (19 respondents) and the control group (19 respondents). The intervention group was given 200 mg long bean leaf extract (made in the Formulation laboratory at UGM) and Fe supplement while the control group was given Fe supplement

only. Respondents consumed long bean leaf extract and Fe supplement for 14 days.

Researchers conducted data collection by observation, identification, filling in the questionnaire and blood tests. Measurement of hematological levels by means of a hematology analyzer was done in the Sarana Medika Surakarta laboratory. Data analysis used paired t-test and independent sample t test. The processed data was used as a basis for discussion of statement problems and then presented in tabular form and conclusions could be drawn.

Result and Discussion

Characteristics of respondents as part of the variables to be compared between the intervention and control groups have been analyzed as follows.

The results of the homogeneity test of all variables showed p-value> 0.05 so that there were no differences in the characteristics of respondents in the intervention and control groups.

Table 1. Frequency Distribution of Respondents Characteristics by Age, Menstruation and Worming

Characteristics	Groups		*p-value*
	Intervention	Control	
Age			
Mean±SD	16,42±0,507	16,37±0,597	
Min±max	16±17	16±18	
Median	16	16	0,815
16 years	11	13	
17 years	8	5	
18 years	0	1	
Menstruation			
Yes	63,2%	47,4%	0,284
No	36,8%	52,6%	
Worming			
Yes	0%	0%	1
No	100%	100%	

Source : Primary data, 2019

Table 2. Hemoglobin Level Before and After Long Bean Leaf Extract Given in the Intervention Group and Control Group

Haemoglobin Level (gr/dL)	Groups		*p value*
	Intervention	Control	
Before Treatment			
Mean±SD	10,12±0,57	10,18±0,64	0,732
min±max	9,00±10,90	9,00±11,00	
After Treatment			
Mean±SD	11,57±0,92	10,93±0,67	0,021
min±max	10,00±13,30	9,80±11,90	
Deviation Average			
Mean±SD	1,45±0,53	0,74±0,40	0,000
min±max	0,50±2,40	0,00±1,40	
p-value (Paired t-test)	0,000	0,000	

Source : Primary data, 2019

The average hemoglobin level before the treatment was given in the intervention group was 10.12 gr / dL where the lowest value was 9.00 gr / dL and the highest was 10.90 gr / dL. After treatment, the mean hemoglobin level became 11.57 gr / dL where the lowest value was 10.00 gr / dL and the highest value was 13.30 gr / dL. The average hemoglobin level before intervention for control group was 10.18 gr / dL where the lowest value was 9.00 gr / dL and the highest value was 11.00 gr / dL. After intervention, the mean hemoglobin level became 10.93 gr / dL with the lowest value of 9.80 gr / dL and the highest value of 11.90 gr / dL. The mean difference of hemoglobin levels before and after treatment in the intervention group was 1.45 gr / dL while for the control group was 0.74 gr / dL with a p-value of 0,000 which means there was a significant difference of hemoglobin levels in the intervention group and control group.

The mean hematocrit level before treatment was given to the intervention group was 35.01% where the lowest value was 31.60% and the highest was 37.70%. After treatment the mean of hematocrit level becomes 38.62% where the lowest value is 35.20% and the highest value is 42.50%. The mean hematocrit level

Table 3. Hematocrit Level Before and After Long Bean Leaf Extract Given in the Intervention Group and Control Group

Haematocrit Level (%)	Groups		p value
	Intervention	Control	
Before Treatment			
Mean±SD	35,01±1,64	35,08±1,80	0,896
min±max	31,60±37,70	31,50±37,80	
After Treatment			
Mean±SD	38,62±2,17	37,01±1,85	0,019
min±max	35,20±42,50	33,90±39,70	
Deviation Average			
Mean±SD	3,61±1,19	1,92±0,97	0,000
min±max	0,80±5,10	0,20±3,60	
p-value (Paired t-test)	0,000	0,000	

Source : Primary data, 2019

Table 4 : Erythrocyte Level Before and After Long Bean Leaf Extract Given in the Intervention Group and Control Group

Amount of Erythrocytes (µl)	Groups		p value
	Intervention	Control	
Before Treatment			
Mean±SD	3,80±0,22	3,80±0,22	0,972
min±max	3,42±4,20	3,34±4,21	
After Treatment			
Mean±SD	4,34±0,29	4,11±0,24	0,013
min±max	3,89±4,87	3,60±4,42	
Deviation Average			
Mean±SD	0,53±0,18	0,30±0,15	0,000
min±max	0,12±0,80	0,09±0,69	
p-value (Paired t-test)	0,000	0,000	

Source : Primary data, 2019

before the treatment was given to the control group was 35.08% where the lowest value was 31.50% and the highest value was 37.80%. After the treatment was given, the mean hematocrit level was 37.01% with the lowest value of 33.90% and the highest value of 39.70%. The mean difference in hematocrit levels before and after treatment was given in the intervention group was 3.61% while the mean in the control group was 1.92% with p-value in the treatment group and the control group was 0,000 which meant there was a significant difference in hematocrit level in the treatment group and control group.

The mean of erythrocytes before the intervention was given in the treatment group was 3.80 x 106 / µl where the lowest value was 3.42 x 106 / µl and the highest was 4.20 x 106 / µl. After intervention, the mean number of erythrocytes was 4.34 x 106 / µl where the lowest value was 3.89 x 106 / µl and the highest value was 4.87 x 106 / µl. The mean number of erythrocytes before the control group intervention was given 3.80 x 106 / µl where the lowest value was 3.34 x 106 / µl and the highest value was 4.21 x 106 / µl. After intervention, the mean number of erythrocytes was 4.11 x 106 / µl with the lowest value of 3.60 x 106 / µl and the highest value of 4.42 x 106 / µl. The average difference in the level of erythrocytes before and after the intervention in the treatment group was 0.53 x 106 / while the mean difference in the control group was 0.30 x 106 / µl with the p-value in the treatment group and the control group 0,000, which means that there were significant differences in erythrocytes level in the treatment group and control group.

The results of the analysis of confounding variables namely age, menstruation and helminthiasis in the treatment group giving long bean leaf extract and Fe supplement and control group giving Fe supplement only were found to be not too different or equivalent (p-value> 0.05). These results can be concluded that the confounding variables namely age, menstruation and helminthiasis in this study can be controlled.

Fe is the most important element in the formation of red blood cells. Fe supplements are taken to prevent and treat anemia in adolescents. Fe supplementation has side effects that cause gestational disorders for some people. These side effects include discomfort on epigastrium, nausea, vomiting and diarrhea. The dose of Fe supplementation is directly related to the frequency of side effects. Giving Fe supplements to some teens can cause constipation. Constipation can be relieved by consuming fiber such as bread, cereals, and agar (Jaya et al., 2020).

Fresh long bean leaf have an iron content of 6.2 mg / 100gr. Fe content after extraction by maceration of 70% ethanol to 13,413 mg / 100gr was tested using the AAS method. Long bean leaf extract is one source of Fe that is needed in the formation of hemoglobin, hematocrit and the level of erythrocytes. Fe content after extraction has doubled compared to fresh long bean leaf. Fe is an important part of hemoglobin which is an oxygen-carrying protein in the blood. Each globin molecule contains four heme groups. Each group contains ferrous iron atoms which quickly bind to one oxygen molecule. Each hemoglobin molecule carries four oxygen molecules (Rosidah & Astuti, 2018). If Fe is reduced, blood cannot carry oxygen effectively. Oxygen is needed by the body for cells to function normally. Fe deficiency can cause anemia (Mukarromah, 2010) ; (C. P. Astuti et al., 2017).

Increased haemoglobin, haematocrit and erythrocytes level occur because long bean leaf have compounds that can help increase Fe in the blood. Long bean leaf contains iron, vitamin C, vitamin A and proteins that can increase haemoglobin, haematocrit and erythrocyte level. Vitamin C plays a role in reducing the entry of ferric element in the small intestine. Vitamin C can help make it easier to reduce ferrous iron (Fe3 +) to ferrous (Fe2 +) so that it is easily absorbed in the intestine because ferrous iron cannot be absorbed by the body. Vitamin C inhibits the formation of hemosiderin which is difficult to mobilize to free Fe when needed. Therefore, lack of vitamin C can more easily experience anemia. (Saputro & Junaidi, 2015) ; (Y. Astuti, 2016).

In addition to vitamin C, long bean leaf also contain vitamin A which functions to help absorption and mobilization of iron in the formation of erythrocytes. Vitamin A is related to erythrocytes in the production of erythrocytes, Fe and protein synthesis transferring both

in mobilization and composing. Deficiency of vimanin A makes Fe deposits unable to be utilized in the erythropoesis process. Protein has an important role in the transportation of iron in the human body (Michelazzo et al., 2013). Protein can help globin synthesis and low protein can inhibit the process of hemoglobin synthesis resulting in iron deficiency. One of the glycoproteins synthesized in the liver is transferrin. This protein has a central role in the metabolism of Fe in the body, this is caused by transferrin transporting Fe in circulation to places that need. Ferritin is another protein that in normal conditions can store Fe and can be taken back for use in accordance with the needs of the body (Simanungkalit et al., 2019).

Increased level of hemoglobin, hematocrit and erythrocytes in female adolescent are not only the influence of Fe supplements alone but other substances in the food consumed also affect the process of hemoglobin synthesis in the body. The Fe content in long bean leaf can help the formation of hemoglobin. Fe is a microelement that is essential for the body to act as a hemoglobin maker. In accordance with research on women workers, there is a significant relation between Fe consumption and elevated Hb levels (Rahmad, 2017).

Long bean leaf extract has several ingredients to help erythropoesis. Erythopoesis is carried out in the bone marrow with ingredients such as iron, vitamin B12, folic acid, vitamin B6, protein and other factors. The lack of one of these ingredients can result in decreased production of red blood cells or anemia. Protein plays a role in synthesizing globin which is part of hemoglobin and cellular protein (low protein intake will affect hemoglobin synthesis). Fe is part of the hem that functions for the preparation of hemoglobin (Petersson et al., 2018).

The process of Fe absorption occurs in the proximal duodenum jejunum to carry out protein synthesis so that in the ferric iron blood plasma is oxidized to ferrous iron blood plasma and then the transferitin binds to transport ferro into the bone marrow to join to form red blood cells. Hematocrit levels are very dependent on the number of erythrocytes because erythrocytes are the largest cell mass in the blood. Increasing and decreasing hematocrit levels in the blood can have an impact on blood viscosity. The greater the percentage of hematocrit levels, the blood viscosity will increase (Taimeh et al., 2017) ; (Hariyadi, 2015)

This research is in line with one in Surakarta, namely an increase in hemoglobin levels in pregnant women after giving 350 gram long bean leaves for 30 days (Prastika et al., 2016). Other research have shown increased levels of hematocrit in pregnant women after consuming green bean juice (Anastasia S et al., 2017).

The supplementation containing Fe substance without the support of other nutrients can influence the level of iron absorption in the body compared to the supplementation of Fe plus long bean extract.

Conclussion

The administration of 200 mg long bean leaf extract per day for 14 days in anemic female adolescent given Fe supplementation improves hematological status (hemoglobin, hematocrit and erythrocyte levels).

For further research, it can be used as supporting data and can further investigate the extract of long bean leaf by examining in more detail such as nanoparticles.

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The Development and Initial Validation of the Indonesian HIV Social Stigma (I-HSS) Scale

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Abstract

Human immunodeficiency virus (HIV) social stigma causes people living with HIV (PLWH) to cover their HIV status. Also, HIV social stigma makes PLWH afraid of seeking information and treatment. Thus, to eliminate the HIV social stigma, measuring tools are needed to obtain the social stigma of the disease. The study aims are to develop and assessed the validation of the instrument of HIV social stigma in society. The instrument was developed through a multi-stage process of item generations and psychometric test of the instrument consists of content validity, construct validity and reliability test. The HIV social stigma scale was distributed to a cross-sectional sample of people in several regions in West Java, Indonesia (n=125). The final version of the I-HSS scales contained 25 items grouped into three dimensions (ignorance, prejudice, and discrimination) with a five-point Likert scale to score each item. Reliability was adequate for most dimensions (Cronbach's alpha 0,76 - 0,78). Thus, the I-HSS scale were moderately correlated with one other (r = 0,52 - 0,84). Therefore, the I-HSS scale suggest a reliable and valid tool to measure social stigma toward people living with HIV in the community.

Introduction

The development of HIV infection as an endemic disease is closely related to the stigma of the disease. Stigma is defined as the act of labelling, discrediting, and discriminating against someone or a group of people on a characteristic that is considered different or deviating from the majority of society.

Monjok, Smesny, & Essien (2009), said stigma is often associated with discrimination and has been described in many different ways. Furthermore, stigma related to knowledge, attitudes, and behaviour. Stigma is an act of giving a social sign that causes negative behaviour and aims to discredit someone (Evans-Lacko et al., 2010). Stigma refers to ignorance, prejudice, and discrimination.

The emergence of stigma in HIV was associated with the assumption that disease is dangerous and identical to sexual deviations and drug use (Earnshaw et al., 2015; Starks et al., 2014). This happens in the community so that views on HIV become negative and stigmatized. The HIV stigma becomes a burden that aggravates the handling of HIV infections.

The impact of HIV stigma from the community on people living with HIV (PLWH) has caused concern and fear among PLWH to seek treatment. As revealed by Nyblade, Stangl, Weiss, & Ashburn (2009), stigma against HIV is a major obstacle in handling the disease. The stigma becomes an obstacle for PLWH in getting access to prevention, care and treatment services.

Besides, stigma has an impact on increasing the potential spread of HIV disease. Stigma has made PLWH reluctant to carry out an HIV tests. This stigma causes PLWH to cover up their positive HIV status, even make PLWH afraid of seeking information and

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treatment. The impact of HIV stigma can also lead to marginalized and isolated communities or groups (Bruce and Harper, 2011).

When a disease is stigmatized, it is hoped that various ways and strategies can suppress the development of stigmatization of the disease. However, there are times when the stigma that arises against HIV comes from a group of people with sufficiently high levels of education, economy and religious knowledge. Stigmatized diseases will make it difficult to accept the sufferer in the community.

Therefore, to reduce the stigma against HIV originating from the community, a measurement tool is needed to assess the social stigma. The aim of study is to develop an HIV social stigma scale and to evaluate the validity and reliability component of the instrument. The hypothesis of study is the scale developed has a good value of content validity and construct validity, as well as a good reliability value to measure the HIV social stigma in the community.

Method

The development and initial validation of an instrument requires a large number of respondents that represent the characteristics to be examined. The HIV social stigma scale, was distributed to a cross-sectional sample of people in several regions in West Java, Indonesia. Respondents come from residents over the age of 17 years and recorded as residents who already have a National Identity Card. The involvement of community members in this study was voluntary. A total of 125 people were involved in this study. Data collection was used non-random sampling with an online survey using Google Forms. The study was approved by the Health Research Ethics Committee at Institute of Health Science Aisyiyah Bandung.

The development of the I-HSS scale was carried out through three main stages: the development, instruments trial, and reporting of results for administering the tests (Haladyna and Rodriguez, 2013). An initial stage of the study was item generations based on the proposed theoretical framework and review literature. After that, the trial was conducted. In trials, the instruments that have been developed were administered to respondents and then were analysed to assess psychometric properties covering the content validity, construct validity, and reliability test.

I-HSS scale is an instrument developed in Indonesian. I-HSS scale is a questionnaire to measure people's views that negatively assess people or groups of people who have HIV/AIDS. The stigma that arises in society refers to problems of knowledge (ignorance), negative attitudes (prejudice), and rejection behaviour (discrimination) (Evans-Lacko et al., 2010). I-HSS scale is a self-administered questionnaire and consisting of 25 items covering three dimensions of stigma: ignorance (seven items), prejudice (nine items), and discrimination (nine items). All items are negative questions with responses that are made on a five-point Likert type scale, ranging from 1 (totally agree) to 5 (totally disagree). The questionnaire also included several questions related to demographic characteristics and relevant information.

