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## Relationship between Knowledge and Covid-19 Preventive Measures among Pregnant Women

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### ABSTRACT

Covid-19 is an acute respiratory tract infection caused by the SARS-CoV-2 virus and has become a pandemic worldwide. Covid-19 has infected the entire world population including pregnant women. The vulnerability of pregnant women to infectious diseases is due to changes in body physiology and immune response mechanisms. One of the causes of transmission of Covid-19 in pregnant women is the lack of knowledge regarding Covid-19 and its prevention. This study mainly aims to determine the relationship between knowledge and Covid-19 preventive measures among pregnant women in Jambi City. This was an analytical observational study with cross-sectional design. The study population involved all pregnant women in Jambi City, with a total sample of 100 pregnant women, who were selected using a purposive sampling technique based on inclusion and exclusion criteria. Data were collected using online questionnaire from December 2020 to March 2021. Data were analyzed using Chi-Square test. Results of this study showed that knowledge had a significant relationship with Covid-19 preventive measures among pregnant women in Jambi City with a p-value of 0.001 (OR=4.943). Based on the results of this study, it is expected that healthcare workers can provide health education to prevent the risk of Covid-19 transmission among at-risk groups.

*Covid-19 merupakan gangguan saluran pernapasan akut yang disebabkan oleh virus SARS-CoV-2 dan telah menjadi pandemi di seluruh dunia. Covid-19 telah menjangkit seluruh penduduk dunia tidak terkecuali ibu hamil. Kerentanan ibu hamil mengalami penyakit infeksi dikarenakan adanya perubahan fisiologi tubuh dan mekanisme respon imun didalam tubuhnya. Salah satu penyebab penularan Covid-19 pada ibu hamil adalah kurangnya pengetahuan terhadap Covid-19 dan pencegahannya. Tujuan penelitian ini adalah untuk mengetahui hubungan pengetahuan dengan tindakan pencegahan Covid-19 pada ibu hamil di Kota Jambi. Penelitian ini merupakan studi observasional analitik dengan rancangan cross-sectional. Populasi dalam penelitian ini adalah seluruh ibu hamil di Kota Jambi, dengan jumlah sampel sebanyak 100 ibu hamil, menggunakan teknik purposive sampling yang memenuhi kriteria inklusi dan tidak termasuk kriteria eksklusi. Pengumpulan data menggunakan kuesioner daring pada bulan Desember 2020 sampai Maret 2021. Analisa data menggunakan uji Chi-Square. Hasil penelitian terdapat hubungan pengetahuan dengan tindakan pencegahan Covid-19 pada ibu hamil di Kota Jambi dengan nilai p-value = 0,001. Dari hasil penelitian ini diharapkan bagi petugas kesehatan dapat memberikan pendidikan kesehatan pencegahan resiko penularan Covid-19 pada kelompok yang berisiko rentan.*

## Introduction

Pregnant women are a group that is vulnerable to experiencing health problems, especially infectious disease due to changes in immune response mechanisms and body physiology during pregnancy (Nurdianto et al., 2020). Since the first case of COVID-19 was found in Wuhan-China, the National Health Commission of China identified as many as 118 pregnant women with COVID-19 from 50 Hospitals across the city of Wuhan from December 8, 2019 to March 20, 2020. Based on the Chinese Clinical Guidance for COVID-19 Pneumonia Diagnosis and Treatment, of the 118 COVID-19 cases found, there were 84 (71%) pregnant women with PCR test results positive for SARS-CoV-2 and the

remaining 34 (29%) people showed an image of infiltrates in the lungs based on CT scans. Based on the data, the number of pregnant women with COVID-19 contributed 0.24% of the number of COVID-19 cases at that time. A total of 75 (64%) pregnant women with COVID-19 were in the third trimester. 13.7% of pregnant women were more likely than those who were not pregnant to be infected with Covid-19, according to data from the Jakarta-based Indonesian Obstetrics and Gynecology Association (POGI) (Rohmah & Nurdianto, 2020).

SARS-CoV-2 exposure among pregnant women can occur in the first, second, and third trimesters. In the early stages of pregnancy, although vertical transmission of SARS-CoV-2 from mother to fetus has not yet been demonstrated, SARS-CoV-2 infection may potentially affect organogenesis and fetal development. It is certain that the earlier the occurrence of cases of infection, the greater the risk of abortion because the women's condition that decreases can affect the flow of nutrients and oxygen that are crucial for fetal development through the placenta (Chen et al., 2020). Mortality rate due to complications in pregnant women diagnosed with Covid-19 is lower compared to SARS or MERS, but there are also complications in the fetus, including miscarriage (2%), intrauterine growth retardation (IUGR; 10%), and premature birth (39%) (Dashraath et al., 2020).

Based on the case study regarding Covid-19 in pregnant women, a number of important facts were presented, including: (1) The most Covid-19 cases in pregnant women were mild, followed by moderate (severe), and critical (critical); (2) The results of symptom observations, laboratory examination results, and CT scans showed that Covid-19 in pregnant women was generally the same as other Covid-19 patients; (3) The potential for spontaneous abortion of pregnant women with Covid-19 was very low; (4) Obesity conditions and the presence of comorbidities in pregnant women with Covid-19 could increase the risk of premature birth and even death; (5) the earlier the gestational age at the time of Covid-19 infection, the higher the potential for spontaneous abortion; (6) Obesity in pregnant women with Covid-19 had the potential to cause pulmonary embolism, (7) Hormonal changes in pregnant women could affect changes in immunity status to become more susceptible to viral infections but were able to inhibit organ damage by the production of anti-inflammatory cytokines (Rohmah, 2020).

A person's health is influenced by two main factors, namely non-behavioral factors and behavioral factors. According to B. Bloom, there are three domains of behavior, namely attitude, knowledge and practice. Meanwhile, these health behaviors, are influenced and determined by three factors, namely reinforcing factors, enabling factors, and predisposing factors (Notoatmodjo, 2014). Regarding predisposing factors, people have various socio-demographic factors such as age, gender, occupation,, marital status, place of residence, education, health status and income. These socio-demographic characteristics can affect people's behavior regarding the Covid-19 preventive measures (Jadoo et al., 2020). Covid-19 is a newly discovered disease, therefore knowledge related to prevention is still limited. Prevention keys include breaking the chain of transmission by isolation, carrying out basic protection, and early detection (ACOG, 2020).

A study conducted by (Nurhasanah et al., 2021) among 40 pregnant women who visited Pratama Arsy Medika Clinic in Cirebon Regency for pregnancy check-up showed that most of respondents (80%) had poor knowledge about Covid-19 and most of pregnant women (70%) had poor Covid-19 preventive measures. The widespread acceptance of information about Covid-19 in the community can support good knowledge. Knowledge about Covid-19 possessed by pregnant women can provide the ability to receive, maintain, and use correct information. Further, it will lead to a reaction that gives a tendency to act or behave.

Based on the results of a preliminary survey conducted in Jambi City, 60% of women had poor knowledge about the prevention of COVID-19 transmission during pregnancy. There were still many pregnant women found in some settings, such as markets, other public places they did not take preventive measures. The most obvious findings were not wearing masks, not caring too much about social distancing and rarely washing hands. This needs to be considered since normal pregnant women has certain health challenges and there is still a high mortality and morbidity rate, coupled with a pandemic situation. Many pregnant women also have not implemented a clean and healthy lifestyle, and this will cause an increase in maternal and neonatal morbidity and mortality. This study aims to determine the relationship between knowledge and Covid-19 preventive measures among pregnant women in Jambi City.

## Methods

This was an analytical observational study with a cross-sectional design. The population in this study involved all pregnant women in Jambi City, with a total sample of 100 pregnant women. The samples were selected using a purposive sampling technique based on exclusion and inclusion criteria. Inclusion criteria included: 1) pregnant women who were domiciled in the Jambi City area, 2) pregnant women who were willing to take part in online research. On the other hand, the exclusion criteria included: 1) pregnant women who did not have a smartphone or had a smartphone but could not operate it, 2) pregnant women who were confirmed positive for Covid-19, 3) pregnant women who could not read and write. Data on Covid-19 knowledge and preventive measures were collected with an online questionnaire which had been tested for validity and reliability. The questionnaire was then made in a google form which could be accessed via a smartphone. Data collection was carried out from December 2020 to March 2021. Data analysis was carried out with the Chi-Square test which was processed using SPSS version 16.0.

## Results

**Table 1.** Distribution of Respondents' Characteristics

Characteristic	Sum (%) N = 100
<b>Age</b>	
20-35 years	88
> 35 years	12
<b>Level of Education</b>	
Elementary School	1

Characteristic	Sum (%)
	N = 100
Senior High School	28
Higher Education	71
<b>Occupation</b>	
Housewife	46
Private Employees	34
Entrepreneur	9
Government Employees	11
<b>Parity</b>	
≤ 2	96
> 2	4
<b>Gestational Age</b>	
Trimester I (1-3 Months)	37
Trimester II (> 3-6 Months)	23
Trimester III (> 6-9 Months)	40
<b>Information Access</b>	
Print Media (Newspapers, Magazines, Posters)	13
Electronic Media (Television/News)	56
Online Media (Facebook, Instagram, WhatsApp)	31

The characteristics of respondents presented in table 1 showed that most of them were in the age range of 20-35 years, had a higher education, housewife, had more than 2 children, in the 3<sup>rd</sup> trimester of pregnancy (> 6-9 months), and had information access from electronic media.

**Table 2.** Distribution of Knowledge and Covid-19 Preventive Measures among Pregnant women

Variable	Sum (%)
	N = 100
<b>Knowledge on Covid-19</b>	
Good	74
Poor	26
<b>Covid-19 Preventive Measures</b>	
Good	69
Poor	31

The results of the study presented in table 2 revealed that 74% of pregnant women in Jambi City had good knowledge on Covid-19. This finding is supported by a study conducted by (Kumbeni et al., 2021) that more than two-thirds of pregnant women (85.6%) had good knowledge on Covid-19.

**Table 3.** Relationship between Knowledge and Covid-19 Preventive Measures among Pregnant Women

Knowledge of Pregnant Women	Covid-19 Preventive Measures			P value	OR 95% CI
	Good	Poor	Total		
Good	58	16	74	0.001	4.943 (1.903- 12.843)
Poor	11	15	26		
Total	69	31	100		

The results of the statistical test analysis obtained a p value of 0.001. Such finding indicated that there was a significant relationship between knowledge of pregnant women and covid-19 preventive measures in Jambi City. Based on the odds ratio value, it was found that pregnant women with good knowledge tended to have good Covid-19 preventive measures 4,943 times greater than pregnant women with poor knowledge.

## Discussion

Knowledge is the understanding of the given topic. Knowledge is the ability to receive, retain and use information, which is influenced by skills and experience. The majority of a person's knowledge comes from personal and other experiences, the environment, mass media, and formal and informal education (Siltrakool, 2018). Good knowledge on Covid-19 is related to the provision of intense information through other media and platforms. Since the emergence of this disease, there has been a variety of information about Covid-19 that is provided constantly by governments, community organizations, and individuals through social media, television, radio and announcements via car. Health education about Covid-19 has also taken place in various health facilities. The role of healthcare workers in disseminating information related to Covid-19 in health facilities is very important (Nwafor et al., 2020). In this study, some (56%) access to information for pregnant women came from electronic media (television / news). Therefore, it can be assumed that pregnant women received good information about Covid-19.