The statistical analysis was used software package SPSS version 22 (IBM Corp., Armonk, NY, USA). Reliability was measured by Cronbach's α. Meanwhile, construct validity was used Pearson correlation to assess the score of each question with a total score of variables.

Result and Discussion

The sample consisted of 125 residents from several regions in West Java, Indonesia (46 men and 79 women) aged between 17 and 59 years (M = 29, 03, SD = 10,11). Most of them, 71 (56, 8%) were married, 50 (40%) were single, and the other 4 (3,2%) was widow. Almost half of them, 45 (36,0%) were private employees; of the remainder, 37 (29,6%) were students, 20 (16,0%) were civil servants, 16 (12,8%) were housewives, and 7 (5,6%) were entrepreneurs.

The twenty five items were included in a content adequacy test to ensure content validity. All of the items in the I-HSS questionnaire were review by scientific experts from HIV/AIDS Service Unit at Gunung Jati Hospital, Cirebon. The results showed that all items on the I-HSS scale questionnaire have represented an aspect of the domain of the variable to be measured.

The mean and standard deviations of I-HSS scale items are given in Table 1. Result of the construct validity test (Table 1) indicated that the I-HSS scale was moderately correlated with another (r = 0,52 - 0,84). Overall items in I-HSS scale were valid. Meanwhile, the internal

TabLe 1. Corrected item-total correlation of the I-HSS scale dimensions

I-HSS Scale and Subscale Items	r	Mean	SD
Ignorance (Knowledge Dimensions)			
HIV is a curse, therefore sufferers must be shunned.	0,56	2,03	1,09
PLHIV can transmit the disease by shaking hands or eating and drinking together.	0,64	1,95	0,75
PLHIV tend to have many sexual partners.	0.57	2.95	0.87
PLHIV are exposed to the virus due to immoral acts.	0.65	2.58	0.99
I would not shake hands with someone if I knew that he/she had HIV.	0.77	2.06	0.72
I prefer not to make physical contact with PLHIV.	0.75	2.30	0.79
I am not willing to talk or chat with PLHIV.	0.59	1.74	0.57
Prejudice (Attitude Dimensions)			
PLHIV are sinners.	0.75	2.10	0.67
PLHIV are immoral.	0.75	1.95	0.55
PLHIV are disgusting.	0.53	1.87	0.52
PLHIV violate religious teachings.	0.69	2.48	0.87
PLHIV should be ashamed.	0.72	2.20	0.78
PLHIV must be quarantined because they have a bad influence.	0.57	2.21	0.65
Society will be better without a person who has HIV.	0.52	3.15	1.14
Families of PLHIV should feel ashamed.	0.54	2.10	0.83
I feel uncomfortable when I'm with person with HIV.	0.73	2.57	0.76
Discrimination (Behaviour Dimensions)			
I will not join an activity if there is a person who has HIV in that activity.	0.80	2.08	0.75
PLHIV do not deserve to live in the same house as someone else because of disease.	0.72	1.86	0.43
PLHIV must live with their fellow HIV sufferers.	0.60	2.36	0.60
PLHIV must be excluded from activities in the community.	0.76	1.92	0.52
PLHIV and their families should not become community leaders.	0.78	2.08	0.52
PLHIV cannot be given a job because they can spread it to their co-workers.	0.80	2.10	0.53
PLHIV must be fired from their jobs.	0.68	1.98	0.42
PLHIV should not go to school with other people.	0.84	1.97	0.40
PLHIV must receive their health services, may not join public health services.	0.62	2.84	0.85

SD = standard of deviation

consistency of I-HSS scale was adequate, with a Cronbach's alpha of 0,75 for the full questionnaire as well as for the each dimension of stigma: Ignorance (α = 0,77), Prejudice (α = 0,76), and Discrimination (α = 0,78).

HIV in the community has been a highly stigmatized disease. PLWH that is stigmatized faces a variety of harmful outcomes. Stigma has a negative impact on the health of PLWH(Molina and Ramirez-Valles, 2013). People with a high degree of stigma can suffer psychological distress and decrease in their health (Kamila and Siwiendrayanti, 2010). Then, people with a high degree of perceived stigma may be less likely to reveal their HIV status because they fear social rejection. These may threaten to compromise the value of antiretroviral therapy (ART) and thus affect the quality of life of PLWH (Gilbert and Walker, 2010).

HIV stigma has negative effects on the lives of infected people and is often cited as a barrier to HIV prevention and treatment (Arnold et al., 2014; Lindberg et al., 2014). Widespread prejudice, discrimination against PLWH, ignorance and misconceptions about how HIV is transmitted can be serious obstacles to HIV control programs. HIV prevention programs must engage more in community mobilization and literacy of rural communities in partnership with other agencies to rectify

this (Deribew et al., 2010). There is consensus within the HIV prevention community that HIV stigma must be reduced and handle to eliminate the HIV epidemic.

By measuring a scale of HIV social stigma, the reduction strategy can be properly developed and addressed, the effectiveness of HIV stigma interventions can be appraised over monitoring and evaluation. Measuring community stigma toward PLWH may reveal a relevant predictor for participation in HIV prevention and treatment. Therefore valid and reliable instrument scales is important to mapping of HIV Stigma and to assess the extent and impact of HIV stigma (Lindberg et al., 2014).

The Indonesian HIV Social Stigma (I-HSS) scale encompasses three dimensions: dimension of information (ignorance), dimension of behaviours (prejudice) and dimension of actions (discrimination). These results demonstrated good reliability and validity for the total 25 items I-HSS scale as well as for the subscales. The construct validity scores of the overall items in the I-HSS scale ranged from 0.52 – 0.84. Meanwhile, the internal consistency or reliability score for I-HSS scale is 0.75. Although the sample size was small, this is a promising scale for measuring HIV social stigma in communities, especially in Indonesia.

Conclusion

HIV social stigma is multidimensional construct that covering three dimensions: ignorance, prejudice, and discrimination. The I-HSS scale and subscales demonstrated a valid and reliable measure for HIV social stigma in a community setting. Furthermore, a reliable measurement instrument can be developed to asses HIV social stigma in society adequately. The study has its own limitations. Our data were collected from a single province in Indonesia. Generalization of all over province in Indonesia still needs to be viewed with caution.

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Fatigue in Loading and Unloading Workers at the Port

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Abstract

The port has a fairly dense loading/unloading activity according to the total flow of goods it manages. In addition to high work activities, environment factors such as noise and work climate can also affect the occurrence of work fatigue. Therefore, this study aims to determine factors associated with work fatigue in loading/unloading workers at the port. This study uses cross sectional study design with simple random sampling. Data analysis used the Paired Sample T-Test and Chi-Square test. The results showed that there was a difference of fatigue before and after work and as many as 71.2% of workers experienced moderate fatigue. It is known that age (p-value = 0,000), breakfast habits (p-value = 0,000), and years of service (p-value = 0,000) have a significant correlation with work fatigue, while nutritional status (p-value = 0.203), workload (p-value = 0.140), hot work climate (p-value = 0.362), and noise (p-value = 0.880) have no correlation with work fatigue. It was concluded that age, breakfast habits and work duration were related to work fatigue in loading/unloading labor. Therefore, workers are advised to be used to have breakfast with the right menu and time and workers should wear hats while working to reduce sun exposure.

Introduction

According to research conducted by the National Safety Council, as many as 13% of work accidents are caused by work fatigue experienced by workers. 1 Still in this study, from 2,010 adults working in America, it was found that as many as 16% of workers had experienced work accidents at least once as a result of fatigue (National Safety Council, 2017). While the number of work accidents in Indonesia in 2018 reached 173,105 accidents, this case has increased where in the previous year there were reported as many as 123,041 cases of work accidents that occurred (Tri, 2019). The number of accidents that occur in the workplace, 60% are caused by work fatigue (Maurits, 2010).

The loading and unloading activity is one of the activities that can be found at the port. Loading and Unloading Workers (TKBM) are required to carry out their work in accordance with predetermined targets. Thus, in addition to strenuous physical activity, high workloads and supported by environmental factors such as noise and hot work climate, causing loading and unloading workers to experience work fatigue. The results of research by Saragih, et. al, it is known that loading and unloading activities, especially in the stevedoring section, have the highest risk of causing fatigue and work accidents at the port (Saragih, Mahyuni, & Lubis, 2015). The results of research by Kurniawan, et. al, it is known that work fatigue is one of the causes of work accidents (Kurniawan, Kurniawan, & Ekawati, 2018).

The results of research conducted at Pekanbaru Port show that fatigue due to heavy workloads affects minor work accidents that

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often occur, from crushed hands or toes to being injured by the goods they transport, but workers never report this to the foreman or the Manpower and Transmigration Office. Putri, 2018). Work fatigue is an effect of accumulated exposure to risk factors in the workplace, such as work environment, intensity and duration of physical work, as well as individual factors, both age or nutritional status (Tarwaka, HA, Bakri, & Sudiajeng, 2004).

Boom Baru Port is one of the ports in Palembang City, South Sumatra. This port has become one of the economic arteries for domestic and international trade in South Sumatra, especially Palembang City. Based on data from the International Port Corporation's Annual Report in 2015, Boom Baru Port is one of the ports that achieved the target in the total flow of visits for general goods and bulk goods managed by the port. Realization of container flow in 2015 was 135,156 TEUs and 123,367 boxes. So from these data, it can be concluded that the loading and unloading activities at the Boom Baru Port are quite high (International Port Corporation, 2015).

The Loading and Unloading Workers (TKBM) of Boom Baru Port work with a wholesale system where in this system workers are required to be able to complete their work quickly and efficiently so that they can achieve predetermined targets. This is directly proportional to the workload received by these workers. In addition, loading and unloading activities are carried out in an open location so that workers are exposed to direct sunlight. From the description of the problems above, it is necessary to analyze the factors related to work fatigue in loading and unloading workers at the Boom Baru Port, Palembang. This study aims to determine the factors associated with work fatigue in these workers.

Method

This type of research used in this research is a quantitative study with a Cross Sectional Study design. The population of this research is all loading and unloading workers at the Boom Baru Port, Palembang. From the sample calculation, the sample in this study was 66 workers. Sampling was carried out using simple random sampling technique with inclusion criteria, namely actively working for the last 1 week and working in the wrapped cargo stevedoring section and the exclusion criteria, namely workers in the wrapped cargo stevedoring section who do not carry out goods carrying activities.

The measurement of work fatigue was carried out before and after work using the Industrial Fatigue Research Committee (IFRC) questionnaire. Direct measurements were made to determine the hot working climate and noise intensity. The measurement of the hot working climate is carried out using a Heat Stress Monitor and noise measurements are carried out using a Sound Level Meter. Measurements were carried out 3 times at 8 points for 8 hours of work. For data analysis, the measurement of work fatigue was carried out using the Paired Sample T-Test and bivariate analysis using the Chi-Square test.

Result and Discussion

The Unloading Workers Cooperative (TKBM) in Palembang is a cooperative whose job is to manage welfare, supervise and regulate the loading and unloading workforce work schedule at the port which was formed since November 4, 1986 after the Yayasan Usaha Karya (YUKA) was dissolved. With a vision to be a cooperative provider of loading and unloading workers (TKBM) at ports that are professional, quality, effective, efficient and modern in serving and supporting loading and unloading activities and port progress.

Measurement of work fatigue in loading and unloading workers at the Boom Baru Port in Palembang is carried out before and after work. This aims to determine the differences in work fatigue of workers before and after work.

Table 1. Differences in the Level of Fatigue at Work Before and After Work

Work Fatigue	Mean	Correlation	**95% CI**	**Df**	**Sig**
Fatigue Before Fatigue After	-1,288	0,994	-1,592 - 0,984	65 (t_{table} = 1,997)	0,000

By using the Paired Sample T-Test, it is known that the average fatigue of work before work is 1,288 lower than that of after work. With 95% CI (-1.592 to 0.984) and tcount = 0.000 <t table = 1.997, it can be concluded that there is a difference between work fatigue before work and fatigue after work. Fatigue is a protective mechanism carried out by the body system so that the body is protected from further damage, resulting in recovery after resting (Tarwaka, HA, Bakri, & Sudiajeng, 2004). The results showed that there were differences in work fatigue before and after work. The results of this study are in line with Rochmah's research which states that there is a difference in the level of work fatigue before and after working with the average fatigue of work before work which is 2.317 lower than that after work (Rochmah, 2011).

The univariate results showed that workers who experienced moderate fatigue were more (42.4%) than workers who experienced low fatigue. There are (66.7%) workers with the old age category. The average age of workers in this study was 42 years, with the youngest being 27 years old and the oldest being 53 years old. The nutritional status of workers is dominated by normal nutritional status (75.8%), the majority of workers have a habit of having enough breakfast (66.7%). More workers are with long work period (63.6%) than workers with new work period. As many as (97.0%) workers have a heavy workload, there are (24.2%) workers exposed to a high work climate and as many (40.9%) workers are exposed to high noise.

From the bivariate analysis, it can be seen that there are 3 (three) variables related to work

Table 2. Frequency Distribution of Factors Associated with Work Fatigue

Variable	n=66	%
Work Fatigue		
Moderate	47	71.2%
Light	19	28.8%
Ages		
Old (>40 years old)	44	66.7%
Young (≤40 years old)	22	33.3%
Nutritional status		
Abnormal	16	24.2%
Normal	50	75.8%
Having Breakfast habits		
Enough	44	66.7%
Good	22	33.3%
Work Period		
Long (>10 years)	54	81.8%
New (≤10 years)	12	18.2%
Workload		
Very heavy	2	3.0%
Heavy	64	97.0%
Hot Working Climate		
High	16	24.2%
Low	50	75.8%
Noise		
High	27	40.9%
Low	39	59.1%

Source: Primary data, 2018

fatigue, including age with p-value = 0.000 (95% CI = 1,260-3,536), breakfast habits with p-value = 0,000 (95% CI = 1,938 -9,100), and years of service with p-value = 0,000 (95% CI = 1,560-66,979). In addition, there are 4 (four) variables that are not related to work fatigue, including nutritional status with p-value = 0.203, workload with p-value = 1,000, hot work climate with p-value = 0.362 and noise with p-value. = 0.880. The results showed that workers with old age had a 2,111 times greater risk of experiencing moderate work fatigue, workers with a fairly moderate risk of having breakfast habits were 4,200 times more likely to experience moderate work fatigue, and workers with long working tenure had a 10,222 times greater risk of experiencing moderate work fatigue.

The results of the measurement of work fatigue show that there are 42.4% more workers who experience moderate work fatigue than those who experience mild fatigue. Based on the Chi-Square test, it is known that there is a relationship between age and work fatigue. Older age was 2.111 times more likely to experience moderate work fatigue (95% CI = 1,260-3,536). According to Mulyadi & Nurwinda, a person's age has a relationship with physical capacity where when a person is 40 years old, physical strength will decrease by 20% and sensory-motor skills decrease by 60% (Mulyadi & P, 2018). In line with Amalia & Widajati's research, which states that there is a relationship between age and work fatigue with a p-value = 0.030 (Amalia & Widajati, 2019).

The increasing age of a person will result

Table 3. Factors Associated with Work Fatigue

Variable	Work Fatigue				P value	PR (95% CI)
	Moderate		Low			
	N	%	N	%		
Ages Old (>40 years old) Young (≤40 years old)	38 9	86.4 40.9	6 13	13.6 59.1	0,000	2,111 (1,260-3,536)
Nutritional status Abnormal Normal	9 38	56.2 76.0	7 12	43.8 24.0	0,203	0,740 (0,468-1,172)
Having Breakfast habits Enough Good	42 5	95.5 22.7	2 17	4.5 77.3	0,000	4,200 (1,938-9,100)
Work period long (>10 years old) new (≤10 years old)	46 1	85.2 8.3	8 11	14.8 91.7	0,000	10,222 (1,560-66,979)
Workload Very heavy Heavy	2 45	100 70.3	0 19	0 29.7	1,000	1,422 (1,213-1,668)
Hot Working Climate High Low	13 34	81.2 68.0	3 16	18.8 32.0	0,362	1,195 (0,883-1,617)
Noisy High Low	20 27	74.1 69.2	7 12	25.9 30.8	0,880	1,070 (0,788-1,453)

Source: Primary data, 2018

in gradual damage to the physiological and chyrcandian systems so that muscle strength decreases and results in the accumulation of lactic acid in the muscles. The accumulation of lactic acid can cause muscle pain and increase a person's heart rate (Budiman, Husaini, & Arifin, 2016). The existence of a relationship between age and work fatigue in loading and unloading workers at the Port of Boom Baru Palembang is influenced by the dominance of long working tenure among workers with old age. If an activity is carried out continuously or for years it can cause disturbances in the body. Physical stress at a certain time can result in decreased and reduced muscle performance which will eventually cause fatigue to occur more quickly (Prastuti & Martiana, 2016).