A similar study conducted by (West et al., 2021) also showed similar finding that 81.4% of pregnant women had a good knowledge on Covid-19. Age, level of education, employment, and parity were significantly related to a good knowledge of Covid-19. Therefore, health education related to the prevention of Covid-19 to the community and at-risk groups such as pregnant women must continue to be carried out when pregnant women had Antenatal care (ANC) as well as through television, radio, and other social media.

The results of this study further revealed that 54% of pregnant women in Jambi City had good actions related to Covid-19 prevention. Such finding is in line with a study conducted by (Kamal et al., 2020) which showed that 92.7% of pregnant women had good Covid-19 preventive measures. Covid-19 preventive measures were illustrated by the results that 93.7% of pregnant women had never visited a crowd, 99% of pregnant women maintained social distancing, and 99.4% of pregnant women washed their hands with soap regularly.

Good Covid-19 prevention was associated with age. Pregnant women aged 28 years and over were more likely to engage in good Covid-19 preventive measures compared to women aged 18-22 years. In this study, most of pregnant women (88%) were in the age range of 20-35 years. Older age is a risk factor for severe complications and even death from Covid-19. In addition, education is also associated with good Covid-19 preventive measures. Pregnant women who had good education were more exposed to health information, especially about Covid-19. The level of education of pregnant women in this study was mostly higher education (71%) is a college. Therefore, pregnant women tended to take positive steps to protect themselves from diseases including Covid-19. Poor Covid-19 preventive measures might be due to several reasons, including non-available masks, water and soap for washing hands and the high cost of hand sanitizer (Kumbeni et al., 2021).

The general public needs to receive health education on Covid-19 preventive measures through social media, newspapers, television, and government health institutions, particularly at-risk groups like pregnant women. Government also needs to support the implementation of Covid-19 preventive

measures such as by enforcing social distancing, restrictions on movement, mandatory areas for wearing masks, and routine health checks (antenatal care for pregnant women) by local healthcare workers (Kamal, 2020).

This study's findings are consistent with those of Dewi's (2020) study, which showed that there was a significant relationship between pregnant women's knowledge and their use of covid-19 prevention measures (p-value of  $0.000 < \alpha 0.05$ ). A comparable study carried out by Nwafor (2020) also showed that 60.9% of pregnant women had a good knowledge on Covid-19. In this study, it was demonstrated that there is a significant link between knowledge and Covid-19 prevention measures. Preventing Covid-19 necessitates knowledge of pregnant women. Knowledge has a significant impact on the management of Covid-19 prevention, preparation, and readiness.

Knowledge cannot be separated from the actions of a person, including pregnant women. Pregnant women with good knowledge will be able to take appropriate covid-19 preventive measures. Information about the prevention of Covid-19 can be obtained by pregnant women through mass and electronic media, both print and non-printing. Governments, community organizations, and individuals have continuously provided information about Covid-19 via social media, television, radio, and car announcements since the disease's emergence. Various health facilities have also conducted Covid-19 health education. In health facilities, healthcare workers play a crucial role in disseminating information about Covid-19 (Nwafor et al., 2020).

Knowledge-based behaviors are more likely to endure than ignorance-based ones. Awareness, interest, evaluation, trial, and adoption are all steps in the process of changing a person's behavior. Improved preventive behavior requires knowledge. A person's behavior can be influenced by the stages of knowledge known as knowledge, comprehension, application, analysis, synthesis, and evaluation. (Notoatmodjo, 2014). Knowledge cannot necessarily change Covid-19 preventive measures if it is not filtered correctly. In addition, the implementation of Covid-19 preventive measures needs support for from various parties, including families and the surrounding community. In general, Covid-19 can have an impact on the concerns of pregnant women towards their pregnancy and good treatment is expected to minimize adverse impacts on maternal and fetal health (Marliandiani, 2021).

WHO recommendations regarding the prevention of Covid-19 among pregnant women include hand hygiene using hand sanitizer (alcohol) or washing hands with soap and running water, application of proper coughing and sneezing etiquette, wearing a mask, maintaining a distance (at least 1 meter) from others, avoiding touching parts of the face (such as, eyes, nose, and mouth), replacing handshake by waving, elbow greetings or smile, eating nutritious food, drinking enough water, and performing regular ANC visit to midwife (ACOG, 2020).

The government through (Ministry of Health of the Republic of Indonesia, 2020) has also mentioned some efforts that can be made to prevent Covid-19 among pregnant women as follows: (1) Wash hands with soap and running water for at least 20 seconds, if soap and water are unavailable, use an alcohol-based hand sanitizer that contains at least 70% alcohol, wash hands especially after defecation, urination and before eating; (2) Wash your hands before touching the mouth, nose, and

eyes.; (3) Keep away from sick people as much as possible; (4) Use an effective medical mask; (5) When coughing or sneezing, according to cough etiquette, cover your mouth and nose with a tissue; (6) Disinfect and clean surfaces and objects that are frequently touched frequently; (7) Postpone the pregnancy examination to the healthcare workers if there are no signs of danger in pregnancy; (8) Avoid contact with animals such as bats, rats, ferrets or other animals carrying COVID-19 and avoid to go to the animal market; (9) If there are symptoms of COVID-19, it is expected to contact the available emergency services telephone (COVID-19 Hotline: 119 extension 9); (10) Avoid going to countries/regions infected with COVID-19, if it is urgent to go, it is expected to first consult with an obstetric specialist or proper health practitioner; (11) Seek the right and correct information about COVID-19 on trusted social media. Health education related to the prevention of Covid-19 to the community and at-risk groups such as pregnant women must continue to be carried out when pregnant women had Antenatal care (ANC) as well as through television, radio, and other social media.

The limitation in this study was regarding data collection that was carried out online using a google form accessed via smartphone so that only pregnant women who had smartphones and internet access could participate. In addition, Covid-19 prevention was only assessed using questionnaires without direct observation.

## Conclusion

It was proven that there was a relationship between knowledge and Covid-19 preventive measures among pregnant women in Jambi City. It is expected that healthcare workers can provide health education regarding the prevention of Covid-19 to at-risk groups such as pregnant women intensely during antenatal care as well as through mass and electronic media so as to prevent the risk of covid-19 transmission among pregnant women.

## References

- American College of Obstetricians and Gynecologists. (2020). Practice advisory: novel coronavirus 2019 (COVID-19). *Dostopno na: <https://www.acog.org/Clinical-Guidance-and-Publications/Practice-Advisories/Practice-Advisory-Novel-Coronavirus2019>*.
- Chen, H., Guo, J., Wang, C., Luo, F., Yu, X., Zhang, W., ... & Zhang, Y. (2020). Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *The lancet*, 395(10226), 809-815.
- Dashraath, P., Wong, J. L. J., Lim, M. X. K., Lim, L. M., Li, S., Biswas, A., ... & Su, L. L. (2020). Coronavirus disease 2019 (COVID-19) pandemic and pregnancy. *American journal of obstetrics and gynecology*, 222(6), 521-531.
- Dewi, R., Widowati, R., & Indrayani, T. (2020). Pengetahuan dan sikap ibu hamil trimester III terhadap pencegahan Covid-19. *Health Information: Jurnal Penelitian*, 12(2), 131-141.
- Jadoo, S. A. A., Alhusseiny, A. H., Yaseen, S. M., Al-Samarrai, M. A. M., Al-Delaimy, A. K., Abed, M. W., & Hassooni, H. R. (2020). Knowledge, attitude, and practice toward COVID-19 among Iraqi people: a web-based cross-sectional study. *Journal of Ideas in Health*, 3(Special2), 258-265.
- Kamal, D., Thakur, V. D., Swain, S. K., & Vikneshram, C. R. (2020). Knowledge, attitude, and practice toward COVID-19 among pregnant women in a tertiary care hospital during the COVID-19 outbreak. *Journal of Marine Medical Society*, 22(3), 66.
- Ministry of Health of the Republic of Indonesia. (2020). Situasi COVID 19. Retrived from [www.kemendes.kemkes.org](http://www.kemendes.kemkes.org)



- Ministry of Health of the Republic of Indonesia. (2020). Pedoman pencegahan dan pengendalian coronavirus disease (COVID-19). Jakarta Selatan: Kementerian Kesehatan RI.
- Kumbeni, M. T., Apanga, P. A., Yeboah, E. O., & Lettor, I. B. K. (2021). Knowledge and preventive practices towards COVID-19 among pregnant women seeking antenatal services in Northern Ghana. *Plos one*, *16*(6), e0253446.
- Lu, H., Stratton, C. W., & Tang, Y. W. (2020). Outbreak of pneumonia of unknown etiology in Wuhan, China: The mystery and the miracle. *Journal of medical virology*, *92*(4), 401.
- Marliandiani, Y. (2021). The effect of anxiety on pregnant women during the COVID-19 pandemic. *Embrio*, 86-91.
- Notoatmodjo S. (2014). Promosi Kesehatan dan Ilmu Perilaku Kesehatan. Rineka Cipta: Jakarta.
- Nurhasanah, N., Maulida, D. A., & Erawati, E. (2021). HUBUNGAN PENGETAHUAN IBU HAMIL TENTANG COVID-19 DENGAN PERILAKU PENCEGAHAN PENULARAN COVID-19. *Jurnal Kebidanan Malahayati*, *7*(3), 432-440.
- Nurdianto, A. R., Suryokusumo, M. G., Suwanti, L. T., Sardjono, T. W., & Dachlan, E. G. (2020). Effects of Hyperbaric Oxygen Therapy on II-17, Fetal Body Weight and Total Fetus in Pregnant Rattus Norvegicus Infected with Tachyzoite Toxoplasma Gondii. *Systematic Review Pharmacy*, *11*(3), 628-634.
- Nwafor, J. I., Aniukwu, J. K., Anozie, B. O., Ikeotuonye, A. C., & Okedo-Alex, I. N. (2020). Pregnant women's knowledge and practice of preventive measures against COVID-19 in a low-resource African setting. *Int J Gynaecol Obstet*, *150*(1), 121-123.
- Jambi Provincial Government. (2020). Data dan informasi coronavirus disease 2019 (Covid-19) Jambi Province. Retrived from [corona.jambiprov.go.id](https://corona.jambiprov.go.id)
- Rohmah, M. K. (2020). Corona Virus Disease 2019 (COVID-19) pada Wanita Hamil dan Bayi: Sebuah Tinjauan Literatur. *Medica Hospitalia Journal of Clinical Medicine RSUP dr. Kariadi*, *7*(1A), 1-8.
- Rohmah, M. K., & Nurdianto, A. R. (2020). Perspective of molecular immune response of SARS-COV-2 infection. *Jurnal Teknologi Laboratorium*, *9*(1), 58-66.
- Siltrakool, B. (2018). Assessment of Community pharmacists' knowledge, attitude and practice regarding non-prescription antimicrobial use and resistance in Thailand.
- West. B. A., Aitafo. J. E., Kalio. D. G. B. (2021). Knowledge, attitudes and practices of pregnant women attending the antenatal clinic of rivers state university teaching hospital, Nigeria towards the coronavirus (COVID-19) pandemic. *IJHSR*, *11*(4), 21-33.
- World Health Organization. (2020). Coronavirus disease 2019 (COVID-19): situation report, 94.

## Relationship between the Use of Social Media and Knowledge on the Impact of Premarital Sexual Behavior during the Covid-19 Pandemic among Adolescents at SMA Negeri 10 Semarang

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### ABSTRACT

Social media usage has increased by 40% during the Covid-19 pandemic since many people use social media to communicate during the pandemic. This increase in use has an impact on adolescents in the form of negative access to social media which has triggered various negative behaviors among adolescents. This study aims to determine the use of social media in seeking information regarding the impact of knowledge on premarital sexual behavior during the Covid-19 pandemic. It is expected that data regarding adolescents' knowledge on the use of social media can be a reference for content creators/writers on social media in a positive and more positive direction. Innovative to be easily accepted by teenagers. This was a quantitative analytic study with correlational design to determine the relationship between daily use of social media during the Covid-19 pandemic and knowledge on the impact of premarital sexual behavior among adolescents. The samples involved 88 students who were selected using purposive sampling technique. Data collection instrument was a questionnaire. Data were analyzed using Chi Square test. It was found that 50 respondents (56.8%) who used social media to find information on the impact of premarital sexual behavior had good knowledge and 7 respondents (7.95%) had poor knowledge. Meanwhile, 20 respondents (22.7%) who did not use social media to find information on the impact of premarital sexual behavior had poor knowledge and 11 respondents (12.5%) had good knowledge. Analysis through Chi Square test obtained a p-value of 0.001 and correlation coefficient (r) 0.829 (>0.60). Therefore, it can be concluded that there was a significant relationship between the use of social media and knowledge on the impact of premarital sexual behavior among adolescents.

*Penggunaan media sosial mengalami kenaikan sebanyak 40% selama pandemi Covid-19. Hal ini dikarenakan banyak orang yang menggunakan media sosial untuk berkomunikasi selama masa pandemi. Peningkatan penggunaan tersebut berdampak pada remaja yakni akses negatif di media sosial yang mengakibatkan memicu berbagai perilaku negatif pada remaja. Penelitian ini bermanfaat untuk mengetahui penggunaan media sosial dalam mencari informasi tentang pengetahuan dampak perilaku seksual pranikah pada masa pandemi Covid-19 sehingga diharapkan dengan mengetahui sejauh mana pengetahuan remaja dalam penggunaan media sosial dapat menjadi acuan content creator/penulis di media sosial kearah yang positif dan lebih Inovatif agar mudah diterima kalangan remaja. Jenis penelitian analitik kuantitatif, desain penelitian yang digunakan korelasional design yaitu dengan mengetahui hubungan penggunaan Media sosial setiap harinya selama masa pandemi Covid-19 terhadap pengetahuan remaja tentang dampak perilaku seksual pranikah. Sampel 88 siswa/i dengan tehnik purposive sampling. Intrumen: Angket, data dianalisis menggunakan Chi Square. Sebagian besar responden menggunakan media sosial untuk mencari informasi tentang dampak perilaku seksual pranikah yaitu 62,5% memiliki tingkat pengetahuan yang baik yaitu sebanyak 61 siswa/i (69,3%) dan responden yang memiliki pengetahuan kurang sebanyak 27 siswa/i (30,7%). Analisis dengan Uji Chi Square di dapatkan nilai p-value 0,001 koefisien korelasi (r) 0,829 (>0,60) yang dapat disimpulkan terdapat*

## **Introduction**

The Covid-19 pandemic is an outbreak of the Coronavirus Disease 2019 (Covid-19) which has been spreading throughout the world (Ismaniar & Utoyo, 2020). The government has started implementing LSRR (Large-Scale Social Restrictions) activities or commonly called social distancing to prevent the spread of Covid-19 virus. Through this policy, residents are required to carry out online or virtual activities using the internet, for example School from Home (SFH), Work from Home (WFH) activities, and others. Such phenomenon reflects that residents always rely on the internet network to carry out online schools or works.

Internet use during the pandemic is growing rapidly. Currently, social media is not only a medium of communication, but also an important part in the worlds of commerce, industry, social interaction and education (Indonesian Internet Service Provider Association (APJII), 2020). The use of social media applications used such as Facebook, Twitter, Instagram, Youtube, whatsapp and tiktok is currently being favored by various groups and there is an increase in its use during the Covid-19 pandemic (Nabila, 2020). The Statistics reported that the most social media users in Indonesia in 2020 were in the age group of 25-34 years old (35.4%), followed by the age group of 18-24 years old (30.3%), 13-17 years old (13.3%)., and 55-64 years old (1.4%). Internet users are getting higher during the pandemic, which reached 73.7% of the population or around 196.7 million people (Indonesian Internet Service Provider Association (APJII), 2020).

Traffic of the use of social media applications such as WhatsApp and Instagram had increased by 40% during the pandemic since many people use social media to communicate during the pandemic. Since the pandemic started, the use of the WhatsApp application increased from 27% to 41% (Frederick & Maharani, 2021). During the COVID-19 pandemic, there was an increase in sexual deviations which resulted in an increase in early marriage. The dispensation rate for early marriage due to pregnancy was related to the adolescent phenomenon in the digital era (Waroh, 2020). Some phenomena of juvenile delinquency were influenced by the easy and cheap supply of drugs/koplo pills, the lack of communication between teenagers and their parents, addiction to playing gadgets, and the surrounding environment (Hariastuti, 2020).

Social media obviously has an effect on adolescent health. Cyberbullying, educational and mental health consequences, sexuality, and privacy concerns are risky effects of social media use. Despite its risky misuse, social media can provide increased opportunities for collaboration, communication, self-esteem enhancement, health promotion, and access to health information when it is used properly (Guinta MR, 2018). Social media plays an important role in disseminating information about the impact of premarital sex. Increasing education and understanding of reproductive health through social media should be focused by the government and health practitioners by disseminating education about the

impact of premarital sexual behavior to reduce the number of sexual deviant behaviors (Yulianingsih et al., 2020).

Talking about knowledge about reproductive health is still considered a strange or odd thing in society. Thus, children tend to look for it from various sources of information, one of which is social media which is not necessarily true. Therefore, it is necessary to supervise the role of parents regarding the use of social media (Barokah & Zolekhah, 2019). Adolescents need to be more critical in seeking information about reproductive health and the impact of early marriage (Waroh, 2020). The better the knowledge of adolescents on the impact of sexual behavior, the more they avoid premarital sexual behavior (Finlay et al., 2020).

The impacts that will arise among adolescents regarding premarital sexual behavior include psychological impacts in the form of guilty feelings, inferiority/worthlessness, depression, haunted by feelings of sin and guilt, loss of the future, anxiety about not being accepted and being abandoned by a partner (Umaroh et al., 2021). Furthermore, there are also health impacts in the form of no willingness to perform abortions that can endanger lives, stunting or child development problems, as well as risk factors for cervical cancer (Weiss et al., 2019).

The social impact of premarital sexual behavior is alienation by the community, and in marriage, the couples are vulnerable to divorce. One of the causes of divorce in early marriage is immature mind and no experience in working or having a permanent job so that such couples are vulnerable to having a lower middle economy (Sari & Umami, 2020). Lack of economic income is very influential, especially for breastfeeding mothers which can affect the quality of the macronutrient components of breast milk. Low economic income indicates that the diet of breastfeeding mothers will be disrupted and it further has a negative impact on the amount and nutritional composition of breast milk. The low macronutrient components of breast milk will affect the infant growth and development process (Hidayatunnikmah, 2019).

According to a study conducted by (Puspita et al., 2020), it was found that the use of social media and the role of peers simultaneously affected 84.3% of risky sexual behavior among students at SMK Surakarta. In line with a study conducted by (Fitriyana, Aulia, 2021) on the relationship between the use of social media and adolescent sexual behavior, it was found a relationship between the use of social media and adolescent sexual behavior. In addition, a study conducted by (Subhi et al., 2021) regarding sexual health and the use of social media among risky adolescents, it was found a significant relationship between the use of social media and sexual health. Thus, the use of social media needs to be continuously monitored and considered so that adolescents strive to be assertive in order to ensure a more prosperous life in the future.

Based on a preliminary study at the Religious Courts in the city of Semarang, child or early-age marriage cases showed an increase during the Covid-19 pandemic from March to December 2020. In 2018 there were 64 incidents, in 2019 it rose to 105 cases then in 2020 it rose again to 217 cases. The surge in cases of early-age marriage one of which is due to the lack of parental supervision in the use of the internet or social media. Adolescents in the age range of 17-18 years or the XI grade are at the stage

of middle adolescence in human development. They tend to look for self-identity and their minds are still abstract. In the use of social media, adolescents have not been fully able to sort out useful access. Teenagers tend to be easily affected by the positive and negative impacts due to their activities in the use of social media (Purnawinadi & Sali, 2020). Therefore, the current study involved the XI grade of Senior High School students as the subjects.

Based on the background, the researcher is interested in conducting a study on the relationship between the use of social media and knowledge on the impact of premarital sexual behavior during the Covid-19 pandemic at SMA Negeri 10 Semarang.

## **Methods**

This was a quantitative analytical study using a cross-sectional design. The populations were all XI Grade students of SMA Negeri 10 Semarang as many as 357 students and the samples were 88 students who were selected using purposive sampling technique. This study was approved by the Research Ethics Committee of the Midwifery and Midwifery Profession Study Programs, Faculty of Medicine, Sultan Agung Islamic University, Semarang, with Decree No. 256/VIII/2021/Commission on Bioethics. The questionnaire data collection instrument used was a questionnaire on the use of social media and knowledge on the impact of sexual behavior during the Covid-19 pandemic. Such questionnaire applied the Guttman Scale based on inclusion criteria, namely willing to be respondents, XI grade students of SMA Negeri 10 Semarang and students who were exposed to social media. In addition, the exclusion criterion was those who were not following the research procedures. The questionnaire with a total of 20 statement items was tested for validity and reliability with a value of >0.3 for each item and Cronbach's alpha value of 0.829 of >0.60, respectively. Thus, so the questionnaire was declared valid and reliable. Data were collected using a google form questionnaire along with informed consent which was distributed online using the Whatsapp Group application. The data were then analyzed through univariate analysis using the percentage of each variable and bivariate analysis to find the effect of social media use. Data were analyzed through bivariate analysis with Chi Square statistical test using SPSS software. The data collection lasted for 5 days from October 3-8, 2021 by distributing questionnaires 3 times. The study was conducted from August to October 2020.

## **Results**

The study was conducted among 88 students in accordance with the inclusion criteria and the respondents had agreed to be involved based on the informant consent provided. Characteristics of respondents are presented in table 1.

**Table 1.** Characteristics of Respondents by the Use of Social Media

	<b>Variable</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
<b>Gender</b>	Male	26	29.5%
	Female	62	70.5%
	<b>Total</b>	<b>88</b>	<b>100%</b>
<b>Frequently used apps</b>	Did not use	31	35.2%
	<i>Google</i>	38	43.2%

	<b>Variable</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
	<i>Instagram</i>	7	8.0%
	<i>Twitter</i>	9	10.2%
	<i>Tiktok</i>	3	3.4%
	<b>Total</b>	<b>88</b>	<b>100%</b>
<b>Reason for Access</b>	Entertainment	48	54.5%
	Socialization	15	17.0%
	Study	25	28.4%
	<b>Total</b>	<b>88</b>	<b>100%</b>
<b>Duration of Social Media Usage</b>	1 – 2 hours	16	18.1%
	3 – 4 hours	21	23.9%
	5 hours	17	19.3%
	>5 hours	34	38.6%
	<b>Total</b>	<b>88</b>	<b>100%</b>

Source: Primary Data, 2021

Based on table 1 above, it was shown that the majority of respondents were female as many as 62 students (70.5%) and there were 26 male respondents (29.5%). The samples were at the stage of middle adolescence in human development. At this age range, they are still looking for self-identity, and their minds are still abstract which not yet fully able to sort out positive and negative content. Therefore, teenagers usually access social media based on interests. In fact, social media can be used to gain certain skills regarding new things in the world of technology and access several applications that can support the learning process (Purnawinadi & Salii, 2020).