From the results of Fisher's Exact test, it is known that there is no relationship between nutritional status and work fatigue. This is in line with Putro & Hariyono's research, which states that there is no relationship between nutritional status and work fatigue with p-value = 0.813 (Putro & Hariyono, 2017). According to Gurusinga et.al., the absence of a relationship between nutritional status and work fatigue is influenced by the fulfillment of nutrients and calories in the worker's body every day, so that workers do not experience work fatigue (Gurusinga, Camelia, & Purba, 2015). If the body gets enough nutrients and is used efficiently, an optimal nutritional status will be achieved which allows physical growth, brain development, workability and general health at the highest possible level (Pranoto, Hardjanto, & Suwadji, 2014).

Nutritional status is related to the consumption of a worker, if the nutritional status of the worker is not normal, it will interfere with the worker's activities due to a decrease in work power and a slowdown in movement (Sari & Muniroh, 2017). The absence of a relationship between nutritional status and work fatigue in loading and unloading workers at Boom Baru Port, Palembang can be influenced by the dominance of workers with normal nutritional status. A person with good nutritional status will store more energy reserves and last relatively longer, therefore the higher the nutritional status of a person, the lower the level of fatigue that is felt (Anggraini, Purba, & Sitorus, 2013).

The results showed that there was a relationship between breakfast habits and work fatigue. Breakfast habits are quite at risk 4,200 times greater for experiencing moderate work fatigue. This result is in line with the research of Sartono, et. al which states that there is a relationship between having breakfast habits and work fatigue with p-value = 0.016 (Sartono, Martaferry, & Winaresmi, 2016). According to Deyulmar et. al. There is a relationship between having breakfast habits and work fatigue due to the fact that many workers rarely have breakfast, workers tend to eat only when the hunger arises, which is above 09.00 am. Meanwhile, workers who eat breakfast do it before 07.00, so that fatigue can be felt faster (Deyulmar, Suroto, & Wahyuni, 2018). As in the research of Yogisutanti et.al. which say that breakfast is an activity that is very important for initial energy when starting an activity, especially activities related to physical and psychological activities (Yogisutanti, Kusnanto, Setyawati, & Otsuka, 2013).

The lack of breakfast habits can cause workers to experience hypoglycemia or glucose levels below normal so that workers will quickly experience weakness and fatigue (Sartono, Martaferry, & Winaresmi, 2016). From observations, it is known that workers tend to consume coffee frequently in the morning, drinking coffee in the morning will cause drowsiness, this is because the caffeine content in coffee can increase the hormone cortisol in the body. The hormone cortisol can trigger excessive anxiety so that the body will feel tired quickly because a lot of energy is drained to overcome the anxiety (Akbar, Kalsum, & Mahyuni, 2015).

From the results of Fisher's Exact test, it is known that there is a relationship between tenure and work fatigue. Long working tenure 10,222 times greater risk of experiencing moderate work fatigue. In line with Paulina & Salbiah's research which states that there is a relationship between work period and work fatigue with p-value = 0.043, this is because the impact of work fatigue experienced by workers is accumulative, the longer the working period the higher a worker is at risk of experiencing fatigue (Paulina & Salbiah,

2016). Fatigue can arise because workers carry out their duties repeatedly every day, causing boredom and boredom in workers (Astuti, Ekawati, & Wahyuni, 2017). According to Prastuti & Martiana, if an activity is carried out continuously or for years it can cause disturbances in the body (Prastuti & Martiana, 2016).

Physical stress at a certain time can result in decreased and reduced muscle performance which in turn causes fatigue to occur more rapidly. The working period is an external part of the workload, in jobs with heavy or excessive workloads it will cause muscle contraction that exceeds the body's capacity so that this can accelerate the occurrence of work fatigue (Tarwaka, HA, Bakri, & Sudiajeng, 2004). The relationship between work period and work fatigue in the loading and unloading workers at the Boom Baru Port in Palembang can be caused by accumulated feelings of boredom for years experienced by workers. From the observations it is known that workers with a long working period are more than those with a new work period.

From the results of this study it is known that there is no relationship between workload and work fatigue. In line with Ningsih & Nilamsari's research, which states that there is no relationship between workload and fatigue with p-value = 0.901, this is because the weight and low workload of workers can be influenced by work environment factors (Ningsih & Nilamsari, 2018). A good work environment will create a sense of comfort for workers, so that the workload of workers can be slightly reduced by this psychological influence. Asriyani et. al. states that a worker has his own ability to adapt to the workload he has, some of which are more suitable for mental, physical and social workloads (Asriyani, Karimuna, & Jufri, 2017). The absence of a relationship between workload and work fatigue can be caused by workers having sufficient rest time after each loading and unloading activity.

Working with high environmental temperatures will cause sweating, if it occurs excessively it will cause the body to lack fluids which results in obstruction of glucose transportation in the body (Juliana, Camelia, & Rahmiwati, 2018). Based on the Fisher's Exact test, it is known that there is no relationship between hot work climate and work fatigue. In line with the research of Starizky et. al. which states that there is no relationship between hot work climate and work fatigue, this is because the worker's body has adapted to the environmental temperature, plus the type of clothing used is not the same so that the ability of the clothes to dissipate heat for each worker is different (Starizky, Ekawati, & Jayanti, 2016). According to Adi et. al., the human body has the ability to adapt well, one of which is adaptation to environmental temperatures (Adi, Suwondo, & Lestyanto, 2013). If a worker is accustomed to being exposed to high environmental temperatures, the slower the body responds to fatigue. The absence of a relationship between the hot working climate and work fatigue of the loading and unloading workers at the Boom Baru Port in Palembang can be caused by workers being accustomed to being exposed to these temperatures.

The results of the research that have been done show that there is no relationship between noise and work fatigue. In line with Andriani's research which states that there is no relationship between noise and work fatigue with p-value = 0.31, this is because the type of noise experienced by workers is the type of implant noise, which means that the noise is not constant and occurs in a short time (Andriani, 2016). Workers who are accustomed to working in noisy places will experience their body adjustments or adapt themselves to loud sounds so that the body will gradually get used to it and cause a decrease in the body's response to noise. There is no relationship between noise and work fatigue in this study because the noise in that place is still below the applicable threshold value. The absence of a relationship between noise and work fatigue in this study can be caused because the type of noise in the Boom Baru Port of Palembang is a type of impulse noise (not constant and occurs briefly) and the measurement results show that the noise level at Boom Baru Port Palembang is still at the safe level is below TLV 85 dBA.

Conclusion

The results showed that there was a difference between work fatigue before and after work with an average of 1,288 work

fatigue before working than after work fatigue. From the results of the bivariate analysis, it is known that there is a relationship between age (p-value = 0.000; PR = 2.11), breakfast habits (p-value = 0.000; PR = 4.20), and years of service (p-value = 0.000; PR = 10. , 22) with work fatigue on loading and unloading workers at the Boom Baru Port, Palembang. Based on the research results, it is better if PT. X as the port manager controls noise coming from cranes by performing routine maintenance on machines and providing or adding lubricants to moving machines to reduce noise due to friction. The Palembang TKBM Cooperative is recommended to be able to carry out health promotions regarding work nutrition, especially the importance of having breakfast before work. In addition to health promotion regarding work nutrition, it is also advisable to carry out health promotion regarding work fatigue, workers are advised to get used to having breakfast before work at 07.00-08.00 in the morning so that the energy reserves in the body can last a little longer. The breakfast menu that workers should consume is foods high in fiber, simple carbohydrates and low in fat with a carbohydrate composition of 60-68%, 12% protein, 20-25% fat, and 10-15% fiber. Workers should also be able to wear a hat that adequately covers the head area but does not obstruct the view while working to avoid direct sunlight.

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Intervention of Specific Nutrition and Sensitive Nutrition with Nutritional Status of Under Two-Year Infants in Family Planning Village as Efforts to Face the Demographic Bonus

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Abstract

KB Village, through the family development program for children under five years (ttoddler) participated involved interventions of sensitive nutrition and specific nutrition. The purpose of this study is to see the role of the KB village in preventing stunting in toddlers (children under five years) and to find the dominant factors that influence it. The research design is cross sectional with 85 samples of under two-year infants (baduta), the mothers, 5 of KB Villages in Palangka Raya and 2 of KB Villages in East Barito Regency (Bartim). The study is conducted from June to October 2018. Statistical analysis using chi square (α = 5%) with the results of the test ρ 0.02 <α 0.05 that there is a relationship of intervention programs of sensitive nutrition and specific nutrition with the nutritional status of children under five years (toddler). The dominant factor in the nutritional status of under two-year infants (baduta) is exclusive breastfeeding with a value of ρ 0.012 <0.05, RR = 6.702 (95% CI 1.518-29.579), mother's education ρ 0.001 <0.05, RR 5.281 (95% CI 1.970-14.158). There is a need for family development programs for children under five years and adolescence in implementing intervention programs of sensitive nutrition and specific nutrition, collaborating with the community, managing records and reporting based on success indicators, partnering with policy holders and community empowerment.

Introduction

Stunting is a problem because it is associated with an increased risk of illness, death, and brain development so that motor development is delayed. Chronic undernutrition stunting is caused by insufficient nutrition for a long time (Firadaus and Muafif, 2016); (Leung *et al.*, 2016). Risks caused by stunting are decreased academic achievement, increased risk of obesity, susceptibility to non-communicable diseases, and risk of degenerative diseases (Mustafa *et al.*, 2015). In the 9-24 month age group, followed by psychological development when they were 17 years old, it was found that adolescents who were stunted with growth had higher levels of anxiety, depressive symptoms, and had self-esteem (OA.Esimai; OE 2015). Children who are stunted before the age of 2 years have worse emotional and behavioral outcomes in late adolescence (Aridiyah, Rohmawati and Ririanty, 2015); (Leung *et al.*, 2016). Stunting is the cause of the poor quality of human resources which affects the development of the nation's potential National Team for the Acceleration of Poverty Reduction (TNP2K), 2018)

Based on basic health research data (riskesdas), the percentage of nutritional status of under two-year short infants (short and very short) in Indonesia in 2013 was 37.2%, so when

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compared to 2010 (35.6%) based on these data showed that there is no significant improvement (Health Research and Development Agency, 2013). Based on data from the Director General of Public Health of the Indonesian Ministry of Health, Directorate of Nutrition, Central Kalimantan, the percentage of stunting at the age of 0-59 months in 2016 was 34.1% and in 2017 was 39.0%. The data report from the Indonesian Ministry of Health, East Barito in 2016 is the district with the highest stunting rate at 0-59 months is 50% so that it is the only district in Central Kalimantan that is on the priority list for stunting intervention by the National Team for the Acceleration of Poverty Reduction (TNP2K) in 2018 (National Team for the Acceleration of Poverty Reduction 2017). The government's effort is to intervene in sensitive nutrition and specific nutrition for expectant mothers, pregnant women, infants and toddlers and breastfeeding mothers.

KB village according to the implementation of Law no. 52 of 2009 that the BKKBN does not only focus on population control but also the problem of family development (National Population and Family Planning Board, 2015). KB village is an excellent program in the Population, Family Planning and Development Program (KKBPK). KB village is expected to improve the quality of life of the community (Pratiwi, 2017). Through the KB village, there is synergy between the central and regional governments by empowering the community, especially prosperous families so that the incidence of stunting can be eliminated (Mardiyono, 2017); (National Population and Family Planning Board, 2017). Based on National Development Planning Board (Bappenas) calculations in 2010, the productive age is 66.5% and this will continue to increase to 68.1% in 2028 to 2031. In the face of the demographic bonus, stunting can hinder the development and growth of under two-year infants and will hinder their productivity in the future.

The projection of the population pyramid of Central Kalimantan province in 2030 - 2035 is that Central Kalimantan Province will have the largest population at the age of 20 to 49 years. In 2017, Bartim Regency was the most productive age. This means that under two-year infants who are now 2 years old, they will be 32 years old in 2030 and included in the productive age range during the demographic bonus period (National Planning Agency; Central Bureau of Statistics: United Nations Population, 2013). Bartim Regency in 2017 shows that the number of 0-4 years old is the highest, 11,476 people. If we project that in 2030, they will be of productive age at work. The handling of the quality of competitive human resources starts from normal nutritional status and one of which is through the KB village program. The establishment of KB villages in Central Kalimantan Province with 14 districts is still increasing its target. In 2016, the 14 KB villages were declared and 19 villages were formed so that the target achievement was 100% and in 2018 the target of 128 KB villages was announced.

Method

The research design used a cross sectional study which aims to see the relationship between interventions of sensitive nutrition and specific nutrition with the nutritional status (TB/U) of under two-year infants in KB villages in East Barito Regency and Palangka Raya City by using *the chi-square* statistical test. The population is mothers of under two-year infants (0-23 months) in the KB Village, Bartim Regency, 2 KB Villages (Juru Banu Village and Ketab Village). The total population is 85 under two-year infants and mothers /caregivers with research sites in Palangka Raya City, 5 KB villages (Tumbang Rungan, Marang, Bereng Bengkel, Tanjung Pinang, Petuk Katimbun Village). The sampling technique used total sampling which was registered in the Integrated Healthcare Center (Posyandu) register book. The number of samples was 23 under two-year infants and mothers in Bartim Regency, 62 under two-year infants and mothers in Palangka Raya City so that the total sample was 85. The instrument used a questionnaire, in the form of a sheet. The nutritional status of under two-year infants uses the WHO Anthro application. The independent variable is the intervention program of sensitive nutrition and specific nutrition. The dependent variable is the nutritional status of under two-year infants (TB / U). The moderator variable is the education of married-aged mothers, exclusive

breastfeeding for diarrhea prevention, TB measurement, participation in family planning, and nutritional counseling.

Result and Discussion

Characteristic of Respondents

There were 77.4% aged <20 years in Palangka Raya City and 95.7% in Bartim Regency. This means that when the respondent is still a child, the respondent is already responsible for taking care of the child. The causes of early marriage are economic factors, self-factors, educational factors, and parental factors (Mardiani, Ita., Purnomo, 2018). The existence of the KB village has a role in reducing the rate of early marriage among adolescents through the youth family development program. The age of marriage, adolescence, affects the mother's parenting style. (Khusna and Nuryanto, 2017). Improper parenting can affect the nutritional status of under two-year infants (Firadaus and Muafif, 2016) (Aisyah, Suyatno and Rahfiludin Zen M, 2019). KB village has a family development program for toddlers to overcome this. Through the formation of toddler families, mothers and families are taught to care for children properly, especially in paying attention to nutritional status in preventing stunting (Tentama *et al.*, 2018); (Wayan and Yasa, 2019).