Based on the results of the study, 38 students (43.2%) frequently used the google application to search for reproductive health information and 31 students (35.2%) did not use social media applications to search for reproductive health information. The study finding is in line with a study conducted by (Harahap & Adeni, 2020) which revealed that many teenagers looked for information that was accessed from social media, one of which is the Google application (Rulli Nasrullah, 2015:28).

Based on the results of the study, most of respondents revealed the reason for using social media as entertainment, namely as many as 48 students (54.6%). Furthermore, 25 students (28.4%) accessed social media to learn and 15 students (17.0%) accessed social media for socialization. Based on the results of the study, 54.5% of respondents (48 respondents) accessed social media to seek entertainment and the intention to access social media as a learning media was quite low (25 respondents or 28.4%). This is in line with a study conducted by (Wulandari & Netrawati, 2020) which found that the level of addiction to using social media for entertainment reached 54.8%, which meant that half of the respondents experienced addiction to social media for entertainment.

The number of students who accessed social media for more than 5 hours per day was quite high, namely as many as 34 students (38.6%) and the second highest duration was 1-2 hours as many as 16 students (18.1%). Furthermore, the use of social media with duration of 3-4 hours involved 21 students (23.9%), and duration of 5 hours involved 17 students (19.3%). During the Covid-19 pandemic, the duration of the use of social media was quite high because all activities were carried out from social media or online. Such condition automatically made the duration of social media use quite high or longer (Tania Intan et al., 2021). Positive use of social media can provide great benefits for education, research, commerce, and other aspects of life. Positive impact is able to encourage adolescents to use social media

as an important tool to assist education, increase knowledge, and expand opportunities and empowerment in achieving a better quality of life (Indanah et al., 2020).

Other benefits of using social media are as a learning platform, e-learning website network, creative self-expression, job opportunities and marketing. Likewise, some students can take advantage of virtual learning during the Covid-19 pandemic which is part of several social networking applications to involve themselves in class. Students can also share subject matter through social media networking applications such as Facebook, Instagram, and WhatsApp (Information Communication and Coding Department, 2021). Students are easily interested in learning new things, but sometimes they do not realize the risks that can be caused by the use of social media (Alfiyah et al., 2018).

Thus, the use of social media among adolescents is more intended for social interaction, entertainment and communication facilities than as a means of seeking information. A student who is too preoccupied with social media will usually find it difficult to understand lessons because of a lack of concentration (Purnawinadi & Sali, 2020). The use of social media may reduce interactions in the real world and as a result, students may become lazy to learn. In addition, social media make students to be less responsive to the environment around them (Gani, 2020). Another negative impact of using social media is the abuse of privacy (Rulli Nasrullah, 2015).

**Table 2.** Frequency Distribution by the Use of Social Media among Students at SMA Negeri 10 Semarang

	<b>Variable</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
<b>Use of Social Media</b>	Used	57	67.8 %
	Did not use	31	35.2%
	<b>Total</b>	<b>88</b>	<b>100%</b>

Source: Primary Data, 2021

Based on table 2, 57 students (67.8%) used social media to find information about reproductive health and 31 students (35.2%) did not use social media to find information about the impact of reproductive health due to premarital sexual behavior. It can be concluded that respondents still did not use social media to find information about the impact of premarital sexual behavior. In addition, the use of social media is still widely misused to write rumors, manipulate news or hoaxes, fraud modes, information wars, violate other people's privacy and just for entertainment. It was revealed that the use of social media access to find information was quite low, especially access to information about reproductive health during the Covid-19 pandemic (Indonesian Internet Service Provider Association (APJII), 2020).

**Table 3.** Frequency Distribution by Knowledge on Reproductive Health Impact of Premarital Sexual Behavior among Students at SMA Negeri 10 Semarang

	<b>Variable</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
<b>Knowledge</b>	Good	61	69.3%
	Poor	27	30.7%
	<b>Total</b>	<b>88</b>	<b>100%</b>

Source: Primary Data, 2021

Based on table 3 above, it was shown that most of respondents had good knowledge on the impact of premarital sexual behavior as many as 61 respondents (69.3%) and 27 respondents (30.7%) had poor knowledge. Knowledge is the result of knowing about an object using five senses. The intensity of attention and perception of objects in sensing affects the results of knowledge. The sense of hearing

(ears) and the sense of sight (eyes) are the most widely used senses to increase knowledge (Notoatmodjo, 2012).

Adolescents can analyze the level of knowledge about the impact of sexual behavior by distinguishing, separating, classifying good and bad behavior in relationships in order to avoid premarital sexual behavior and its adverse effects (Notoatmojo, 2012).

**Table 4.** Frequency Distribution by Knowledge on Reproductive Health Impact of Premarital Sexual Behavior among Students at SMA Negeri 10 Semarang

Use of Social Media	Knowledge				Total		P-Value	OR
	Poor		Good					
	N	%	N	%	N	%		
Did not use	20	22.7	11	12.5	31	35.2	0.000	12.987
Used	7	7.95	50	56.8	57	64.8		
<b>Total</b>	27	30.7	61	69.3	88	100		

Source: Primary Data, 2021

Based on table 4 above, bivariate analysis using the Chi-square test obtained a *P*-value of 0.000 ( $p < 0.05$ ), which indicated a significant relationship between the use of social media and knowledge on reproductive health impact of premarital sexual behavior during the Covid-19 pandemic. The variable of social media use was found to affect the level of knowledge of adolescents on the impact of sexual behavior with an OR of 12.987, which meant that respondents who did not use social media to seek information had 12,987 times the chance of a lack of knowledge on the reproductive health effects of premarital sexual behavior.

Based on the results of study, 50 respondents (56.8%) who used social media to find information on the impact of premarital sexual behavior had good knowledge and 7 respondents (7.95%) had poor knowledge. Meanwhile, 20 respondents (22.7%) who did not use social media to find information on the impact of premarital sexual behavior had poor knowledge and 11 respondents (12.5%) had good knowledge.

## Discussion

It can be concluded that respondents who accessed social media tended to have good knowledge on the impact of premarital sexual behavior, while respondents who did not access social media tended to have poor knowledge about the impact of premarital sexual behavior. Lack of knowledge of adolescents about premarital sexual behavior has an impact on adolescents who behave sexually without accurate information on reproductive health. Such fact places adolescents in unsafe sexual behavior and can lead to various impacts of sexual behavior such as unwanted pregnancy, sexually transmitted infections (STD) and various other impacts (Kurniasari et al., 2018).

Many factors influence knowledge about the impact of premarital sexual behavior on adolescents such as education level, experience, and beliefs. In addition, adolescents get reproductive health knowledge from school materials, social media, books, health education videos, films about sexual behavior, family, and friends (Alfiyah et al., 2018). Increased knowledge among adolescents can be obtained from various sources of information such as through mass media such as newspapers,



magazines, television news and some of them can also be obtained from social media content, counseling as well as health education (Aprilia et al., 2020).

Social media has not been fully utilized properly in various fields, including in education (Tania Intan et al., 2021). The use of social media can be performed anytime and anywhere. During a pandemic, sometimes some teachers only provide material virtually without providing an optimal explanation. So that teenagers are not necessarily able to understand and apply their knowledge well (Yulianingsih et al., 2020). Thus, certain character of social media to be concerned is dissemination or sharing. Sharing shows that the audience is actively developing and disseminating information or content (Rulli Nasrullah, 2015:33).

The more exposure to reproductive health information, the easier it is for adolescents to understand information about the impact of premarital sexual behavior. With the proper amount of health information obtained, adolescents will pay more attention to their sexual behavior and consider the pros and cons of sexual behavior, especially in dating (Rihardini, 2018). Adolescent knowledge is also influenced by the surrounding environment since the new knowledge will be sorted according to the conditions that exist around a person, namely the work environment, living environment and the environment of friendship or peer influence (Puspita et al., 2020).

Information from education can provide a faster understanding due to its short-term impact (immediate impact) (Barokah & Zolekhah, 2019). Non-formal education on reproductive health can be accessed through various social media platforms, from educational videos, images and posters. Formal education to increase information about reproductive health knowledge can be obtained from the participation of adolescents in in webinars, adolescent reproductive health organizations and the healthy youth movement (Wirenviona, 2020). During a pandemic, social media is another way for adolescents to interact with friends, a means of entertainment and a means of learning in the midst of the Covid-19 pandemic and teenagers being vulnerable to being exposed to inaccurate information on social media. In addition, social media may increase cyberbullying behavior, exploitation to pornographic sites, cybersex and others (Aisyah et al., 2020).

According to Unicef Indonesia (2020) in the midst of the Covid-19 pandemic, there are various other negative impacts of using the internet or social media, including sexual violence, sexual harassment, self abuse or self-abuse, and exploitation of children or pedophile behavior. Openness and parental assistance to children is the most appropriate way to prevent negative impacts of social media (Zahara, 2021). The use of social media must be supervised by parents so that its use is appropriate and avoids negative content. Understanding from parents is important in monitoring the behavior of using social media in adolescents (Yulianingsih et al., 2020). When children feel comfortable and openly understood by their parents, they will discuss their use of social media and are willing to share stories. Meanwhile, parents who do not understand make children become introverted and in some cases, engage in risky social media use behavior during the Covid-19 pandemic (Biernesser1 et al., 2020).

Teenagers who initially do not want to behave negatively on social media can also be influenced by content that leads them to negative actions. There is a crucial need for the role of parents in

accompanying children in the midst of the Covid-19 pandemic so that children will be able to be supervised and further reduce negative impacts (Suherniati Antina, 2021). One of the important challenges of using social media is overcoming the perception of using social media as a mere communication and entertainment tool. Moreover, social media has the potential as a health promotion tool for adolescents so that it can increase the knowledge of its users. However, many adolescents have not used social media to get various reproductive health information, especially the impact of premarital sexual behavior (Marie Plaisime, 2020).

The flexibility and versatility of the use of social media is the responsibility of health practitioners and researchers who must always update their knowledge and provide messages according to the needs of adolescents in their communities, especially regarding reproductive health (Aprilia et al., 2020). The use of social media in seeking information on reproductive health and various health programs, including social media-based programs on adolescent knowledge, attitudes, and behavior, is still not intensified. Therefore, given the lack of information, it is necessary for health observers to further explore how social media platforms can be used to promote health (Marie Plaisime, 2020). Effective youth health promotion using social media must utilize a variety of communication strategies to expand, reach and encourage youth involvement in obtaining interesting, accurate and easy-to-understand health information from social media access (Pramono et al., 2019).

With regard to negative impact of using social media, a media literacy movement is needed. Media literacy is a movement to increase control over the use of media for each individual (Muttaqin, 2020). Thus, messages that link reproductive health problems with social determinants of premarital sexual behavior can be packaged more attractively for adolescents. For example, from a public health perspective, premarital sexual risk and adolescent health are framed as social impacts (Bemj et al., 2021). Topics or social media content related to drugs and premarital sexual behavior are more popular on social media platforms. Many adolescents stated they were more comfortable looking for this knowledge information online, compared to non-virtual communication (in person). Teenagers were found to be more receptive to online platforms for sexual health information (Marie Plaisime, 2020).

Adolescents are more interested in reading articles using health messages, stories, and images targeted at teenagers, visually appealing, funny, and entertaining on social media. Thus, they have the potential to share health information across their peer network. Despite a lot of valid information that is disseminated through social media, there is also a variety of medically and scientifically inaccurate information (Djalante et al., 2020). Accurate and actual health promotion/updates need to be blown up more, because there are many myths related to health that can be strengthened through various sources (social media sites, education, friends and the environment), and there are many inaccurate stories or personal experiences that are spread through social media (Gani, 2020).

## **Conclusions**

There are some conclusions based on the study. Most of respondents had good knowledge on the impact of premarital sexual behavior as many as 61 respondents (69.3%) and 27 respondents (30.7%)

had poor knowledge. Furthermore, there was a relationship between the use of social media and knowledge on reproductive health impact of premarital sexual behavior with a  $P$ -value of  $0.000 < (0.05)$ .

Based on the results of study, 50 respondents (56.8%) who used social media to find information on the impact of premarital sexual behavior had good knowledge and 7 respondents (7.95%) had poor knowledge. Meanwhile, 20 respondents (22.7%) who did not use social media to find information on the impact of premarital sexual behavior had poor knowledge and 11 respondents (12.5%) had good knowledge. Adolescents are expected to be wiser in using social media and can access more information on the impact of premarital sexual behavior on social media. The current study is expected to be a reference for school managements to take preventive action in reducing premarital sexual behavior among adolescents by knowing the level of knowledge of students about premarital sexual behavior.

Healthcare workers are expected to use social media as a reference to add insight into the level of knowledge of adolescents by optimizing programs for adolescents in health facilities, so as to help suppress the rise of negative behaviors regarding premarital sexual behavior among adolescents. For further researchers, thus study is expected to be a reference to design educational content about the impact of premarital sexual behavior on social media that is attractive and easily accessible to adolescents.

## References

- Aisyah, S., Syafar, M., & Amiruddin, R. (2020). Pengaruh Media Sosial Untuk Meningkatkan Pengetahuan Dan Sikap Remaja Tentang Hiv & Aids Di Kota Parepare. *Jurnal Kesehatan Masyarakat Maritim*, 3(1). <https://doi.org/10.30597/jkmm.v3i1.10299>
- Alfiyah, N., Solehati, T., & Sutini, T. (2018). Gambaran Faktor-Faktor yang Berhubungan dengan Perilaku Seksual Pranikah pada Remaja SMP. *Jurnal Pendidikan Keperawatan Indonesia*, 4(2), 131–139. <https://doi.org/10.17509/jpki.v4i2.10443>
- Aprilia, R., Sriati, A., & Hendrawati, S. (2020). Tingkat Kecanduan Media Sosial pada Remaja. *Journal of Nursing Care*, 3(1), 41–53. <https://jurnal.unpad.ac.id/jnc/article/view/26928>
- Barokah, L., & Zolekhah, D. (2019). Hubungan Penggunaan Media Massa Dengan Tingkat Pengetahuan Dampak Pernikahan Dini Terhadap Kesehatan Reproduksi. *Jurnal Kebidanan*, 11(01), 44. <https://doi.org/10.35872/jurkeb.v11i01.329>
- Bemj, B. E. J., Pertiwi, D., & Yasmin, R. (2021). Pengaruh pendidikan promosi kesehatan seksual dan reproduksi pada anak remaja di Samarinda pada tahun 2021. *Bunda Edu-Midwifery Journal (BEMJ) (BEMJ)*, 4(2).
- Biernesser1, C., , PhD, MSW, M. G. M., , DO, M. E. M., & , MD, PhD; Ana Radovic2, 3 MD, Ms. (2020). Social media use and monitoring for adolescents with depression and implications for the Covid-19 pandemic: qualitative study of parent and child perspectives. *JMIR PEDIATRICS AND PARENTING*.
- Information Communication and Coding Department. (2021). *Pentingnya Penggunaan dan Pemanfaatan Teknologi di Masa Pandemi*.
- Djalante, R., Lassa, J., Setiamarga, D., Sudjatma, A., Indrawan, M., Haryanto, B., Mahfud, C., Sinapoy, M. S., Djalante, S., Rafliana, I., Gunawan, L. A., Surtiari, G. A. K., & Warsilah, H. (2020). Review and analysis of current responses to COVID-19 in Indonesia: Period of January to March 2020. *Progress in Disaster Science*, 6, 100091. <https://doi.org/10.1016/j.pdisas.2020.100091>
- Finlay, J. E., Assefa, N., Mwanyika-Sando, M., Dessie, Y., Harling, G., Njau, T., Chukwu, A., Oduola, A., Shah, I., Adanu, R., & Bukenya, J. (2020). Sexual and reproductive health knowledge among

- adolescents in eight sites across sub-Saharan Africa. *Tropical Medicine and International Health*, 25(1), 44–53. <https://doi.org/10.1111/tmi.13332>
- Fitriyana, Aulia, D. L. N. (2021). Penggunaan Media Sosial Dengan Perilaku Seksual Remaja. *Jurnal Kebidanan Malahayati*, 7(2), 303–309.
- Frederick, B., & Maharani, A. K. (2021). Eksistensi Media Sosial Pada Masa Pandemi Covid-19. *Jurnal Penelitian Pendidikan Sosial Humaniora*, 6(2), 75–83.
- Gani, A. G. (2020). Pengaruh Media Sosial Terhadap Perkembangan Anak Remaja. *Jurnal Mitra Manajemen*, 7(2), 32–42. <http://journal.universitassuryadarma.ac.id/index.php/jmm/article/viewFile/533/499>
- Guinta MR, J. R. (2018). Social media and adolescent health. *Pediatric Nursing*, 44(4), 196–202.
- Harahap, M. A., & Adeni, S. (2020). Tren penggunaan media sosial selama pandemi di indonesia. *Jurnal Professional FIS UNIVED*, 7(2), 13–23.
- Hariastuti, I. (2020). *Sebuah Tantangan Program Genre pada Kejadian Dispensasi Kawin di Jawa Timur*.
- Hidayatunnikmah, N. (2019). Pengaruh Pendapatan Ekonomi Ibu Menyusui Terhadap Kualitas Komponen Makronutrien Asi. *Journal Of Health Science (Jurnal Ilmu Kesehatan)*, 4(2), 1–7. <https://doi.org/10.24929/jik.v4i2.796>
- Indanah, I., Faridah, U., Sa'adah, M., Sa'diyah, S. H., Aini, S. M., & Apriliya, R. (2020). Faktor Yang Berhubungan Dengan Pernikahan Dini. *Jurnal Ilmu Keperawatan Dan Kebidanan*, 11(2), 280. <https://doi.org/10.26751/jikk.v11i2.796>
- Indonesian Internet Service Provided Association (APJII). (2020). *Profil Pengguna Internet Indonesia*.
- Ismaniar, I., & Utoyo, S. (2020). “Mirror of Effect” dalam Perkembangan Perilaku Anak pada Masa Pandemi Covid 19. *Diklus: Jurnal Pendidikan Luar Sekolah*, 4(2), 147–157. <https://doi.org/10.21831/diklus.v4i2.32429>
- Kurniasari, N. D., Hariastuti, I., & Pardiono, P. (2018). Pemahaman Remaja Tentang Kesehatan Reproduksi (Pernikahan Dini Dan Perilaku Beresiko) Di Sampang Madura. *Jurnal Komunikasi*, 12(1), 74–85. <https://doi.org/10.21107/ilkom.v12i1.3801>
- Marie Plaisime, C. (2020). Social Media and Teens: A Needs Assessment Exploring the Potential Role of Social Media in Promoting Health. *SAGE*. <https://doi.org/10.1177/2056305119886025>
- Muttaqin, M. Z. (2020). *Kemampuan Literasi Media (Media Literacy) di Kalangan Remaja Rural di Kabupaten Lamongan*.
- Nabila, D. (2020). *peradaban media sosial di era industri 4.0* (rahardian tegar kusuma (ed.)). PT Citra intrans Selaras.
- Notoatmodjo, S. (2012). *Kesehatan Masyarakat, Ilmu & Seni* (Revisi). Rineka Cipta.
- Pramono, S. E., Melati, I. S., & Kurniawan, E. (2019). Fenomena Pernikahan Dini Di Kota Semarang: Antara Seks Bebas Hingga Faktor Pengetahuan. *Jurnal Riptek*, 13(2), 107–113. <https://ripteck.semarangkota.go.id/index.php/ripteck/article/view/63/56>
- Purnawinadi, I. G., & Sali, S. (2020). Durasi Penggunaan Media Sosial Dan Insomnia Pada Remaja. *Klabat Journal of Nursing*, 2(1), 37. <https://doi.org/10.37771/kjn.v2i1.430>
- Puspita, I. A., Agusybana, F., & Dharminto, D. (2020). Hubungan Penggunaan Media Sosial dan Peran Teman Sebaya dengan Perilaku Seksual Berisiko di SMK Kota Surakarta. *Jurnal Kesehatan*, 7(3), 111–118. <https://doi.org/10.25047/j-kes.v7i3.113>
- Rihardini, T. (2018). Perbedaan Antara Perilaku Seksual Remaja Yang Pernah / Sedang berpacaran dan yang belum berpacaran di SMA “X” Madura. *Jurnal Embrio Kebidanan*, X(2).
- Rulli, N. (2015). *Media Sosial Perspektif Komunikasi, Budaya dan Sioteknologi*. Simbiosis Rekatama media.
- Sari, L. Y., & Umami, D. A. (2020). Dampak Pernikahan Dini Pada Kesehatan Reproduksi Dan Mental

- Perempuan (Studi Kasus Di Kecamatan Ilir Talo Kabupaten Seluma Provinsi Bengkulu). *Jurnal Bidang Ilmu Kesehatan*, 10(1), 54–65. <https://doi.org/10.52643/jbik.v10i1.735>
- Subhi, N., Alya, N., Razak, A., & Ibrahim, R. (2021). *Kesihatan Seksual Dan Penggunaan Media Sosial Dalam*. 18(6), 146–160.
- Suherniati Antina, M. K. A. (2021). *Komunikasi efektif dalam proses pembelajaran di era digital*.
- Tania Intan, Ismail, N., & Handayani, V. T. (2021). Penggunaan Media Pembelajaran Alternatif Sebagai Mitigasi Dan Adaptasi Pada Masa Pandemi Covid-19. *Kaibon Abhinaya : Jurnal Pengabdian Masyarakat*, 3(2), 73–78. <https://doi.org/10.30656/ka.v3i2.3043>
- Umaroh, A. K., Prastika, C., Herawati, Chalada, S., & Pratomo, H. (2021). Fenomena Pacaran Remaja Selama Masa Pandemi Covid-19 di Jabodetabek. *Fakultas Kesehatan Masyarakat, Universitas Indonesia*, 5(1), 125–138.
- Waroh, Y. K. (2020). Hubungan antara Pengetahuan Remaja tentang Kesehatan Reproduksi dengan Pernikahan Dini di Desa Panggung Kecamatan Sampang, Sampang. *Embrio*, 12(1), 58–65. <https://doi.org/10.36456/embrio.v12i1.2361>
- Weiss, G., Ganz, T., & Goodnough, L. T. (2019). Anemia of inflammation. *Blood*, 133(1), 40–50. <https://doi.org/10.1182/blood-2018-06-856500>
- Wirenviona, R. A. A. I. D. C. R. (2020). *Edukasi Kesehatan Reproduksi Remaja* (Rr. Iswari Hariastuti (ed.)). Airlangga University Press.
- Wulandari, R., & Netrawati, N. (2020). Analisis tingkat kecanduan media sosial pada remaja. 5(2), 41–46. <https://doi.org/https://doi.org/10.29210/3003653000>
- Yulianingsih, W., Suhanadji, S., Nugroho, R., & Mustakim, M. (2020). Keterlibatan Orangtua dalam Pendampingan Belajar Anak selama Masa Pandemi Covid-19. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 5(2), 1138–1150. <https://doi.org/10.31004/obsesi.v5i2.740>
- Zahara, S. (2021). *Peran orang tua dalam mendampingi anak menggunakan media sosial di tengah Pandemi Covid-19*. 3.