Description of KB Village in Palangka Raya City and Bartim Regency

Data of the KB village program that is directly related to stunting prevention efforts, such as community development for under two-year infants families. This shows that there is no form of data documentation and reports. Preventive efforts and interventions for stunting have been running as usual through Integrated Healthcare Center (posyandu) activities. There are no new programs running after the KB village was inaugurated. Not all KB villages have family assistance with under two-year infants. Existing data are routine data from health services at the Integrated Healthcare Center (Posyandu), while for family development activities by Family Planning Counselor (PLKB), midwives, and cadres have not been documented in the form of a report. The objective of the KB village program is to empower the community in improving family welfare assisted by the PLKB, midwives, cadres, and government officials (Mardiyono, 2017). However, the government's commitment is still lacking in financial support related to the implementation of the KB village program, so the PLKB says that there are difficulties in program operations. The toddler family development program provides guidance in

Table 1. Characteristic of Respondents (Mothers and Under Two-Year Infants)

Characteristic of Respondents	Palangka Raya City		Bartim Regency	
	N	%	**n**	**%**
Gender of Under two-year infants				
Male	25	40.3	7	30.4
Female	37	59.7	16	69.6
Mother's education				
University	6	9.7	1	4.3
Primary School	3	4.8	3	13.0
Senior High School	47	75.8	14	60.9
Junior High School	6	9.7	5	21.7
Mother's job				
Honorary	1	1.6	0	0
House wife	51	8.3	21	91.3
Farmer	1	2.6	1	4.3
State worker	7	11.3	1	4.3
Private worker	1	1.6	0	0
Business	1	1.6	0	0
Age of married mother				
<20 years	48	77.4	22	95.7
≥20 tahun	14	22.6	1	4.3

Source: primary data, 2018

preventing stunting (National Population and Family Planning Board, 2015).

Interventions of Specific Nutrition in KB Village

Specific nutritional interventions are distinguished based on pregnancy, lactation period in 0-6 months and lactation period in 7-23 months.

Table 2. Specific Nutrition Intervention Activities

Specific Nutrition Intervention	Palangka Raya City		Bartim Regency	
	n	%	n	%
Immunization				
yes	62	100	23	100
no	0	0	0	0
Exclusive breastfeeding				
yes	48	77.4	17	73.9
no	14	22.6	6	26.1
Fortification of Iron in Food				
yes	2	3.2	0	0
no	60	98.8	23	100
Complete Immunization				
complete	46	74.2	16	69.6
not complete	16	25.8	7	30.4
Immunization history was recorded in KMS				
yes	48	77.4	17	73.9
no	14	22.6	6	26.1
Prevention of diarrhea				
yes	29	46.8	10	43.5
no	33	53.2	13	56.5
Regular Height Measurement				
yes				
no	49	79.0	23	100
	13	21.0	0	0
Nutrition Counseling by Health Officers				
yes				
no	4	6.5	1	4.3
	58	93.5	22	95.7
Ante Natal Care (ANC)				
yes	62	100	23	100
no	0	0	0	0
Providing Tablets for Supplements / Iron in Pregnant Women				
yes				
no	62	100	23	100
	0	0	0	0
Prevention of Malaria During Pregnancy				
yes	32	0	0	0
no	30	100	23	100
Mother's Difficulties for Exclusive Breastfeeding				
yes	13	21	5	21.7
no	49	79	18	78.3
Assistance in breastfeeding by health workers (7 to 23 months)				
yes	5	0	0	0
no	57	100	23	100
Provision of worm medicine (7 to 23 months)				
yes	21	66,1	0	0
no	41	33,9	23	100

Source: SPPS analysis from primary data, 2018

Exclusive breastfeeding, ANC, and measurements of TB/U which are carried out regularly at the posyandu, are to prevent stunting (Rahmadini, Sudiarti and Utari, 2013). The percentage of assistance in breastfeeding and food menu processing (MPASI) was not carried out 100% and nutritional counseling was still low (6.5%) in Palangka Raya City and (4.3%) in Bartim District. ASI and complementary food assistance is important to anticipate mothers who have difficulty in breastfeeding and food menu processing (MPASI) for under two-year infants. The role of posyandu and PLKB cadres is participating in this assistance and can be one of the activities in the family development program for under two-year infants. In addition, exclusive breastfeeding is also a 1,000 day life program (Khoeroh, Handayani and Indriyanti, 2017) in KKBPK. Breastfeeding as a natural contraceptive for mothers who provide exclusive breastfeeding has used family planning with the lactation amenorrhoea method and the return of menstruation in mothers who use the lactation amenorrhoea method for more than six months (Khusna and Nuryanto, 2017);(Andriani, Wismaningsih and Indrasari, 2015), the frequency of breastfeeding with the success of the MAL method increases knowledge about the frequency of breastfeeding with the success of the MAL method (Purwaningsih, Sumarmi and Saputra, 2015). Midwives and PLKB need to provide counseling for each mother to be able to exclusively breastfeed as an effort to prevent pregnancy during breastfeeding (Khusna and Nuryanto, 2017).

Intervention of Sensitive Nutrition in KB Village

This sensitive nutrition intervention variable was added by the researcher with the knowledge of the community in the family planning village and other activities related to stunting prevention.

Environmental sanitation poses a risk of infectious diseases such as diarrhea (Sholikah, Rustiana and Yuniastuti, 2017). Poor environmental sanitation causes infectious disease which is a factor in the occurrence of

Table 3. Activities of Nutrition Sensitive Interventions

Nutrition Sensitive Interventions	Palangka Raya City		Bartim Regency	
	N	%	n	%
Access to clean water				
yes	61	98.4	19	82.6
no	1	1.6	4	17.4
Household waste disposal				
yes	2	3.2	5	21.7
no	60	96.8	18	78.3
Temporary trash disposal				
yes				
no	62	100	17	73.9
	0	0	6	26.1
KB participation				
yes	51	82.3	20	87.0
no	11	17.7	3	13.0
Ownership of public health insurance (Jamkesmas)				
yes	57	91.9	19	82.6
no	5	8.1	4	17.4
Knowledge about KB village				
yes				
no	59	95.2	19	82.6
	3	4.8	4	17.4
Activities outside the Posyandu				
yes	9	14.5	5	21.7
no	53	85.5	18	78.3

Sources: SPSS analysis from primary data, 2018

stunting, plus unhealthy behavior due to low health knowledge (Kusumawati *et al.*, 2015).

The relationship between sensitive and specific nutrition interventions and nutritional status of under two-year infants in KB Village along with other variables

A sensitive nutrition and specific nutrition intervention program is achieved or not based on whether or not the sensitive nutrition and specific nutrition intervention activities are implemented.

In normal nutritional status, there were 28.6% of families (mothers) who had implemented interventions of sensitive nutrition and specific nutrition according to the questions, after eliminating other variables. This is smaller than the group that did not achieve the intervention activities of sensitive nutrition and specific nutrition, which was 71.4%. Palangka Raya City and Bartim Regency with normal nutritional status had the highest percentage. Under two-year infants with short nutritional status (9.7%) were in Palangka Raya City and (4.3%) in Bartim Regency. The highest percentage of married age is in Palangka Raya City. There is a tendency that the earlier the mother gets married, the higher the percentage of stunting and malnourished children (Khusna and Nuryanto, 2017).

The value of ρ (0.02) is in exact sig. (2-sided) <0.05, meaning that there is a relationship between the achievement of the Intervention Activities of Specific Nutrition & Specific Nutrition with the Nutritional Status of Under two-year infants in the KB Village in Palangka Raya City and Bartim Regency. The correlation value (r) is 0.239, meaning that the correlation is still weak but the correlation value is positive. Therefore, the more sensitive nutrition intervention activities and specific nutrition interventions reach the target, the more normal nutritional status of under two-

Table 4. Intervention Program of Sensitive Nutrition / Specific Nutrition and Nutritional Status of Under Two-Year Infants in KB Villages, Palangka Raya City and Bartim Regency

Variable	Palangka Raya City		Bartim Regency	
	N	%	n	%
Intervention Programs of Sensitive and Specific Nutrition				
achieved	18	29.1	2	8.7
not achieved	44	70.9	21	91.3
Nutritional Status for under two-year infants (TB/U)				
Normal	52	83.9	19	82.6
Short	6	9.7	1	4.3
Very short	4	6.5	3	13.0

Sources: SPSS analysis from primary data, 2018

Table 5. The Relationship between the Intervention Programs of Nutrition Sensitive & Specific Nutrition and the Nutritional Status of Under two-year infants in the KB Village, Palangka Raya City and Bartim Regency.

Nutritional status of Under two-year infants	Achievement of Sensitive & Specific Nutrition Programs		Total	X^2	R
	Achieved	Not achieved			
Normal	20 (28.6 %)	51 (71.4 %)	71 (83.5%)	0.02	0.239
Stunting	0	14 (100 %)	14 (16,5%)		
Total	20	65	85		

Source: SPSS analysis from primary data, 2018

year infants will be. National Movement for the Acceleration of Nutrition Improvement in the framework of the First Thousand Days of Life (1000 HPK) to prevent stunting (Khoeroh, Handayani and Indriyanti, 2017) contained in specific and sensitive nutrition interventions (Rosha *et al.*, 2016). There is a significant relationship that the intervention activities of specific and sensitive nutrition can reduce the incidence of stunting in toddler (Khusna and Nuryanto, 2017). Educational variables are mother, age of marriage, exclusive breastfeeding, prevention of diarrhea, regular height measurement, participation in family planning and nutritional counseling. To find out the most dominant variable influencing, a simple logistic regression test was performed to determine the p value as the basis for the variable to be included in the multiple logistic regression test. The variables of maternal education and exclusive breastfeeding have P <0.05, meaning that they can enter into multivariate modeling II.

The thing that affects the nutritional status of under two-year infants is exclusive breastfeeding with p value of 0.012 <0.05 and RR value (6,702), meaning that if they are not given exclusive breastfeeding for 7 times, there is a risk of stunting in under two-year infants. Mother's education with 0.001 <0.05 (RR 5.281), meaning that the lower the mother's education is 5 times, the risk of stunting in under two-year infants. In line with Khusna & Nuryanto's research, 2017, there is a relationship between exclusive breastfeeding and the nutritional status of toddlers (1-5 years). Mothers who do not provide exclusive breastfeeding and children under five who are malnourished are 2-3 years old (Giri, Muliawarta and Wahyuni, 2013). Mothers who do not provide exclusive breastfeeding have toddlers with nutritional status above the red line while mothers who give exclusive breastfeeding have children with nutritional status below the red line (Demirchyan *et al.*, 2016); (Putu, Sugiani and Suarni, 2018). The result of the correlation test of significance value is p = 0.000 (p <0.05), which means that there is a relationship between exclusive breastfeeding and the nutritional status of children in 6-24 months (Andriani, Wismaningsih and Indrasari, 2015). Mother's education affects parenting and child development (Muniroh and Ni'mah, 2015); (Waqidil and Adini, 2016). Community empowerment in the form of counseling or assistance to mothers when giving exclusive breastfeeding in the family development program for under two-year

Table 6. Relationship between Mother's Education, Exclusive Breastfeeding, Regular Height Measurement, Nutrition Counseling, and Nutritional Status of Under Two-Year Infants

	Nutritional Status of Under Two-Year Infants		N	P-value	RR
	Normal	Stunting			
Mother's Education					
University	6 (7.1%)	0	6 (7.1%)	0.001	5.281
Senior high school	56 (65.9%)	6 (7.1%)	62 (72.9%)		
Junior high school	7 (8.2%)	4 (4.7%)	11 (12.9%)		
Primary school	2 (2.4%)	4 (4.7%)	6 (7.1%)		
Exclusive breastfeeding					
yes	59 (69.4%)	7(8.2%%)	66 (77.6%)	0.012	6.702
no	12 (14.1%)	7 (8.2%)	19 (22.4%)		
Regular Height Measurement					
yes	58 (68.2%)	14 (16.5%)	72 (84.7%)	0.998	0.000
no	13 (15.3%)	0	13 (15.3%)		
Nutrition Counseling					150311599.488
yes	7 (8.2%)	0 (0%)	7 (8.2%)	0.999	
no	64 (75.3%)	17 (16.5%)	78 (91.8%)		

Source: SPSS analysis from primary data, 2018

infants, which is one of the family planning programs as a prevention effort (Meutia and Yulianti, 2019). Breast milk is the raw material and source of energy in the body's metabolism. The quality and quantity of food affects growth and development in children (Woldehanna, Behrman and Araya, 2017), so that during the growth period there should be enough food with balanced nutrition (National Population and Family Planning Board, 2017) (Prado *et al.*, 2016).

Conclusion

There is a relationship between the achievement of intervention activities of sensitive nutrition & specific nutrition with the nutritional status of under two-year infants in Family Planning (KB) Village in Palangka Raya City and Bartim Regency, where the value of ρ (0.02) is in exact sig. (2-sided) <0.05, the correlation value (r) is 0.239 positive. This means that the more intervention programs of sensitive nutrition and specific nutrition reach the target, the more normal the nutritional status of under two-year infants. The dominant variable affecting nutritional status is exclusive breastfeeding with a p value of 0.012 <0.05, RR value (6,702), meaning that when exclusive breastfeeding is not given 7 times, there is a risk of stunting in under two-year infants. Mother's education with 0.001 <0.05 also has 5 times of stunting risk. The village that was chosen as the KB village took part in implementing a intervention program of sensitive nutrition and specific nutrition. According to the objectives of the Population, Family Planning and Development Program (KKBPK), especially in the context of preventing stunting. A partnership with related parties and a joint commitment to run the KB village program is needed in accordance with the technical guidelines made by the National Population and Family Planning Board (BKKBN). The BKKBN in the Province collaborates with the Population Control Office at the city or district level, optimizing the role of Family Planning Conselor (PLKB) and cadres to activate the toddler family development program, increase counseling and counseling in under two-year infant families regarding stunting prevention interventions.

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Care Support Education: Optimization Model of Communication Change Behavior in Female Sex Workers

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Abstract

Female Sex Workers (FSW) are a group of populations at high risk of transmitting HIV/AIDS. In Indonesia, it is predicted that more than 50% of FSW suffer from sexually transmitted diseases (STDs), as well as in the district of Batang, Central Java, the most cases of HIV/AIDS in FSW. The main causes are weak sexual negotiation skills and economic reasons. The model of behavior change is the main key in decreasing cases of HIV/AIDS transmission. The Care Support Education (CSE) model is an innovative community-based behavior change communication. This research is pre experimental research with one group pretest posttest design. The population is FSW in Batang district localization totaling 123 people. Samples were taken by purposive sampling of 57 people. Test the effect of applying the CSE model on behavior change was analyzed using the Mc Nemar test. Condom use in risky sexual behavior among FSWs was still low (15.8%). Factors that influence it are knowledge, attitudes, perceptions of vulnerability, seriousness, benefits, negotiation capabilities and customer support. The application of the CSE model can significantly increase knowledge (p value 0.00006), attitude (0.0001), condom negotiation skills (0.000001) and practise of using condoms (0.000005).

Introduction

Cases of HIV / AIDS in Indonesia is increasing year after year. The trend of new cases in the last three years has a significant increase. New cases of HIV in 2015 were 30,935 cases. This case increased in 2016 to 41,250, and in 2017 it reached 48,300 cases. Likewise the new AIDS case, in the last three years in general has also increased. In 2015 AIDS cases numbered 9,215 cases, in 2016 it increased to 10,146, and in 2017 it dropped to 9,280 cases (Dirjen P2P, Kemenkes, 2018).

While in Central Java, HIV/AIDS cases in the last three years also experienced a significant increase. Cumulatively from 1993 to June 2018 in Central Java there have been 23,603 cases, 1,672 of whom died from this disease. This fact has made Central Java province ranked fifth in the highest number of HIV / AIDS cases nationally (Dirjen P2P, Kemenkes, 2018).

Batang Regency is one of the regions that has a large risk factor for HIV / AIDS transmission because it has the most localization sites in Central Java, which is 12 prostitution localizations spread along the northern coast of Java. Batang District AIDS Commission, said the cases in Batang continue to increase. Since 2007 to June 2018 there had been 1,039 cases of HIV / AIDS, 165 of them had died (Komisi Penanggulangan AIDS, 2018).

In the past year, 75 new cases of HIV / AIDS had occurred in the Batang district and 10 people had died. HIV / AIDS cases are dominated by women (63%) and occur mostly

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in female sex workers (FSW). FSW considered as the group having the biggest risk factors for contracting and transmitting sexually transmitted diseases (STDs) including HIV / AIDS due to risky sexual behavior namely changes partners and does not use condom (Komisi Penanggulangan AIDS, 2018). This fact shows that HIV / AIDS is apprehensively increasing both in quantitative and qualitative terms especially at risk populations (FSW, customers and other risk communities in localization).