## Anxiety of Pregnant Women and Determination of Maternity Health Care Facility during the COVID-19 Pandemic

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### ABSTRACT

There are physical and psychological changes during pregnancy experienced by pregnant women. Anxiety often increases before delivery, especially in the third trimester. During pregnancy, COVID-19 can contribute to a woman's mental health issues. Anxiety is often experienced regarding previous birth and delivery, fear of becoming infected with COVID-19 and transmitting it to others, and information obtained from social media regarding the susceptibility of pregnant women to COVID-19. Anxiety will impact decision making, especially concerning the selection of maternity health care facilities during the COVID-19 pandemic. This was a quantitative analytical study with cross-sectional design through survey methodology that was conducted July-November 2021 in the work area of 3 Community Health Centers (Betoambari, Katobengke and Kadolomoko) at Baubau City, Southeast Sulawesi. 72 pregnant women in the third trimester who were recorded in the MCH book were selected as the study samples through probability sampling technique. This study aims to determine the relationship between anxiety of pregnant women and the type of maternity health care facility during the COVID-19 pandemic. Data were collected using HARS (Hamilton Anxiety Rating Scale) questionnaire. The results of data analysis using the Chi-Square test obtained a  $p=0.001 < \alpha=0.05$ . There was a relationship between anxiety of pregnant women and the type of health care facility during the COVID-19 pandemic. Women with severe anxiety chose Private Practice Midwife (16.6%), women with moderate anxiety chose CHC (15.2%) and women with mild anxiety chose hospital (12.5%) as a maternity health care facility during the Covid-19 pandemic.

*Selama masa kehamilan terjadi perubahan fisik maupun psikologi pada ibu hamil. Kecemasan meningkat menjelang persalinan terutama pada trimester tiga. Selama kehamilan, COVID-19 dapat berkontribusi pada masalah kesehatan mental wanita. Kecemasan yang dirasakan, khususnya mengenai pengalaman ibu-ibu sebelumnya yang pernah melahirkan, ketakutan tertular COVID-19 dan menularkannya kepada orang lain, serta informasi yang diperoleh dari media sosial mengenai kerentanan ibu hamil terhadap COVID-19. Rasa cemas akan memengaruhi pengambilan keputusan khususnya dalam menentukan jenis fasilitas pelayanan kesehatan bersalin di masa pandemi COVID-19. Penelitian ini dilakukan untuk mempelajari bagaimana ketakutan pandemi COVID-19 memengaruhi keputusan ibu hamil tentang ke mana harus mencari perawatan bersalin. Penelitian ini bersifat kuantitatif, menggunakan desain cross-sectional dan metodologi survei analitik dilakukan pada Juli–November 2021 di wilayah kerja Puskesmas (Betoambari, Katobengke dan Kadolomoko) Kota Baubau Sulawesi Tenggara. Teknik pengambilan sampel dengan probability sampling melibatkan 72 ibu hamil trimester tiga yang tercatat di buku Laporan KIA. Teknik pengumpulan data menggunakan kuesioner HARS (Hamilton Anxiety Rating Scale). Hasil analisis data menggunakan uji Chi-Square menunjukkan  $p=0,001 < \alpha=0,05$  adanya hubungan kecemasan dalam menentukan jenis fasilitas pelayanan kesehatan di masa pandemi COVID-19. Kecemasan berat memilih Praktik*

## **Introduction**

Pregnant women often experience physical and mental changes. In general, the physical changes during pregnancy characterized by amenorrhea, enlarged breasts and abdomen, weight gain, relaxation of the digestive muscles, changes in sensitivity and changes in the shape of the uterus and organ system function (Pieter H.Z & Lubis N. L, 2010). Complaints of feeling nauseous, abdominal pain, dizziness, and fatigue as well as face that looks so tense are found in the first trimester. Tari & Romania 2011 in (Rustikayanti, R. N., 2016) regarding psychological changes in the first trimester of pregnancy states that about 80% of pregnant women experience negative emotions such as disappointment, rejection, anxiety, and sadness. A woman's mental state may appear stable and show signs of adaptation during the second trimester, but actually anxiety often emerges during the third trimester as the baby grows (Janiwarty & Pieter, 2012). A woman's physical and mental health continues to develop along with increasing gestational age until delivery. The time of delivery that is getting closer causes anxiety, especially for women with the first delivery experience (Marmi, 2011). Pregnancy is a source of anxiety, especially in primigravida because this is a kind of new condition that is experienced for the first time. These changes are normal conditions as the sign of the body's adaptive response during pregnancy (Mandriwati & Ayu, 2016).

Anxiety is a feeling of discomfort or fear that a person feels in a tense situation. As the due date draws near, many expectant mothers experience an increase in their anxiety levels. About 28.7 percent of the Indonesian population suffers from anxiety. Women in the third trimester of pregnancy in the island of Java have an anxiety level of 52.3% when they are asked about birth and delivery (Siallagan & Lestari, 2018). According to Rukiyah (2013), in the third trimester of pregnancy, when the time for delivery is getting closer, pregnant women experience an increasing and intense level of anxiety. Furthermore, Hidayat (2014) states that if pregnant women do not get motivation from their environment, especially from their husbands and closest people, anxiety and fear tend to be one of the emotions most often experienced (Siallagan & Lestari, 2018).

According to study conducted by Einsenberg (1996) regarding the anxiety of pregnant women, almost all (94%) respondents worried about having a healthy baby, almost all (93%) worried about going through labor without incident, and almost all (91%) worried about their appearance rather than their health. According to these findings, moderate anxiety affected 69.6% of pregnant women and mild anxiety affected 8.7% of pregnant women. Discussing maternal health during pregnancy and the potential complications that can arise during delivery is a major part of the family system's efforts to prepare for and prevent adverse outcomes. During the time before delivery, most mothers struggle to make concrete decisions and doubt their own judgment about what they need (Hidayat, 2013).

Psychological problems, such as whether or not the fetus is healthy in the womb, have been exacerbated by the outbreak of the COVID-19 virus. Anxiety is fueled by memories of previous births,

care to be received and the spread of COVID-19, and data obtained from the media about safety measures to be taken during the pandemic. Most expectant mothers are reported to feel anxious about giving birth during the current COVID-19 pandemic. This is mainly due to the widespread coverage in the media and social media of the increased risk of infection for pregnant women and their unborn babies, as well as other factors such as previous deliveries, previous exposure to the virus, and the likelihood of contracting it (Pane et al., 2021). According to Dunkel in Purwaningsih (2020) depression and anxiety are common in pregnant women, and lack of social support can be a contributing factor. The less anxiety and depression a person experience, the more effective the social support will be. During pregnancy, as people take on new responsibilities and roles in society, social support is critical to their health and happiness.

At this stage, the significance of social support lies in the help or support that people receive from certain groups and relationships (husband, parents, in-laws, friends, neighbors) that are able to make the recipient feel loved and valued, or in other words to get support from the community. Women need their social networks to gather around them as they approach their due date. In this case, the husband can provide support by encouraging and paying more attention to his pregnant wife, which will bring good to their relationship as well as decision making. Anxiety will affect a person's decision making (Maharani, TI., Fakhurrozi, 2014). Shared responsibility of society and government is to ensure that all mothers have ready access to prenatal care, skilled medical assistance during labor, postpartum care for mother and child, specific attention and referral in case of complications, care for new children, and methods of contraception and family planning (Ministry of Health of the Republic of Indonesia, 2021).

Based on the initial data survey conducted at 3 CHCs in Baubau City with the highest number of delivery coverage in July 2021 which involved Private Practice Midwife (PMB) in each work area, it was found that of the women giving birth, 24-26% chose CHCs, while 73-75% chose PMB which were inversely proportional to the number of visits by women in the third trimester of pregnancy who visited each CHCs for Antenatal Care. The results of interviews with 3 pregnant women in three CHCs showed that they were anxious to hear the news on social media regarding Baubau City as COVID-19 cluster with an increase in the number of daily cases at the Regional Public Service Agency (BLUD) of the Baubau City Hospital. Therefore, together with nuclear family members, they decided to choose the type of health service facility with minimal risk of exposure to COVID-19 cases, namely PMB. They expected to pass the birth process safely and comfortably. The current study aims to determine the relationship between anxiety of pregnant women and the type of maternity health care facility during the COVID-19 pandemic.

## **Methods**

This was a quantitative analytical study with cross-sectional design through survey methodology that was conducted July-November 2021 in the work area of 3 Community Health Centers (Betoambari, Katobengke and Kadolomoko) at Baubau City, Southeast Sulawesi. 72 pregnant women in the third trimester who were recorded in the MCH book were selected as the study samples through probability



sampling technique. Data were collected using HARS (Hamilton Anxiety Rating Scale) questionnaire. Before delivered to respondents, validation and reliability tests for the questionnaire were conducted. The Chi-Square significance test was conducted on the data by using SPSS with a 95% significance level to analyze the data.

**Results**

**Table 1.** Characteristics of Respondents of Pregnant Women in the Third Trimester in The Work Area of 3 CHCs (Betoambari, Katobengke and Kadolomoko)

Characteristics of Respondents	F	(%)
<b>Age (Years)</b>		
20–35	57	79.2
>35	15	20.8
<b>Level of education</b>		
Primary School	1	1.4
Junior High School	13	18.1
Senior High School	35	48.6
College	23	31.9
<b>Work</b>		
Housewife	51	70.8
Working Mother	21	29.2
n	72	100

**Table 2.** Relationship between Age, Level of Education and Employment with the Level of Anxiety

	Level of Anxiety						F		P
	Mild		Moderate		Severe		F	%	
	F	%	F	%	F	%			
<b>Age (Years)</b>									
20–35	27	37.5	27	37.5	3	4.1	57	79.2	0.017
> 35	0	0	2	6.9	13	81.3	15	20.8	
<b>Level of Education</b>									
Junior High School		5.5	5	6.9	5	6.9	14	19.5	0.011
Senior High School		18	3	4.1	19	26.3	35	48.6	
Higher Education		13.8	5	6.9	8	11.1	23	31.9	
<b>Employment</b>									
Unemployed (Housewife)	27	37.5	10	13.9	14	19.4	51	70.8	0.029
Employed	8	11.1	10	13.9	3	4.1	21	29.2	

Based on the Chi-Square test, it was obtained a p value of  $0.017 < \alpha 0.05$  (at a significance level of 5%). Women's anxiety during pregnancy correlated with their age during the COVID-19 pandemic. The Chi-Square test resulted in a level of significance of  $p=0.011 < \alpha 0.05$ . Anxiety of pregnant women during the COVID-19 pandemic was positively correlated with their educational attainment. According to the finding derived from Chi Square statistical test, the p value was lower than 0.05. During the COVID-19 pandemic, there was a correlation between the amount of work pregnant women have to do and their overall anxiety level.