In Indonesia, it is predicted that more than 50% of FSW suffer STDs. This is exacerbated by the behavior of female sex workers who do not pay attention to their own health. Most FSW do not conduct health checks and seek information related to their health status due to economic reasons and their negative stigma. They prefer to buy their own medicines, including using antibiotics without medical consulting (Baral, 2012). The government and non-governmental organizations have made various efforts to reduce and prevent cases of HIV / AIDS transmission in high-risk populations, but these efforts have not been effective.

Poor knowledge of FSW related to HIV / AIDS, weak negotiation skills and reasons for earning more income are the main causes of the weak efforts to prevent HIV/AIDS transmission in localization (Exavery et al, 2012). FSW has borne a high burden of HIV infection in and throughout the HIV epidemic. Comprehensive community empowerment based HIV prevention interventions that emphasize sex worker organizations and mobilization to address HIV risk are essential (Wirtz et al, 2014).

Identification of risk factors for HIV / AIDS transmission among FSWs as high-risk populations is very important in order to be able to conduct behavioral change interventions through the development of effective and innovative models of education and health promotion in the prevention of HIV / AIDS transmission, especially in high-risk populations that are localized (Glanz et al, 2008). This study will analyze the application of the Care Support Education (CSE) model as a communication model and its effect on changes in FSW behavior in Batang District.

Method

This is a pre experimental research with one group pretest posttest design using a quantitative approach. The population is FSW in the Penundan location in Batang, which is 123 people. Samples were taken by purposive sampling, which has been residing in the localization for at least 2 months, is willing to attend the CSE program for 3 months and can read and write. Based on these requirements a sample of 57 people was obtained. This research protocol was reviewed and approved by the Health Research Ethics Commission (komisi etik penelitian kesehatan/KEPK), Semarang State University with Ethical Clearance number: 137 / KEPK / EC / 2019.

An overview of the CSE model implemented in this study: 1) CSE is an educational model developed based on the community (involving community members both as participants and as trained peer-support); 2) CSE aims to provide positive information and support to at-risk populations to implement HIV / AIDS transmission prevention behaviors; 3) CSE education model is 3F (focus, friendly, and fun), i.e. Focus is divided into small groups of up to 10 participants with a peer-support. Friendly, namely the trust between peer-support and participants. Fun means that CSE is not formal education, but prioritizes openness, cheerfulness, comfort, relax, interspersed with motivational games and a more flexible atmosphere of the place; 4) CSE is held every 2 weeks for 3 months; 5) The focus of CSE targets includes: the facts of STDs and HIV/AIDS and their prevention and control in high-risk populations, awareness and motivation of the importance of using condom in risky sexual behavior, and training of alternative skills.

Application of Care Support Education (CSE) model as a communication model for changing behavior in the prevention of HIV / AIDS transmission among FSWs in limited groups, with the following description and intervention procedures: 1) establishing FSWs in small groups, 2) choosing FSW to be Peer-Supports, 3) Peer-Support training, and 4) application of CSE models to FSW small groups that have been formed. Data analysis

was performed with the Chi Square test to determine the determinants of HIV / AIDS transmission prevention behavior in FSW and Mc Nemar test to analyze the effect of the application of the CSE model on changes in FSW behavior.

Result and Discussion

Based on the results of the study, of the 57 FSWs participating in the Care Support Education (CSE) program, it was found that their average age was 29 years, the youngest FSW was 20 years old and the oldest was 47 years. The following data illustrates marital status, education level, length of service as sex workers, the practice of using condom in risky sexual activities among them.

At the beginning of this study, it was found that the use of condom in sexual behavior among FSWs was still very low (15.8%). This means that there are still many sexual activities carried out by female sex workers and their customers without consistent condom usage. This has the potential to transmit sexually transmitted diseases (STDs), including AIDS.

The low use of condom in sexual behavior among FSWs is due to the lack of condom negotiation skills carried out to its customers. Economic reasons are also a factor contributes to the low use of condom in FSW (Baral, 2012). The following are determinants or factors that influence condom use behavior in sexual behavior among FSWs in localization.

Table 2 shows that 29 FSWs (50.9%) had lacked knowledge about STIs and HIV/AIDS, 26 FSW (45.6%) had a less supportive attitude towards preventing transmission of HIV/AIDS, 44 FSW (77.2%) were less aware that they are a vulnerable group (high risk) that is infected and transmits HIV/AIDS, 43 FSW (75.4%) were less aware that AIDS is a serious and deadly disease and 39 FSW (68.4%) were also less aware of the benefits of preventing HIV transmission / AIDS in risk groups like them. Whereas judging from the ability to negotiate condom usage with their customers, 44 FSW (77.2%) are less skilled in conducting condom negotiations.

Meanwhile, from the support given by its customers it is also still low. This is indicated by 38 FSW (66.7%) stating that they had lack of support from their customers or it means that the customer does not want to use condom when engaging in sexual activity with FSW.

The results of correlation analysis with the chi square test showed that the factors

Table 1. Characteristic and behavior of FSW in localization in HIV/AIDS infection prevention

Variable	Frequence	%
Marital Status		
Single	4	7,0
Married	11	19,3
Widow/Divorced	42	73,7
Education Level		
Not graduate from Elementary	2	3,5
Elementary graduate	35	61,4
Junior High graduate	18	31,6
Senior High Graduate	2	3,5
Work period as FSW		
<1 year	13	22,8
1-5 years	38	66,7
years	4	7,0
>10 years	2	3,5
Using condom in risky sexual activity		
Not always	48	84,2
Always	9	15,8

Source: Primary Data, 2019

Table 2. Relation between knowledge, attitude, susceptibility perception, seriousness perception, benefit perception, negotiation skill and customer support with condom usage practice on FSW sexual behavior

Variable	CondomUsage		*P Value*
	Not Always	Always	
Knowledge			
Poor	28 (96,6%)	1 (3,4%)	0,012
Good	20 (71,4%)	8 (28,6%)	
Attitude			
Less supportive	25 (96,2%)	1 (3,8%)	0,031
Supportive	23 (74,2%)	8 (25,8%)	
Susceptibility Perception			
Poor	41 (93,2%)	3 (6,8%)	0,003
Good	7 (53,8	6 (46,2%)	
Seriousness Perception			
Poor	39 (90,7%)	4 (9,3%)	0,032
Good	9 (64,3%)	5 (35,7%)	
Benefit Perception			
Poor	36 (92,3%)	3 (7,7%)	0,022
Good	12 (66,7%)	6 (33,3%)	
Negotiation Skill			
Less skilled	41 (93,2%)	3 (6,8%)	0,003
Skilled	7 (53,8%)	6 (46,2%)	
Customer Support			
Poor	36 (94,7%)	2 (5,3%)	0,004
Good	12 (63,2%)	7 (36,8%)	

Source: Primary Data, 2019

that influenced the practice of condom usage in FSW sexual behavior were knowledge (0.012), attitude (0.031), susceptility perception (0.003), seriousness perception (0.032), benefit perception (0.022), FSW negotiation skills (0.003) and customer support (0.004).

The results are in accordance with Liying Zhang et al (2015), which states that self-efficacy, and perceptions of obstacles become predictions of the intention and behavior of condom usage consistency at FSW. Other research states that FSW is a high-risk population that is infected and transmits HIV/AIDS due to unsafe sexual behavior. Prevention of transmission is very important to be done by FSW, one of which is by adhering to the use of condom in risky sexual behavior. Non-compliance to condom usage is caused by FSWs not daring to refuse unprotected sexual relations (Kate et al. 2010). Consistent usage of condom is an effective strategy in the prevention of sexually transmitted infections and transmission of HIV/AIDS (Rotrease, 2013). Condom today are still a versatile prevention technology that can prevent unwanted pregnancy and sexually transmitted infections including HIV. If used correctly and consistently, condom can provide an optimal level of protection (Beksinska et al, 2019).

This is also consistent with the Health Belief Model theory that perceived susceptibility is a person's subjective perception of the risk of certain diseases. Someone will act to treat or prevent disease, if they feel vulnerable to the attack of the disease (Sarwono, 2007). This is one of the strong perceptions to encourage individuals to behave healthily. The greater the risk perception, the greater the likelihood of interest in healthy habits to reduce the risk that will occur. Perception of susceptible make someone feels confidence/believe in the possibility of sickness occured in him self.

Table 3. The improvement of knowledge, attitude, negotiation skill, and condom usage practice before and after the implementation of *Care Support Education (CSE)* to FSW

Variable	Knowledge (Post-test)		P Value
	Poor	Good	
Knowledge (Pre-test)			
Poor	14 (24,6%)	15 (26,3%)	0,00006
Good	0 (0,0%)	28 (49,1%)	
	Attitude (Post-test)		
	Less Supportive	Supportive	
Attitude (Pre-test)			
Less Supportive	12 (21,1%)	14 (24,6%)	0,0001
Supportive	0 (0,0%)	31 (54,4%)	
	Negotiation Skill (Post-test)		
	Less Skilled	Skilled	
Negotiation Skill (Pre-test)			
Less Skilled	19 (33,3%)	25 (43,9%)	0,000001
Skilled	0 (0,0%)	13 (22,8%)	
	Condom Usage Practise (Post-test)		
	Poor	Good	
Condom Usage Practise (Pre-test)			
Not always	17 (29,8%)	31 (54,4%)	0,000005
Always	0 (0,0%)	9 (15,8%)	

Source: Primary Data, 2019

A person's actions to seek treatment or prevention are also encouraged because of the threat or seriousness of the disease. In addition, the perception of the benefits or benefits of acting will also affect an individual's belief in healthy behavior. Likewise, perceived obstacles can become obstacles in carrying out the recommended behavior (Sarwono, 2007). This perception refers to an individual's evaluation of barriers to behavior or healthy habits. Perceived Barriers are a significant factor in changing habits. When people or the community believe that new healthy habits or behaviors are more beneficial than old habits in reducing risk, new healthy habits / behaviors will be used.

Research by Greig, et al (2003), stated that women's negotiation and economic independence are the most powerful factors affecting their behavior in HIV / AIDS prevention, especially in the use of condom. This fact is consistent with the study of Lianne, et al (2012), which stated that internal factors, physical environment, economy, policy and social factors, are significantly related to HIV / AIDS prevention efforts through condom negotiations by FSW. The helplessness of sex workers is an obstacle to negotiating safe sex practices (Kate, et al, 2010). Another study by Exvery, et al (2012), which stated that the belief in negotiating the use of condom is a significant predictor in the practice of condom use.

In general, the results of the study have confirmed the Health Belief Model (HBM) theory. In the HBM concept it is stated that health behavior is determined by personal beliefs or perceptions about the disease and strategies available to reduce the occurrence of the disease (Glanz, et al, 2008)

The result of Care Support Education (CSE) model application shows that after attending the CSE program for 3 months, the results obtained was there is a significant increase in knowledge. FSW who before joining the CSE program had less knowledge, after participating in the CSE program, had knowledge improvement up to 43 people (75.4%). According to the Mc Nemar test showed a p value of 0.00006 (<0.05), this shows a significant increase in the knowledge of FSW, before and after the FSW joined the CSE

program. The following table shows differences in knowledge, attitudes, negotiation skills and practice of using condom.

Likewise, with the FSW attitude. After participating in the Care Support Education (CSE) program, FSW whose attitudes began to change realized (supporting) the importance of preventing HIV/AIDS transmission increased to 45 people (79.0%) from before there was a CSE program of only 31 (54.4 %) with p value 0,0001. Negotiation skills have also improved. The number of FSWs who were already skilled in negotiations before participating in the Care Support Education (CSE) program was 13 (22.8%) increasing to 38 (66.7%) after intensively participated in the CSE program.

The usage of condom among FSW has also increased. Before joining the Care Support Education (CSE) program, it was 9 persons (15.8%), this number increased to 40 FSWs (70.2%). The same thing with adherence to screening for STIs once a month also increased. Before participating in the CSE program, only 16 FSW (28.1%) stated that they routinely attend IMS screening every month, after CSE program the number increased to 29 (50.9%). The participation rates in VCT have also increased. FSW which stated that they routinely conducted VCT every 3 months were 15 FSW (26.4%) increasing to 26 FSW (45.7%).

Care Support Education (CSE) developed in this research is a communication model for changing behavior in the prevention of HIV/AIDS transmission in FSWs according to the problem and support for policies and rules that apply to localization. Through a behavioral change communication approach that is carried out in FSW peers in localization, this CSE model has been able to increase knowledge among groups, provide awareness and motivation on the importance of using condom in risky sexual behavior, as well as routine health checks, including STI screening and VCT. The results of this research are in line with Dewi (2008), which stated that health education provided to the Commercial Sex Workers (CSWs) community has an effect on the knowledge increase and attitudes of CSWs. Another study by Purnomo (2013), stated health education affects the increasing knowledge and attitudes in controlling HIV/AIDS.

The existence of mutual support or mutual giving to realize the importance of efforts to prevent transmission of HIV/AIDS among fellow FSWs has influenced the better awareness in preventing HIV/AIDS transmission by increasing condom usage, participation in STI screening and VCT. The results of this research are in accordance with Bateganya et al (2015) which stated group support can improve the perception of the benefits of prevention and the impact of ongoing HIV transmission. Peer-based prevention and treatment significantly reduce the incidence of HIV among young FSWs in Burkina Faso, through reducing risk behavior (Traore et al, 2015). These results are also consistent with the results of Purnomo's research (2013), which stated there is an influence of health education on increasing attitudes and awareness in controlling HIV/AIDS.

The Care Support Education (CSE) can also improve FSW skill in condom negotiations through training and simulation of persuasion communication to its customers. They need to be empowered to not only refuse unprotected sex, but also to be able to motivate clients to use condom. Condom intervention and promotion must also be able to overcome the factors that affect the ability of FSW to negotiate condom usage (Bharat, et al, 2013).

The reason customers and FSWs are not willing to use condom is the lack of information about the importance of it as a prevention of transmission of sexually transmitted diseases including HIV/AIDS, the usage of condom is felt disturbing, uncomfortable, and can reduce pleasure.

The results are in line with Budiono's research (2012), which stated that factors proven to be related to condom usage practices are FSW knowledge about STIs and HIV/AIDS, FSW attitudes towards condom use, and access to information about STIs and HIV/AIDS. This result is also in line with Azam, et al (2014), the Community Educator integration model and the reward-punishment system, can improve the practice of condom usage among female sex workers (FSW).

Conclusion

The use of condom in sexual behavior among FSWs is still low (15.8%), not all localized

FSWs always attend IMS screening every month (71.9%), and there are still many who do not always do VCT every three months (73,3%). Factors that affect the practice of condom age in FSW sexual behavior are knowledge, attitudes, perceptions of susceptibility, perceptions of seriousness, perceptions of benefits, negotiation skill of FSW and customer support. Factors that affect compliance in conducting STI screening every month are knowledge, attitudes, perceptions of susceptibility, perceptions of seriousness, perceptions of benefits, and pimps' support. While the factors that affect compliance with conducting VCT every three months are knowledge, attitudes, perceptions of susceptibility, perceptions of seriousness, perceptions of benefits, and pimps' support.

The application of the Care Support Education (CSE) model has been able to improve knowledge, attitudes, condom negotiation skills, condom usage practise, FSW participation in STI screening, and FSW participation in VCT.

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Care Support Education: Optimization Model of Communication Change Behavior in Female Sex Workers

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At the beginning of this study, it was found that the use of condom in sexual behavior among FSWs was still very low (15.8%). This means that there are still many sexual activities carried out by female sex workers and their customers without consistent condom usage. This has the potential to transmit sexually transmitted diseases (STDs), including AIDS.

The low use of condom in sexual behavior among FSWs is due to the lack of condom negotiation skills carried out to its customers. Economic reasons are also a factor contributes to the low use of condom in FSW (Baral, 2012). The following are determinants or factors that influence condom use behavior in sexual behavior among FSWs in localization.

Table 2 shows that 29 FSWs (50.9%) had lacked knowledge about STIs and HIV/AIDS, 26 FSW (45.6%) had a less supportive attitude towards preventing transmission of HIV/AIDS, 44 FSW (77.2%) were less aware that they are a vulnerable group (high risk) that is infected and transmits HIV/AIDS, 43 FSW (75.4%) were less aware that AIDS is a serious and deadly disease and 39 FSW (68.4%) were also less aware of the benefits of preventing HIV transmission / AIDS in risk groups like them. Whereas judging from the ability to negotiate condom usage with their customers, 44 FSW (77.2%) are less skilled in conducting condom negotiations.

Meanwhile, from the support given by its customers it is also still low. This is indicated by 38 FSW (66.7%) stating that they had lack of support from their customers or it means that the customer does not want to use condom when engaging in sexual activity with FSW.

The results of correlation analysis with the chi square test showed that the factors

Table 1. Characteristic and behavior of FSW in localization in HIV/AIDS infection prevention

Variable	Frequence	%
Marital Status		
Single	4	7,0
Married	11	19,3
Widow/Divorced	42	73,7
Education Level		
Not graduate from Elementary	2	3,5
Elementary graduate	35	61,4
Junior High graduate	18	31,6
Senior High Graduate	2	3,5
Work period as FSW		
<1 year	13	22,8
1-5 years	38	66,7
years	4	7,0
>10 years	2	3,5
Using condom in risky sexual activity		
Not always	48	84,2
Always	9	15,8

Source: Primary Data, 2019

Table 2. Relation between knowledge, attitude, susceptibility perception, seriousness perception, benefit perception, negotiation skill and customer support with condom usage practice on FSW sexual behavior

Variable	CondomUsage		*P Value*
	Not Always	Always	
Knowledge			
Poor	28 (96,6%)	1 (3,4%)	0,012
Good	20 (71,4%)	8 (28,6%)	
Attitude			
Less supportive	25 (96,2%)	1 (3,8%)	0,031
Supportive	23 (74,2%)	8 (25,8%)	
Susceptibility Perception			
Poor	41 (93,2%)	3 (6,8%)	0,003
Good	7 (53,8	6 (46,2%)	
Seriousness Perception			
Poor	39 (90,7%)	4 (9,3%)	0,032
Good	9 (64,3%)	5 (35,7%)	
Benefit Perception			
Poor	36 (92,3%)	3 (7,7%)	0,022
Good	12 (66,7%)	6 (33,3%)	
Negotiation Skill			
Less skilled	41 (93,2%)	3 (6,8%)	0,003
Skilled	7 (53,8%)	6 (46,2%)	
Customer Support			
Poor	36 (94,7%)	2 (5,3%)	0,004
Good	12 (63,2%)	7 (36,8%)	

Source: Primary Data, 2019

that influenced the practice of condom usage in FSW sexual behavior were knowledge (0.012), attitude (0.031), susceptility perception (0.003), seriousness perception (0.032), benefit perception (0.022), FSW negotiation skills (0.003) and customer support (0.004).

The results are in accordance with Liying Zhang et al (2015), which states that self-efficacy, and perceptions of obstacles become predictions of the intention and behavior of condom usage consistency at FSW. Other research states that FSW is a high-risk population that is infected and transmits HIV/AIDS due to unsafe sexual behavior. Prevention of transmission is very important to be done by FSW, one of which is by adhering to the use of condom in risky sexual behavior. Non-compliance to condom usage is caused by FSWs not daring to refuse unprotected sexual relations (Kate et al. 2010). Consistent usage of condom is an effective strategy in the prevention of sexually transmitted infections and transmission of HIV/AIDS (Rotrease, 2013). Condom today are still a versatile prevention technology that can prevent unwanted pregnancy and sexually transmitted infections including HIV. If used correctly and consistently, condom can provide an optimal level of protection (Beksinska et al, 2019).

This is also consistent with the Health Belief Model theory that perceived susceptibility is a person's subjective perception of the risk of certain diseases. Someone will act to treat or prevent disease, if they feel vulnerable to the attack of the disease (Sarwono, 2007). This is one of the strong perceptions to encourage individuals to behave healthily. The greater the risk perception, the greater the likelihood of interest in healthy habits to reduce the risk that will occur. Perception of susceptible make someone feels confidence/believe in the possibility of sickness occured in him self.

Table 3. The improvement of knowledge, attitude, negotiation skill, and condom usage practice before and after the implementation of *Care Support Education (CSE)* to FSW

Variable	Knowledge (Post-test)		P Value
	Poor	Good	
Knowledge (Pre-test)			
Poor	14 (24,6%)	15 (26,3%)	0,00006
Good	0 (0,0%)	28 (49,1%)	
	Attitude (Post-test)		
	Less Supportive	Supportive	
Attitude (Pre-test)			
Less Supportive	12 (21,1%)	14 (24,6%)	0,0001
Supportive	0 (0,0%)	31 (54,4%)	
	Negotiation Skill (Post-test)		
	Less Skilled	Skilled	
Negotiation Skill (Pre-test)			
Less Skilled	19 (33,3%)	25 (43,9%)	0,000001
Skilled	0 (0,0%)	13 (22,8%)	
	Condom Usage Practise (Post-test)		
	Poor	Good	
Condom Usage Practise (Pre-test)			
Not always	17 (29,8%)	31 (54,4%)	0,000005
Always	0 (0,0%)	9 (15,8%)	

Source: Primary Data, 2019

A person's actions to seek treatment or prevention are also encouraged because of the threat or seriousness of the disease. In addition, the perception of the benefits or benefits of acting will also affect an individual's belief in healthy behavior. Likewise, perceived obstacles can become obstacles in carrying out the recommended behavior (Sarwono, 2007). This perception refers to an individual's evaluation of barriers to behavior or healthy habits. Perceived Barriers are a significant factor in changing habits. When people or the community believe that new healthy habits or behaviors are more beneficial than old habits in reducing risk, new healthy habits / behaviors will be used.

Research by Greig, et al (2003), stated that women's negotiation and economic independence are the most powerful factors affecting their behavior in HIV / AIDS prevention, especially in the use of condom. This fact is consistent with the study of Lianne, et al (2012), which stated that internal factors, physical environment, economy, policy and social factors, are significantly related to HIV / AIDS prevention efforts through condom negotiations by FSW. The helplessness of sex workers is an obstacle to negotiating safe sex practices (Kate, et al, 2010). Another study by Exvery, et al (2012), which stated that the belief in negotiating the use of condom is a significant predictor in the practice of condom use.

In general, the results of the study have confirmed the Health Belief Model (HBM) theory. In the HBM concept it is stated that health behavior is determined by personal beliefs or perceptions about the disease and strategies available to reduce the occurrence of the disease (Glanz, et al, 2008)

The result of Care Support Education (CSE) model application shows that after attending the CSE program for 3 months, the results obtained was there is a significant increase in knowledge. FSW who before joining the CSE program had less knowledge, after participating in the CSE program, had knowledge improvement up to 43 people (75.4%). According to the Mc Nemar test showed a p value of 0.00006 (<0.05), this shows a significant increase in the knowledge of FSW, before and after the FSW joined the CSE

program. The following table shows differences in knowledge, attitudes, negotiation skills and practice of using condom.

Likewise, with the FSW attitude. After participating in the Care Support Education (CSE) program, FSW whose attitudes began to change realized (supporting) the importance of preventing HIV/AIDS transmission increased to 45 people (79.0%) from before there was a CSE program of only 31 (54.4 %) with p value 0,0001. Negotiation skills have also improved. The number of FSWs who were already skilled in negotiations before participating in the Care Support Education (CSE) program was 13 (22.8%) increasing to 38 (66.7%) after intensively participated in the CSE program.

The usage of condom among FSW has also increased. Before joining the Care Support Education (CSE) program, it was 9 persons (15.8%), this number increased to 40 FSWs (70.2%). The same thing with adherence to screening for STIs once a month also increased. Before participating in the CSE program, only 16 FSW (28.1%) stated that they routinely attend IMS screening every month, after CSE program the number increased to 29 (50.9%). The participation rates in VCT have also increased. FSW which stated that they routinely conducted VCT every 3 months were 15 FSW (26.4%) increasing to 26 FSW (45.7%).

Care Support Education (CSE) developed in this research is a communication model for changing behavior in the prevention of HIV/AIDS transmission in FSWs according to the problem and support for policies and rules that apply to localization. Through a behavioral change communication approach that is carried out in FSW peers in localization, this CSE model has been able to increase knowledge among groups, provide awareness and motivation on the importance of using condom in risky sexual behavior, as well as routine health checks, including STI screening and VCT. The results of this research are in line with Dewi (2008), which stated that health education provided to the Commercial Sex Workers (CSWs) community has an effect on the knowledge increase and attitudes of CSWs. Another study by Purnomo (2013), stated health education affects the increasing knowledge and attitudes in controlling HIV/AIDS.

The existence of mutual support or mutual giving to realize the importance of efforts to prevent transmission of HIV/AIDS among fellow FSWs has influenced the better awareness in preventing HIV/AIDS transmission by increasing condom usage, participation in STI screening and VCT. The results of this research are in accordance with Bateganya et al (2015) which stated group support can improve the perception of the benefits of prevention and the impact of ongoing HIV transmission. Peer-based prevention and treatment significantly reduce the incidence of HIV among young FSWs in Burkina Faso, through reducing risk behavior (Traore et al, 2015). These results are also consistent with the results of Purnomo's research (2013), which stated there is an influence of health education on increasing attitudes and awareness in controlling HIV/AIDS.

The Care Support Education (CSE) can also improve FSW skill in condom negotiations through training and simulation of persuasion communication to its customers. They need to be empowered to not only refuse unprotected sex, but also to be able to motivate clients to use condom. Condom intervention and promotion must also be able to overcome the factors that affect the ability of FSW to negotiate condom usage (Bharat, et al, 2013).

The reason customers and FSWs are not willing to use condom is the lack of information about the importance of it as a prevention of transmission of sexually transmitted diseases including HIV/AIDS, the usage of condom is felt disturbing, uncomfortable, and can reduce pleasure.

The results are in line with Budiono's research (2012), which stated that factors proven to be related to condom usage practices are FSW knowledge about STIs and HIV/AIDS, FSW attitudes towards condom use, and access to information about STIs and HIV/AIDS. This result is also in line with Azam, et al (2014), the Community Educator integration model and the reward-punishment system, can improve the practice of condom usage among female sex workers (FSW).

Conclusion

The use of condom in sexual behavior among FSWs is still low (15.8%), not all localized

FSWs always attend IMS screening every month (71.9%), and there are still many who do not always do VCT every three months (73,3%). Factors that affect the practice of condom age in FSW sexual behavior are knowledge, attitudes, perceptions of susceptibility, perceptions of seriousness, perceptions of benefits, negotiation skill of FSW and customer support. Factors that affect compliance in conducting STI screening every month are knowledge, attitudes, perceptions of susceptibility, perceptions of seriousness, perceptions of benefits, and pimps' support. While the factors that affect compliance with conducting VCT every three months are knowledge, attitudes, perceptions of susceptibility, perceptions of seriousness, perceptions of benefits, and pimps' support.

The application of the Care Support Education (CSE) model has been able to improve knowledge, attitudes, condom negotiation skills, condom usage practise, FSW participation in STI screening, and FSW participation in VCT.

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Development of School Reproductive Health Education Index Model (Indeks Pendidikan Kesehatan Reproduksi Sekolah / IPKPRS)

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Abstract

One of the important health issues to be on the agenda of health promotion in schools is reproductive health. The results of the Basic Health Research (Riskesdas) in 2018 showed that nationally as many as 65.2% of the population had less knowledge about HIV/AIDS. This indicates that Indonesia is faced with the problem of low reproductive health literacy of school residents. The R&D design is used to develop the School Reproductive Health Education Index (IPKRS) instrument. R&D is carried out in 3 stages, namely: 1) determination of IPKRS dimensions and parameters by the focus group discussion (FGD) method; 2) Preparation, consultation and revision of the IPKRS model through experts judgment by the Delphy method; 3) Testing the validity of IPKRS by experts. The results shows that there are 4 dimensions of IPKRS, namely 1) the knowledge of school residents; 2) curriculum; 3) infrastructure; 4) institutional. The four dimensions are described in 13 IPKRS parameters. The validity test results shows all IPKRS parameters proved to be valid (Aiken's coefficient V value for each item ≥ 0.92). The findings of the IPKRS model need to be followed up by implementing in schools within the framework of mapping the quality of school reproductive health education.

Introduction

The key to the success of health development is its multi-sector role in supporting the achievement of health indicators. One sector that must considering the health aspects is education (Rochmayani & Zulaekha, 2019), that is, 25.8%. In middle age and older, the incidence of hypertension in women will increase. This study aims to determine the effectiveness of the CePat Tensi pocket book. Method: This type of research is a quasi-experimental study with a non-equivalent control group design. The population of this study were postmenopausal women who were members of the elderly posyandu in Tlogosari Wetan Village. In this study, total sampling was used. The number of respondents in the experimental group was 22 and the control group was 22 respondents. Data analysis was performed using univariate and bivariate (Wilcoxon test). The education sector is expected to play a role by integrating health education materials in school curriculum at all levels of education (World Health Organization, 2006).

The integration of health materials in the school curriculum mentioned above is in line with the holistic Health Promoting School efforts launched by the World Health Organization (WHO) (World Health Organization, 2018). One of the important health issues to be on the agenda of health promotion in schools is the issue of reproductive health (Achora et al., 2018; de Castro et al., 2018).

The urgency of the integration of reproductive health education materials into

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the school curriculum can be seen from the low literacy of reproductive health. Until now, nationally there is no data available that represents the quality of reproductive health literacy. National health research is currently only presenting data on HIV/AIDS knowledge. The results of the Basic Health Research (Riskesdas) in 2018 showed that nationally, as many as 65.2% of the population had poor knowledge about HIV / AIDS (Kemenkes, 2019).

The low literacy about reproductive health should be improved by integrating reproductive health education materials in the school curriculum (Vongxay et al., 2019), leading to poor sexual and reproductive health (SRH. But unfortunately, school reproductive health education has not received serious attention. Research on junior high school students and teachers in the city of Semarang shows that 90% of students have reproductive health knowledge in the inadequate category. The results of the study also showed that 50% of teachers did not have sufficient competence related to reproductive health materials (Rochmayani & Zulaekha, 2019), that is 25,8%. In middle age and older, the incidence of hypertension in women will increase. This study aims to determine the effectiveness of the CePat Tensi pocket book. Method: This type of research is a quasi-experimental study with a non-equivalent control group design. The population of this study were postmenopausal women who were members of the elderly posyandu in Tlogosari Wetan Village. In this study, total sampling was used. The number of respondents in the experimental group was 22 and the control group was 22 respondents. Data analysis was performed using univariate and bivariate (Wilcoxon test).

The situation of reproductive health education in schools that has not met the expectation prompted the need for various innovations. One of the innovations to encourage the implementation of reproductive health education in schools is through evaluating school performance in the field of reproductive health education. In general, performance appraisal will be easier to understand if it is realized in an index. Therefore this research undertakes efforts to develop a model of School Reproductive Health Education Index (Indeks Pendidikan Kesehatan Reproduksi Sekolah/ IPKRS).

The implementation of IPKRS by the Government provides benefits in the form of the availability of quality mapping instruments for reproductive health education in schools. As for schools, the IPKRS assessment can be an evaluation material for efforts to improve the quality of reproductive health education in their respective schools.

Method

The IPKRS model was developed using the R&D design. This R&D phase aims to produce a model design and test the validity of the IPKRS model based on expert judgment. The design of the IPKRS model was produced through 3 stages. The first stage, a focus group discussion (FGD) was conducted to determine the dimensions and parameters of the IPKRS assessment. The second stage, an initial model of the IPKRS instrument was made and an expert assessment was made using the Delphy method. The third stage, testing the validity of IPKRS was carried out by experts and practitioners in the field of reproductive health education.