**Table 3.** Relationship between Anxiety of Pregnant Women and the Type of Maternity Health Care Facility during the COVID-19 Pandemic

Level of Anxiety	Maternity Health Care						n		p
	Private Practice Midwife		Community Health Center		Hospital		F	%	
	F	%	F	%	F	%			
Mild	8	11.1	5	6.9	9	12.5	22	30.5	0.001
Moderate	10	13.8	11	15.2	1	1.3	22	30.5	
Severe	12	16.6	7	9.7	9	12.5	28	38.2	

Table 3 presents a p-value  $0.001 < \alpha 0.05$  which was derived from the chi-square test. It can be concluded that  $H_0$  was rejected and  $H_1$  was accepted, so that there was a relationship between the anxiety of pregnant women and determination of maternity health care facility during the COVID-19 pandemic in Baubau City.

## Discussion

Result In this study show that Women's anxiety during pregnancy correlated with their age during the COVID-19 pandemic. According to the finding of a study conducted by Etri. et al. (2020), there was a relationship between age and anxiety. Women aged  $>35$  years are included a high-risk group. Various risks of pregnancy may occur at this age range, namely bleeding, preeclampsia/eclampsia, infection and retained placenta. At this age range, the ability of the reproductive organs decreases which may increase the level of anxiety. Previous experience of labor and delivery also has a significant effect coupled with the age of  $>35$  years.

This study shown was Anxiety of pregnant women during the COVID-19 pandemic was positively correlated with their educational attainment. Someone who is highly educated understands in advance a response that occurs compared to someone with low education (Rozikhan, 2021). Severe anxiety tends to be found in people with low education, who do not have the background knowledge to process an event in a way that prevents them from fearful perceptions and responses (Aslinda Hafid, 2021). Education level has a role in responding to the information obtained as the basis for attitudes in making decisions.

Working women tend to experience anxiety due to workload and household matters while those who do not work tend to have a lighter thought load (Nekada, 2020). Most working adults report stress, and many working women experience anxiety due to their jobs (Hendriani et al., 2021).

Anxiety about childbirth is usually associated with health status, gravida, and age. A previous study found that 87% of pregnant women experienced mild anxiety and 13% experienced moderate anxiety (Siallagan & Lestari, 2018).

Anxiety of pregnant women can increase if they are concerned about their own physical changes, the health of unborn baby, and their own mental readiness for childbirth. In the third trimester, anxiety levels increase as labor approaches (Rukiyah, A, 2013). Pregnant women often experience anxiety and fear before labor if they do not get motivation from their environment, especially their husbands (Hidayat, 2013). Prior to delivery, one of factors that trigger anxiety is social support. Lower level of depression and anxiety was found to be related to higher level of social support. Furthermore, Schetter (2011) emphasizes the importance of social support in determining the health of mothers and babies during pregnancy. A woman will have a new role after childbirth. Social support has a direct effect on mental health by reinforcing healthy practices, increasing optimistic emotions, and facilitating more effective coping mechanisms. Physiological responses to stress are indirectly moderated by social support. Positive social relationships will protect the developing fetus from the negative effects of stress on the mother. Social support also has an impact on decision making regarding the type of health care

facility that the mother chooses for delivery. Decision is not absolutely made by the pregnant woman but is made together with the nuclear family. Pregnant women with severe anxiety (16.6%) chose Private Practice Midwife (PMB), pregnant women with moderate anxiety (15.2%) chose CHC, and pregnant women with mild anxiety (12.5%) chose Hospital as the maternity health service facility during the COVID-19 pandemic. 19. Determination of the type of health service facility was taken by considering aspects of minimal risk of being exposed to and exposing COVID-19. Pregnant women perceived that PMB was a safe place for delivery compared to CHC and Hospital as the centers of health services.

Pregnant woman's main concern is the health of her unborn baby. Although there is a lack evidence for vertical transmission from mother to fetus, the possibility cannot be ruled out. Some new mothers worry about contracting an infection or experiencing complications during childbirth. Pregnant women also need more frequent medical check-ups, which is difficult to perform during the pandemic. Pregnant women may also be concerned about their health if they have difficulty getting the care from a trained medical professional they need. Pregnant women who are exposed may also feel uncomfortable in medical facilities due to the COVID-19 pandemic (Kajdy et al., 2020).

## Conclusion

There was a relationship between anxiety of pregnant women and the type of maternity health care facility during the COVID-19 pandemic.

## References

- Aslinda Hafid, H. H. (2021). Hubungan Kejadian Pandemi Covid 19 Dengan Kecemasan Ibu Hamil Trimester Tiga. *Keperawatan Muhammadiyah*, 6(2), 151–155.
- Etri., Y., Irman, V., & Harmawati. (2020). Optimalisasi Kesehatan Ibu Hamil. *Abdimas Sainitika*, 1(1), 1–8.
- Hendriani, D., Widyastuti, H., Putri, R., & Puspitaningsih, R. (2021). Peran Suami Dalam Gangguan Kecemasan Dan Stress Pada Ibu Hamil Selama Pandemi Covid-19. *Mahakam Midwifery Journal*, 6(1), 28–36.
- Hidayat, S. (2013). Kecemasan Ibu Hamil dalam menghadapi Proses Persalinan. *Kesehatan Wiraraja Medika*, 13(2), 67–72.
- Janiwarty, & Pieter. (2012). *Pendidikan Psikologi Untuk Bidan*. Rapha Publishing.
- Kajdy, A., Feduniw, S., Ajdacka, U., Modzelewski, J., Baranowska, B., Sys, D., Pokropek, A., Pawlicka, P., Kaźmierczak, M., Rabijewski, M., Jasiak, H., Lewandowska, R., Borowski, D., Kwiatkowski, S., & Poon, L. C. (2020). Risk factors for anxiety and depression among pregnant women during the COVID-19 pandemic: A web-based cross-sectional survey. *Medicine*, 99(30), e21279. <https://doi.org/10.1097/MD.00000000000021279>
- Maharani, TI., Fakhurrozi, M. (2014). Hubungan Dukungan Sosial dan Kecemasan dalam menghadapi Persalinan pada Ibu Hamil Trimester Ketiga. *Ilmiah Psikologi*, 2(7), 61–67.
- Mandriwati, & Ayu, G. . J. E. 2016. (2016). *Asuhan kebidanan kehamilan berbasis kompetensi edisi 3* (3rd ed.). EGC.
- Marmi. (2011). *Asuhan Kebidanan Pada Masa Antenatal*. Pustaka Belajar.
- Pane, J. P., Saragih, H., Sinaga, A., & Manullang, A. (2021). Jurnal Ilmu Keperawatan Jiwa. *Jurnal Ilmu Keperawatan Jiwa*, 4(2016), 461–468. <https://journal.ppnijateng.org/index.php/jikj>
- Pieter H.Z & Lubis N. L. (2010). *Pengantar Psikologi Untuk Kebidanan*. Rapha Publishing.

- Purwaningsih, H. (2020). *Analisis Masalah Psikologis pada Ibu Hamil Selama Masa Pandemi Covid-19. Literatur review 9–15.*
- Rukiyah, A, Y. (2013). *Asuhan Kebidanan Kehamilan.* Trans Info Media.
- Rustikayanti, R. N., et all. (2016). Korelasi Perubahan Psikologis Ibu Hamil dengan Tingkat Kepuasan Seksual Suami. *Midwife Journal*, 2(1), 62–71.
- Schetter, C. D. (2011). Psychological science on pregnancy: Stress processes, biopsychosocial models, and emerging research issues. *Annual Review of Psychology*, 62(November 2010), 531–558. <https://doi.org/10.1146/annurev.psych.031809.130727>
- Siallagan, D., & Lestari, D. (2018). Tingkat kecemasan menghadapi persalinan berdasarkan status kesehatan, graviditas dan usia di wilayah kerja puskesmas jombang. *Journal of Midwifery (IJM)*, 1(September), 104–110. <http://jurnal.unw.ac.id/index.php/ijm>

## Difference in the Effectiveness of Dysmenorrhea Exercise and Warm Compress to Relieve Menstrual Pain

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### ABSTRACT

Dysmenorrhea is a common complaint experienced before or during a woman's period. Dysmenorrhea can be treated by applying pharmacological and non-pharmacological methods to relief pain. Pharmacological intervention involves administration of pain medication, while non-pharmacological intervention involves Dysmenorrhea exercise and warm compress. This study aims to determine the difference in the effectiveness of dysmenorrhea exercise and warm compress to relieve menstrual pain. This was a quasi-experimental study with post-test two groups design. 20 samples were selected using purposive sampling technique and assigned into 2 groups. Data were analyzed using the Mann-Whitney statistical test. The results showed that there was no significant difference in effectiveness between Dysmenorrhea exercise and warm compress to relieve menstrual pain, with a p-value of  $0.127 > 0.05$ . It can be concluded that there was no difference in effectiveness between Dysmenorrhea exercise and warm compress. However, based on the score, it was revealed that warm compress was more effective in relieving menstrual pain than Dysmenorrhea exercise.

*Dysmenorrhea adalah masalah yang sering terjadi pada wanita yang dialami sebelum ataupun saat menstruasi berlangsung. Dismenore dapat ditangani dengan metode farmakologi dan non farmakologi untuk dapat meminimalkan rasa nyeri. Intervensi farmakologi, seperti pemberian obat anti nyeri. Sedangkan teknik non farmakologi, diantaranya berupa senam Dysmenorrhea dan kompres hangat. Tujuan penelitian ini adalah untuk melihat perbedaan efektivitas senam Dysmenorrhea dan kompres hangat Terhadap penurunan nyeri haid. Desain penelitian, menggunakan quasy experiment dengan two group post-test. Pengambilan sampel menggunakan teknik purposive sampling dengan jumlah sampel 20 responden terbagi dalam 2 kelompok. Analisis data menggunakan uji statistik Mann-Whitney. Hasil penelitian menunjukkan bahwa tidak terdapat perbedaan efektivitas yang signifikan antara senam Dysmenorrhea dan kompres hangat terhadap penurunan nyeri haid, dengan hasil uji menunjukkan nilai p-value  $0,127 \geq 0,05$ . Kesimpulan tidak terdapat perbedaan efektivitas antara senam Dysmenorrhea dan kompres hangat, namun jika dilihat berdasarkan skor menunjukkan kompres hangat lebih efektif dalam menurunkan nyeri haid dibandingkan senam Dysmenorrhea.*

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### Introduction

Dysmenorrhea or menstrual pain is the most common complaint experienced at the beginning or during menstruation (Reeder, 2013). Data derived from the World Health Organization (WHO) shows that about 50% of adolescents in the world experience menstrual pain. In America, about 90% experience dysmenorrhea and about 10%-15% experience severe dysmenorrhea which causes them to

be unable to do any activities (Rini and Nuryanti, 2020). In Indonesia, about 64.25% of adolescents experience dysmenorrhea and around 54.89% are included in primary dysmenorrhea (Rini and Nuryanti, 2020).