The FGD activity of developing dimensions and parameters of IPKRS involved 5 experts from midwives, community health experts, school principals, head of Puskesmas, academics. In the second stage of the study, the subjects consisted of 3 experts who came from: 1) Professional midwives; 2) Public Health Expert; and 3) public health academics. The three subjects of the study provided suggestions, input and assessments up to the initial IPKRS model which was declared feasible. Next, for the final stage, the validation of the IPKRS model involves 3 experts from public health academics.

In accordance with the stages of the research, in the first stage the instrument was a guideline for implementing the FGD. In the second stage, the instrument used was a questionnaire with a Likert scale which had a score range of 1-5 of each question item. The instrument was used to assess the relevance of the IPKRS model to aspects of reproductive health education in schools. In the third stage, the instrument used was a questionnaire with a

Likert scale that had a score range of 1-5 of each question item. The instrument was used to test the content validity of the final IPKRS model. The validity test of the final model of IPKRS was carried out using the Aiken's V formula, where the coefficient of content-validity was calculated based on the results of expert evaluations.

Result and Discussion

The first stage of R&D is to develop the dimensions and parameters needed for the assessment of the IPKRS model. Based on the results of the FGD, 4 dimensions were formulated to measure the IPKRS, namely: 1) the dimension of knowledge of school residents, 2) the curriculum dimension 3) the infrastructure dimension, 4) the institutional dimension. From each of these dimensions, several parameters have also been developed to measure each dimension. In total there are 13 parameters that were successfully formulated to measure dimensions in the IPKRS. The following table 1 is a breakdown of the

Table 1. IPKRS: Dimensions, Parameters and Definitions

No	Parameters	Definitions
School Community Knowledge Dimension		
1	Student knowledge about reproductive health	Is the percentage of students with knowledge about reproductive health in good category
2	Teacher knowledge about reproductive health	Is the percentage of teacher with knowledge about reproductive health in good category
Curriculum Dimension		
1	The existence of reproductive health material in the curriculum	Is the availability of reproductive health material in the curriculum that applies in school
2	Extracurricular activities that support the application of reproductive health material	Is the existence of extracurricular activities related to reproductive health materials that are scheduled and carried out continuously
3	The involvement of reproductive health experts in the preparation of intra and extracurricular curriculum	Is the involvement of reproductive health experts in the preparation of intra and extracurricular curriculum
4	The enrichment of reproductive health materials for teachers	Is an effort to enrich the reproductive health material for teachers by the school
Infrastructure Dimension		
1	Availability and accessibility of reproductive health learning media in schools	Is the availability of reproductive health learning media in schools that can be accessed by school residents
2	Availability and accessibility of reference books on reproductive health in schools	Is the availability of reference books on reproductive health in schools that can be accessed by school residents
3	Availability of space infrastructure for reproductive health counseling	Is the availability of reproductive health counseling space infrastructure in school
4	Availability of clean toilet infrastructure that supports reproductive health practices for all school residents	Is the availability of clean toilet infrastructure that supports reproductive health practices for all school residents
Institutional Dimension		
1	There is an innovative school program that supports reproductive health education in school	Is an innovative school program that supports reproductive health education in school
2	The existence of school regulations that support reproductive health education in schools	Is the existence of school regulations that support reproductive health education in schools
3	The involvement of partners in reproductive health education activities in schools	Is the involvement of partners in reproductive health education activities in schools

Source: Primary Data, 2019

dimensions, parameters and definitions of the parameters of the developed IPKRS model:

The dimensions and parameters listed in table 1 are the breakdown points of the IPKRS assessment. To get the index value from IPKRS, each parameter is given a score. Scoring is done by giving values ranging from 1 to 5. A score of 5 reflects the most ideal conditions of a parameter. The score 1 indicates the most ideal conditions. In addition to scoring 1 - 5, on parameters for which no data are available, a score of 1 is given (Budiono, 2013). The consideration for giving a score of 1 on parameters for which data is not available is school commitment. Meaning, schools that do not have information or data from parameters in the IPKRS show the weak commitment of the school in this aspect.

Furthermore, from each dimension the index is calculated with the following formula (Budiono, 2013):

$$\text{Dimension Index} = \frac{\text{Actual Value} - \text{MinimumValue}}{\text{Maximum Value} - \text{MinimumValue}}$$

After indexing of each dimension is calculated, the final index is also calculated, namely IPKRS with the following formula:

IPKRS = ¼ school community behavior dimension + ¼ curriculum dimension + infrastructure dimension + ¼ institutional dimension

The IPKRS limits/criterias are determined as follows:

Table 2. School Reproductive Health Education Index (IPKRS) Criterias

Indeks	Kategori
0,800 – 1	IPKRS in Good category
0,500 – 0,799	IPKRS in Average category
0 – 0,499	IPKRS in Poor category

The development phase in this research has resulted in the IPKRS model. In order to be used as a valid instrument for evaluating school awareness of reproductive health education, expert validation was performed at the next stage.

At this stage the experts give an assessment using a Likert scale with a score range of 1-5 to show the degree of relevance of each item.

Based on table 3 it appears that the coefficient value of Aiken's V for each item ≥ 0.92. This shows that the IPKRS assessment instrument model developed was declared valid from the reproductive health expert review.

The results showed that there were 4 dimensions for the assessment of the Reproductive Health Care Index. The first dimension is the knowledge of school residents. This dimension consists of parameters of students and teacher knowledge about reproductive health. Several previous studies indicate that one indicator of the success of reproductive health education in schools is the existence of reproductive health literacy in students. Research in Lao PDR shows that students' knowledge about sexual and reproductive health can be achieved by means of comprehensive education. Adequate sexual and reproductive health literacy is further proven to be able to help students in solving reproductive health problems they face (Vongxay et al., 2019) leading to poor sexual and reproductive health (SRH). In addition to student knowledge, reproductive health education efforts also require the presence of teachers with adequate reproductive health literacy. In this case the teacher can take the role as a reproductive health counselor for their students. Therefore, it is important for schools to improve teacher knowledge and competencies in terms of reproductive health education (Alavi-Arjas et al., 2018).

The second dimension in the assessment instrument for the Reproductive Health Care Index School is the curriculum. This is based on the results of previous studies which showed that many reproductive health practices were lacking due to students not being exposed to reproductive health materials in schools. Therefore the integration of reproductive health materials in both intra and extracurricular curriculum is very important. Rochmayani's research (2019), shows that there are 5 main materials that support the competency of reproductive health education professionals for teachers who are successfully developed. The five components are 1) Male and female reproductive organs, 2) Self-protection from

Table 3. Experts Validation on IPKRS Design

Dimensions	Parameters	Aiken's V Coefficient value	Conclussion
School Community Knowledge Dimension	Students knowledge about reproduction health	1,00	Valid
	Teachers knowledge about reproduction health	1,00	Valid
Curriculum Dimension	The existence of reproductive health material in the curriculum	1,00	Valid
	Extracurricular activities that support the application of reproductive health material	0,92	Valid
	The involvement of reproductive health experts in the preparation of intra and extracurricular curriculum	1,00	Valid
	The enrichment of reproductive health materials for teachers	1,00	Valid
Infrastructure Dimension	Availability and accessibility of reproductive health learning media in schools	1,00	Valid
	Availability and accessibility of reference books on reproductive health in schools	1,00	Valid
	Availability of space infrastructure for reproductive health counseling	1,00	Valid
	Availability of clean toilet infrastructure that supports reproductive health practices for all school residents	1,00	Valid
Institutional Dimension	There is an innovative school program that supports reproductive health education in school	1,00	Valid
	The existence of school regulations that support reproductive health education in schools	1,00	Valid
	The involvement of partners in reproductive health education activities in schools	1,00	Valid

Source : Primary Data, 2019

Remark :

Limit of Aiken's V coefficient value acceptance with 3 experts raters is 0,92

sexual harassment, 3) Problems related to reproductive health behavior, sexually transmitted diseases (STDs) and HIV-AIDS, 5) Environmental care about reproductive health (Rochmayani & Zulaekha, 2019), that is 25.8%. In middle age and older, the incidence of hypertension in women will increase. This study aims to determine the effectiveness of the CePat Tensi pocket book. Method: This type of research is a quasi-experimental study with a non-equivalent control group design. The population of this study were postmenopausal women who were members of the elderly posyandu in Tlogosari Wetan Village. In this study, total sampling was used. The number of respondents in the experimental group was 22 and the control group was 22 respondents. Data analysis was performed using univariate and bivariate (Wilcoxon test).

The dimensions of the curriculum in the IPKRS model are assessed by 4 parameters, namely 1) The existence of reproductive health material in the curriculum; 2) The existence of extracurricular activities that support the application of reproductive health material; 3) The involvement of reproductive health experts in the preparation of intra and extracurricular curriculum; 4) There is enrichment of reproductive health material for teachers. The urgency of the four parameters as IPKRS assessment parameters is in line with the results of previous studies that emphasize the importance of holistic reproductive health education. This holistic effort can be achieved by taking into account the integration of reproductive health education materials in the curriculum, the involvement of health professionals, and the efforts to improve teacher

competency (Achora et al., 2018; Shahhosseini & Abedian, 2015; Tushabomwe & Nashon, 2016).

The importance of curriculum material as a dimension of the IPKRS assessment also reinforces the results of previous research. Some previous studies recommend the need for efforts and innovation to integrate reproductive health education materials in the school curriculum. For that reason, various innovative efforts need to be made to provide alternative ways of reproductive health education in schools (Canan & Jozkowski, 2017; de Castro et al., 2018; Dongre et al., 2011). The integration of reproductive health education in the school curriculum is a potential and inclusive effort to promote reproductive health in the adolescent age group. The benefits that can be obtained from these efforts include 1) reducing and preventing the transmission of sexually transmitted diseases in the future, and 2) increasing awareness of sexually transmitted disease prevention behaviors (Sani et al., 2016).

The third dimension in the assessment of IPKRS is infrastructure aspects. Infrastructures such as healthy toilets, counseling rooms, innovative learning media and reference books on reproductive health are driving and enabling factors in the formation of attitudes and practices regarding positive reproductive health. Research has proven the link between school facilities and educational outcomes. School facilities in this case include healthy toilet facilities, counseling rooms, and learning media. The educational outcomes include reproductive health education (Magzamen et al., 2017).

Reproductive health education for students in addition to instilling healthy reproductive behavior is also useful to provide skills for students in maintaining personal genital hygiene. For example in problems related to premenstrual syndrome, these problems can be prevented by adequate reproductive health education (Canan & Jozkowski, 2017). Research shows that reproductive health education in schools is an investment in the prevention of sexually transmitted diseases in the future. Reproductive health education in schools can also control problems due to free sex and teenage pregnancy. To improve the quality of reproductive health education in schools, adequate school facility support is needed (Lee et al., 2007; Rada, 2014) genuine sexual and reproductive health (SRH).

The fourth dimension in the assessment of IPKRS is the institutional dimension. The parameters of the institutional dimension include: 1) The existence of innovative school programs that support reproductive health education in schools; 2) The existence of school regulations that support reproductive health education in schools; 3) The involvement of partners in reproductive health education activities in schools. The urgency of innovative school parameters in the IPKRS assessment is that education is dynamic. Likewise, reproductive health education is also dynamic. This means that reproductive health learning efforts in schools are always faced with different situations between one school and another school. Therefore, various forms of innovation in reproductive health education need to be developed so that the goal of increasing reproductive health literacy can be achieved (Achora et al., 2018; Alavi-Arjas et al., 2018; Tebb et al., 2019).

The school's initiative in making certain rules/standard procedures that favor the implementation of reproductive health education in the school environment is a tangible manifestation that schools have a concern for reproductive health education. This reasoning justifies the need for these parameters to be included in the institutional dimension in the IPKRS assessment.

The third parameter in the institutional dimension of IPKRS is the involvement of partners in learning reproductive health in schools. This parameter is urgent to be made a component of the institutional dimension of IPKRS for several reasons, namely: 1) limited human resources with reproductive health education competencies owned by schools; 2) the success of reproductive health education requires cross-sector involvement. Some previous research also strengthens the argument about the importance of aspects of partner involvement in reproductive health education in schools. Achora's research (2018), presents the conclusion that a combination of efforts involving stakeholders, including

teachers, community leaders, peers, health professionals, and parents is the key to the success of reproductive health education in schools (Achora et al., 2018; Canan & Jozkowski, 2017; Denno et al., 2015).

Conclusion

The IPKRS (School Reproductive Health Education Index) instrument consists of 4 dimensions, namely 1) knowledge of school residents, 2) curriculum 3) infrastructure, 4) institutional. The knowledge dimension consists of 2 parameters, namely 1) student knowledge, and 2) teacher knowledge about reproductive health. From the overall dimensions, it was developed into 13 IPKRS assessment parameters.

All parameters developed in IPKRS are proven valid. This means that the IPKRS can be implemented to measure the quality of reproductive health education in schools. The IPKRS model that was successfully developed in this study needs to be followed up with trials on a broader scale.

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A Cross-sectional Study of Nutritional Status and Cardiovascular Health Status among Housewives in Tegal Regency, Central Java

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Abstract

Unhealthy diet and physical inactivity are two major factors related to degenerative diseases such as diabetes, hypertension, cancer, and it is still growing issues that mainly occurred in developing countries like Indonesia. It is a descriptive quantitative study, aims to investigate nutritional also cardiovascular health status among housewives in Tegal Regency, Central Java. Twenty adult women (33-57 years old) were voluntary and randomly signed up. Data on body weight (kg), height (cm), waist circumference (cm), hip circumference (cm), systolic-diastolic blood pressure (mm/hg) were collected by survey and measurement techniques. IBM SPSS 21 used to perform descriptive quantitative analysis for all data. Body mass index: 35% obese, 45% pre-obese, 5% overweight, 15% ideal weight. Waist circumference: 35% low category, 65% high category. Waist-to-hip ratio: 60% at risk of chronic diseases, 35% moderate, 5% good. Blood pressure: 40% hypertension stage-two, 25% hypertension stage-one, 25% elevated, 10% normal. Pre-obese and obese have found as the current nutritional status, followed by overweight. Meanwhile, hypertension has found as the current cardiovascular health status, followed by elevated blood pressure. This novel is empirical evidence for the housewife to be more physically active, and manage the diet to improve their health status.

Introduction

A housewife is the most important person in the family, it is determinant how a family to adapt, to develop, to prevent, and to fix any problem like health problems which occurred in the family. One family member's problem will affect overall functional and practical any other members, (Sutikno, 2011). The truth is physical health is the key factor in order to do daily activities without feeling tired, it is also included medical consumption, diet, physical fitness and sleeping duration. However, Indonesian housewives' behavior is shifting time by time. They are tend to do such as snacking, coach potato, and inconsistent in healthy lifestyle. This is almost happen in every single of them, (Nakita, 2019).

Physical inactivity is able to increase the risk of many chronic diseases. On skeletal muscle, it causes disuse atrophy, and sarcopenia. On bone, it causes osteoporosis, osteoarthritis, imbalance bone remodeling, fracture/falls. On nervous, it causes cognitive dysfunction, depression, and anxiety. On cardiorespiratory, it causes heart disease, myocardial infraction, hypertension, stroke,

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hemostasis, congestive heart failure, endothelial dysfunction, atherosclerosis, peripheral artery disease, deep vein thrombosis. On immune system, it causes rheumatoid arthritis, and increase pain sensation. On endocrine, it causes insulin resistance, metabolic syndrome, type 2 diabetes, obesity. On digestive system, it causes nonalcoholic fatty liver, colorectal cancer, diverticulitis, and constipation. On reproduction, it causes breast cancer, endometrial cancer, gestational diabetes, pre-eclampsia, polycystic ovary syndrome, and erectile dysfunction, (Booth, Roberts, Thyfault, Ruegsegger, & Toedebusch, 2017).

Physical activity management and diet is the best combination to maintain or to improve overall health status. there is a positive correlation between nutritional status and the physical fitness levels in adult women, those who have balanced diet and exercise program are having good fitness levels, (Utami, 2012). Exercise is able to positively affecting the energy balance, also it can be performed as the strategy for inducing short-term energy deficits irrespective of adiposity and sex. This phenomenon comparable in active versus sedentary individuals, (Dorling et al., 2018).

Other positive effects of exercise showed that mixed impact aerobic dance with average intensity (60% up to 80% of maximum heart rate), three times a week for about 30 up to 45 minutes is significantly able to lowering blood pressure and resting heart rate, (Ali, M. A., et al., 2017). Relaxation exercises like Taichi Chuan and Jacobson's Progressive Muscular Relaxation are able to decrease cortisol concentration, lowering blood pressure in pre-hypertension population, (Kosoema, Chasani, & Handoyo, 2016). Physical activity (exercise) recommendation for adults with non-communicable disease are: 1) Aerobic with moderate intensity must be done no less than 150 minutes each week, and 75 minutes with vigorous intensity or a combination of both. 2) Muscle-strengthening activities must be done at least twice a week, (Geidl, Abu-Omar, Weege, Messing, & Pfeifer, 2020).

The amount and the composition are keys to nutrient intake in order to achieve optimal health for each individual. Excessive calories, especially food high fat and carbohydrates are well known causing unwanted health problems. Reducing fats and cholesterol consumption is a way of lowering the risk of chronic diseases such as heart disease and cancer. Along with that, food containing high sugar causes inflammation, high blood pressure, and obesity, (Touger-Decker & Sirois, 2005). Based on the elucidation above, Purposes of this study are: 1) To investigate the nutritional status, and 2) To investigate the cardiovascular health status among housewife in Tegal Regency, Central Java, Indonesia.

Method

This is descriptive quantitative study with cross-sectional data. Twenty adult women (33 years old up to 57 years old) were voluntary and randomly signed up in this study. Measurement techniques were performed to collect the data such as body weight (Kg), height (cm), waist circumference (cm), hip circumference (cm), systolic and diastolic blood pressure (mm/Hg). All the procedures in this study have been approved by the institutional committee of Faculty of Sports Science, state university of Semarang. First of all, samples received the explanation about study purposes, and the protocol. Secondly, they were asked to rest (sitting) for about 15 minutes before blood pressure measurement was performed using Automatic Blood Pressure Monitor (OMRON Model HEM-7203 with pressure accuracy ±3 mmHg and Pulse Accuracy ±5% of display reading). To measure Body Mass Index (BMI), samples were asked to step on the portable electronic weighing scale (OMRON Model HN289 Digital Personal Scale up to 150 Kg) and height was measured by a portable height meter (One Med No. 26SM up to 200 CM). Last step their waist and hip circumferences were measured by using a constant tension tape/tape measure (Figure Finder, Rockton, IL USA Pat. No. 4.433.486). To get easier visualization of our procedure, see Figure 1. IBM SPSS Statistics Version 21 was used to perform descriptive quantitative analysis for all data.

Result and Discussion

Different spectrum of physical inactivity causes different effects on health problems. It is categorized from motorized transportation like using scooters versus using bike; aging affecting the physical activity levels; sitting as

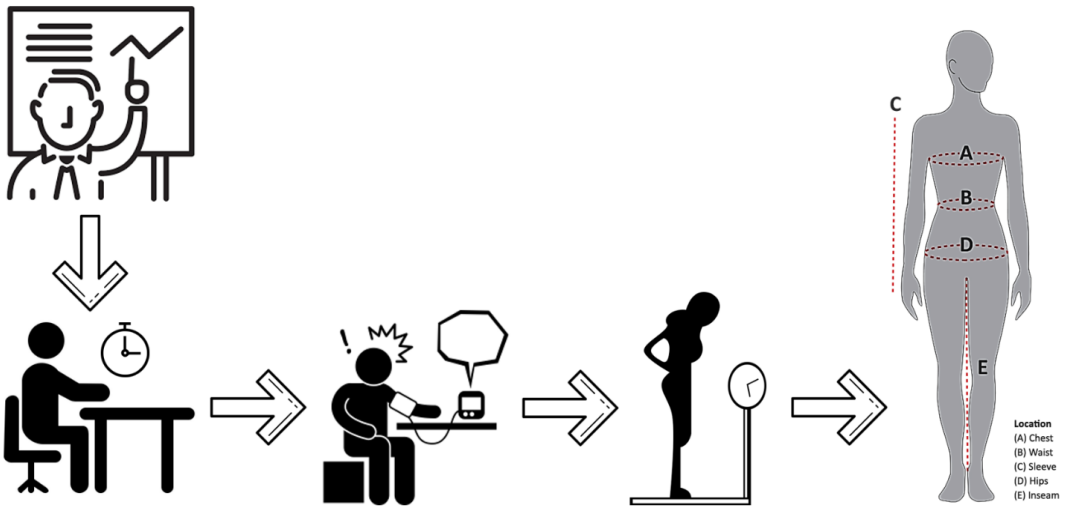

Figure 1. Research procedure

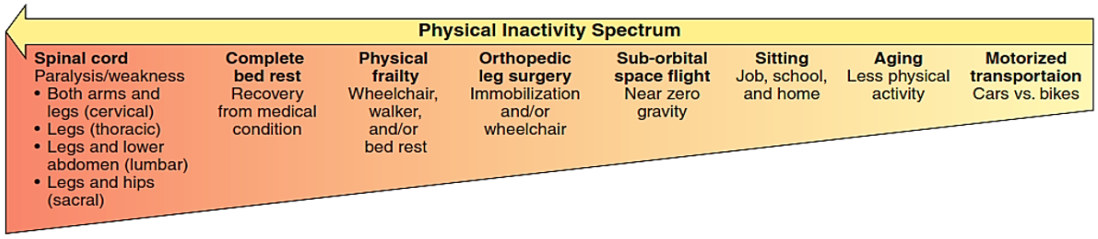

Figure 2. Spectrum of the types of physical inactivity, (adopted from Booth et al., 2017)

sedentary lifestyle pattern such as job, school, home; sub-orbital space flight such as aircraft crews or astronauts (near to zero gravity); immobilization and/or wheelchair caused orthopedic leg surgery; physical frailty like wheelchair, walker, and/or bed rest; recovery from medical condition (complete bed rest); both arms and legs/cervical, legs/thoracic, leg and lower abdomen/lumbar, legs and hips/sacral due to spinal cord paralysis/weakness, (Booth et al., 2017).

All data in this study are primary. Obtained directly from the subjects. Additional data such as reference values of body mass index, waist circumference, and waist-to-hip ratio are from the World Health Organization year 2008, and blood pressure reference value is from Blood Pressure Association, 2008. Based on the BMI data as a determinant of nutritional status, seven samples (35%) are in obese category, nine samples (45%) are in pre-obese category, one sample (5%) is in overweight category, and only three samples (15%) are in normal weight category, (Figure 3).

From total sample in this study we have found only two categories, there are: low category is 35% (7 samples), and high category is 65% (13 samples), data are in table 1. According to BMI data, samples who have low waist circumference they are ones who have normal BMI (3 samples), overweight (1 sample), and pre-obese (3 samples). Whereas, those sixty five percent of sample (high circumference) who are classified into pre-obese (6 samples), and obese (7 samples). Data on table 2 are showing that sixty percent (60%) of total sample is at risk of chronic diseases, thirty five percent (35%) is at average/moderate, and only five percent (5%) is at good category. Meanwhile, data on table 3 are showing that forty percent (40%) of sample are having hypertension stage two, twenty five percent (25%) are having hypertension stage one, another twenty five percent (25%) are elevated blood pressure, and only ten percent (10%) having normal blood pressure.

Both physical in-activity and sedentary

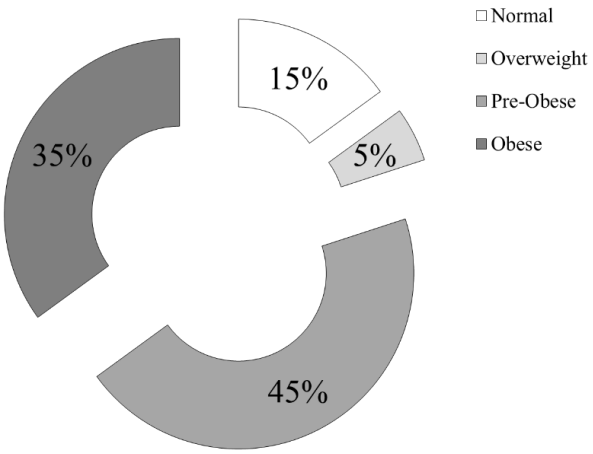

Figure 3. Study result of nutritional status based on Asian female's Body Mass Index, (research data, year 2019; WHO, 2008).

Table 1. Norms of waist circumference (WC) and study result on WC, (research data, year 2019; WHO, 2008).

Category	Range	Sample (n=10)	Percentage (%)
Very High	>110	0	0
High	90-109	13	65
Low	70-89	7	35
Very Low	<70	0	0

Source: Primary Data

Table 2. Female's Waist-to-Hip Ratio (WHR), (research data, year 2019; WHO, 2008).

Category	Range	Sample (n=10)	Percentage (%)
Very High	<0.75	0	0
High	0.75-0.79	1	5
Low	0.80-0.86	7	35
Very Low	>0.86	12	60

Source: Primary Data

Table 3. Norms of blood pressure and study result on blood pressure, (research data, year 2019; Blood Pressure Association, 2008).

Category	Systolic BP	Diastolic BP	Sample (n=10)	Percentage (%)
Normal	<120	<80	2	10
Elevated	120-129	<80	5	25
Hypertension 01	130-139	80-89	5	25
Hypertension 02	140-179	90-121	8	40
Hypertension Crisis	>180	>120	0	0

Source: Primary Data

behavior such as eight hours per day sitting at work, long distance driving, prolonged study at school cause low energy expenditure which leads to energy imbalance, where eventually leads to overweight, pre-obese, and obese, (Inyang, 2015; Owen, Sparling, Healy, Dunstan, & Matthews, 2010). Type 2 diabetes mellitus is confirmed has strong association with physical in-activity, and it is regardless of sex, age, ethnics, or BMI. Further, two of ten people in this modern lifestyle are physically in-active, (González, Fuentes, & Márquez, 2017). Since BMI has different cut-off values among ethnics especially for Asian population, waist circumference measurement is needed to confirm action levels based on BMI. Caucasian is having less amount of visceral adipose tissue compared to Asian by waist circumference measurement, (WHO, 2008).

Different ways to do physical activity such as walking, cycling, household activities, physical exercise, sports recreation, and it can be done anytime, anywhere, at home, school or at work. With sufficient duration and proper intensity, it will bring many benefits effect on the body. Noncommunicable diseases (diabetes, heart disease, stroke, breast and colon cancers) can be prevented even can be treated by regular physical activity. It also capable to prevent hypertension, overweight and obesity. Hence, it can improve mental health and overall the wellbeing and quality of life. Physical activity itself defined as any movement produced by bio-motor (skeletal muscle) that requires energy expenditure, (WHO, 2018).

Waist-to-hip ratio is a measurement of waist circumference compared to hip circumference, it is used to be simple and good indicator for fat storage in abdomen and hip, and it is assumed as a better approach to evaluate the obesity levels, supporting the BMI measurement, (Hartanto & Yong, 2018; Ntuk, Gill, Mackay, Sattar, & Pell, 2014). Interestingly, obesity is not only risk factor for metabolic disorder linked to degenerative diseases, but also a risk factor for asthma both sex in female and male, and the risk factor is increased in females with abdominal obesity, (Brumpton, Langhammer, Romundstad, Chen, & Mai, 2013).

The relationship between WHR, BMI and women are complicated. At first, the idea of very low WHR and low BMI in women are believed become the center of attraction for gentlemen, because they believe those are the reliable features for superior fertility. However, scientific evidence shows that female with higher BMIs have earlier menarche and later menopause compared to lower BMI and lower WHR; they do not have predisposes to conditions that compromise infant survival; they have more chance to live births and conditional for education; mothers with ideal pre-pregnancy BMIs have a decreased of producing both preterm infants and low-birth-weight, (Lassek & Gaulin, 2018).

A condition when individual is having excess body fat ≥20% is simple definition of obesity, and it is long-term implication from imbalance energy intake (energy consumption is higher than energy expenditure), and it has strong relationship with hypertension, (Jiang, Lu, Zong, Ruan, & Liu, 2016; Kotsis et al., 2018). Other factors related to hypertension are lifestyle such as ad libitum salt consumption, sleep disturbances, and keep elevating the waist circumference, (Zanchetti, 2017). Angina (chest pain), heart failure, heart attack, stroke, and chronic kidney disease are degenerative diseases related to harden arteries (decreased blood flow) caused by hypertension, (Chockalingam, 2007). Interestingly, social support and social integration are having physiological impact in hypertension prevalence, (Yang, Boen, & Mullan Harris, 2015).

Hypertension is defined as the blood pressure elevated ≥140/90 mm/Hg, and it is related to short life expectancy. It is the most common modifiable risk of cardiovascular diseases, but it leads to cause of the death especially in women in developing countries. However, hypertension prevalence is higher in men compared to women in the younger population than sixty-five years old, (Ahmad & Oparil, 2017). However, elderly women predicted having higher risk of hypertension than men, it is due to the negative effect of combined oral contraceptive drugs. Furthermore, women are in the high incidence of cancer, (Pimenta, 2012). There are some considered strategies to lower the incident both obesity and hypertension: 1) active lifestyle, 2)

body weight management, 3) diet management (less last and more magnesium), 4) sleep management, 5) environmental and social intervention, (Kotsis et al., 2018).

Physical exercise is considered having association with the regression and even prevention of left ventricular hypertrophy (a condition of heart wall's main pumping chamber become thickening and enlargement "LVH"), (Hegde & Solomon, 2015). Other than that, there is an evidence state that weight management having positive feedback with hypertension which weight increase makes higher probability to hypertension and it vice versa, (Sabaka et al., 2017). Furthermore, the overall body weight is not the actual deal who is having a relationship with blood pressure, but the body composition. The body fat and systolic blood pressure were significantly changed during the alternation of diet management causes body composition modification, (Fazliana et al., 2018).

Unsurprisingly, insomnia and sleep deprivation are positively related to prevalence of hypertension. Based on both the observational and prospective studies, there is a strong correlation between the risk of hypertension with obstructive sleep apnea, (Calhoun & Harding, 2010). More detail, increased hypertension risk is associated with the duration of sleeping, either short or long sleep duration, (Grandner et al., 2018). Additionally, increased blood pressure and endothelial inflammation are associated with poor sleep patterns. Common but frequently neglected sleep disturbances (insomnia, poor sleep quality, short sleep duration) is able to causes harmful effects on blood pressure as well as the vascular inflammation, (Aggarwal et al., 2018).

Increased in systolic blood pressure is associated with decreasing individual education, extended with decreasing residential neighborhood education. Body mass index/ waist circumference and resting heart rate mediate the association between blood pressure and residential neighborhood education, (Chaix et al., 2010). Other social factors linked to hypertension are economic status, to access affordability of care, (Wenger et al., 2018). The association between low socioeconomic status with higher blood pressure is due to the level of education, (Leng, Jin, Li, Chen, & Jin, 2015). Interestingly, although some studies showing that education is related with increased blood pressure, but a study by Cuschieri in 2017 showing that it did not have any association with the risk of hypertension prevalence, (Cuschieri, Vassallo, Calleja, Pace, & Mamo, 2017). It is a research gap, to any scientist who is interested to do strongly suggested to consider more variables which maybe could be different factors in different places.

Conclusion

Unfortunately, instead of normal/ ideal weight, pre-obese and obese were found become the current nutritional status for the majority of housewife in Central Java, followed by overweight. Alert, Hypertension both stage one and two are found become seriously current cardiovascular health status, followed by elevated blood pressure. These found become empirical evidence to advise housewife for being more physically active, manage their diet and sleeping time to improve their current nutritional and cardiovascular health status. At last, to complete our limitations, future study is suggested to evaluate the physical behavior, to investigate the food intake, and to check biomarkers such us blood glucose, uric acid, nitrogen balance, and many other indicators related to nutritional status and cardiovascular health.

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