If left untreated, dysmenorrhea can lead to activity disorders, retrograde menstruation, infertility and infection. In addition, it can cause emotional conflict, tension and anxiety, as well as uncomfortable and strange feelings (Sarifudin, 2011). Dysmenorrhea can be managed pharmacologically and non-pharmacologically. Pharmacologically treatment involves painkillers, but the use of these drugs also have side effects. Previous studies showed that non-pharmacological treatments had a significant and safe effect. One of the non-pharmacological treatments is relaxation technique with dysmenorrhea exercise. Dysmenorrhea exercise which was performed 5 times in a row in a week was proven to help stretch the abdominal, pelvic and waist muscles (Lismaya, Sambas, and Hersoni 2021). Such finding is reinforced by a study conducted by Aidah rachmawati and Rini (2020), which revealed that dysmenorrhea exercise could relieve dysmenorrhea (Rini and Nuryanti 2020).

In addition, therapy using warm compress was proven to reduce the intensity of dysmenorrhea. Warm compress can cause vasodilation in blood vessels so as to increase blood flow to the tissues (Natali, 2013). A study conducted among adolescent girls at SMPN 1 Kartoharjo showed evidence that warm compress was effective in relieving menstrual pain from moderate pain to mild pain (Hanifah and Kuswantri, 2020). Dysmenorrhea exercise and warm compress are easy, inexpensive therapies and do not require any tool for the implementation (Anugraheni 2013). The high incidence and impact of dysmenorrhea encourages researchers to conduct a study entitle "Differences in the Effectiveness of Dysmenorrhea Exercise and Warm Compress to Relieve Menstrual Pain (Primary Dysmenorrhea). Hopefully the results of this study can be the latest evidence based in handling of pain.

## **Methods**

This was a quasi-experimental research with post-test two group design approach to determine the difference between the two treatment groups. The current study was conducted at Women's Dormitory of Health Polytechnic of Sorong. The study site was chosen because the study was conducted during the Covid-19 pandemic so that students did online learning from home and did not travel to campus. The dormitory is one of the places where these students gather so that it was chosen for the reason of time effectiveness to facilitate the course of study.

The study was conducted for 1 month (April-June, 2021). The study population involved all undergraduate midwifery students of Health Polytechnic of Sorong with a total number of 123 people. The samples of this study were 20 students of applied midwifery undergraduate program who met the inclusion and exclusion criteria. The inclusion criterion in this study was respondents who experienced dysmenorrhea for 3 consecutive months during the menstrual cycle, while the exclusion criterion was respondents who had comorbidities in the reproductive system.

The sampling technique applied here was purposive sampling to determine samples based on certain considerations. Assessment of pain response applied the NRS scale instrument, while assessment

for exercise and warm compress applied the SOP sheet. Data were analyzed using the Mann Whitney test which is a non-parametric test, since the researcher would compare two means from the same population (Sugiyono, 2015).

The study implementation process began with conducting a survey on the population that met the inclusion and exclusion criteria. After that, population that met the criteria was taken as respondents. The first 10 respondents were assigned in the relaxation technique group and the next 10 respondents were assigned in the warm compress group. Before the intervention was given, an *NRS* scale instrument was delivered to each group. Furthermore, the exercise group was given a dysmenorrhea exercise intervention 3 times in a row in one week (Thursday, Friday and Saturday) while the warm compress group was given a warm compress using a hot bladder on abdominal area on the first and second day of menstruation.

## Results

The results of this study consist of univariate and bivariate data. Univariate data present data on the characteristics of respondents including age, family history of dysmenorrhea, menstrual cycle and menstrual duration. More details on data regarding characteristics of respondent are presented in table 1 below:

**Table 1.** Characteristics of Respondents

Variable	Dysmenorrhea Exercise Group		Warm Compress Group	
	Frequency	(%)	Frequency	(%)
<b>Age (years)</b>				
≤ 20	2	20.0	1	10.0
20-30	4	40.0	9	90.0
≥ 30	4	40.0	0	0
<b>Total</b>	<b>10</b>	<b>100,0</b>	<b>10</b>	<b>100,0</b>
<b>Family History with Dysmenorrhea</b>				
Yes	2	20.0	3	30.0
No	8	80.0	7	70.0
<b>Total</b>	<b>10</b>	<b>100,0</b>	<b>10</b>	<b>100,0</b>
<b>Menstrual Cycle</b>				
Regular	8	80.0	6	60.0
Irregular	2	20.0	4	40.0
<b>Total</b>	<b>10</b>	<b>100,0</b>	<b>10</b>	<b>100,0</b>
<b>Menstrual Period (Days)</b>				
3-5	2	20.0	10	100.0
≥ 5	8	80.0	0	0
<b>Total</b>	<b>10</b>	<b>100,0</b>	<b>10</b>	<b>100,0</b>

Based on table 1, it was shown the characteristics of respondents in the dysmenorrhea exercise group. Most of respondents were included in the age range of 20-30 years and >30 years with a total of 4 respondents (40%). Regarding the family history variable, most of respondents or 8 respondents (80%) did not have a family history of dysmenorrhea. Regarding the menstrual cycle variable, most of respondents or 8 respondents (80%) were involved in the category of regular menstrual cycle. Regarding the menstrual period variable, most of respondents or 8 respondents (80%) were involved in the category of > 5 days.

In the warm compress group, most of respondents were included in the age range of 20-30 years with a total of 9 respondents (90%). Regarding the family history variable, most of respondents or 8

respondents did not have a family history of dysmenorrhea. Regarding the menstrual cycle variable, most of respondents or 6 respondents (60%) were involved in the category of regular menstrual cycle. Regarding the menstrual period variable, all respondents (100%) were involved in the category of 3-5 days.

The decrease in the level of pain after the dysmenorrhea exercise and warm compress interventions is presented in table 2:

**Table 2.** Distribution of Pain Levels after the Dysmenorrhea Exercise and Warm Compress interventions (n= 20).

Groups	Pain Level	Post Test	
		Frequency	Percentage (%)
Dysmenorrhea Exercise	No pain	0	0
	Mild pain	2	20.0
	Moderate pain	8	80.0
	Severe pain	0	0
	Uncontrolled pain	0	0
Warm Compresses	No pain	2	20.0
	Mild pain	3	30.0
	Moderate pain	5	50.0
	Severe pain	0	0
	Uncontrolled pain	0	0

Based on table 2, it can be seen the intensity of the respondent's pain after the dysmenorrhea exercise and warm compress interventions. In the dysmenorrhea exercise group, there were 8 respondents (80%) with moderate pain intensity and 2 respondents (20%) in mild pain intensity. Meanwhile, in the warm compress group, there were 5 respondents (50%) with moderate pain intensity, 3 respondents (30%) with mild pain intensity and 2 other respondents did not experience pain.

The Mann Whitney statistical test aims to determine the difference in the effectiveness of dysmenorrhea exercise and warm compress to relieve dysmenorrhea. More details are presented in table 3:

**Table 3.** Difference in the Effectiveness of Dysmenorrhea Exercise and Warm Compress to Relieve Dysmenorrhea

Variable	Mean difference	p-Value
Dysmenorrhea Exercise	12.20	0,127
Warm Compress	8.80	
*Mann-Whitney test	p ≥ 0,05	
*Significant		

The results of data analysis using the Mann Whitney test obtained p-value of  $0.127 \geq 0.05$ . Such finding indicated that there was no significant difference in the effectiveness of dysmenorrhea exercise and warm compress to relieve menstrual pain.

### Discussion

Based on the results of the study, it was revealed that there was no significant difference in effectiveness of dysmenorrhea exercise and warm compress. This was supported by the results of the Mann-Whitney statistical test which obtained a p value of 0.127,  $\alpha = 0.05$  ( $p > \alpha$ ). The researcher assumed that such finding was due to the respondents were given the similar treatment, namely dysmenorrhea gymnastic and warm compress. Dysmenorrhea exercise helps stretch the abdominal,



pelvic and waist muscles. This is a physical activity that can help relieve pain. In addition, dysmenorrhea exercise also provides a relaxing sensation. A relaxed body is able to stop the production of adrenaline hormone (Hidayatunnikmah et al., 2022).

Adrenaline is a hormone that triggers stress in a person. Exercise is an activity of the body and by doing gymnastic movements,  $\beta$ -endorphins will be secreted and be received by receptors in the hypothalamus and limbic system which function to regulate emotions. An increase in  $\beta$ -endorphins can significantly reduce pain, improve memory, appetite, sexual ability, as well as blood pressure and breathing (Lismaya, Liza Aina, 2021). This study finding is in line with a study conducted by Rahayu, 2015 and Nuraeni, 2015, which showed that dysmenorrhea exercise could significantly reduce the degree of dysmenorrhea (Mutasya, Edison, and Hasyim, 2016).

A warm compress is a kind of heat transfer process that can provide comfort. While providing compress, the blood vessels in certain parts in pain will widen (Lowdermilk, D, L, Perry Shannon E, 2013). In addition, blood flow will increase and the muscles in the compressed area will relax, so that it can directly reduce pain including menstrual pain (dysmenorrhea) (Lowdermilk, D, L, Perry Shannon E, 2013). This study finding is in line with a study conducted by Restiana Saras, 2017, Asmita and Tri Veny, 2017 and Ulfa and Aris, 2019 which showed that warm compress could significantly relieve dysmenorrhea, especially among adolescent girls (Ammar, 2016).

There are several predisposing factors that influence the occurrence of dysmenorrhea including age, family history of dysmenorrhea, menstrual duration and menstrual cycles that have been presented in this study. However, the researcher did not directly conduct an in-depth study or analysis regarding these predisposing factors so that there is a need for further study (Ammar, 2016).

The results of this study indicated that dysmenorrhea exercise and warm compress had the similar effectiveness so that they can be applied for relieving dysmenorrhea.

## Conclusions

The results showed that there was no significant difference in the effectiveness of dysmenorrhea exercise and warm compress to relieve menstrual pain with a  $p$  value = 0.127,  $\alpha = 0.05$  ( $p > \alpha$ ). Such findings meant that dysmenorrhea exercise and warm compress were equally effective in relieving menstrual pain (dysmenorrhea) so that these two treatments can be applied by women who experience dysmenorrhea.

## References

- Ammar, Ulya Rohima. 2016. "Faktor Risiko Dismenore Primer Pada Wanita Usia Subur." *Faktor Risiko Dismenore Primer pada Wanita Usia Subur di Kelurahan Ploso Kecamatan Tambak Sari Surabaya*.
- Anugraheni, V and WahyuNingsi. 2013. *Efektivitas Kompres Hangat Dalam Menurunkan Intensitas Nyeri Dismenorrhea*. Kediri.
- Hanifah, Astin Nur, and Syahda Febby Kuswantri. 2020. "Efektivitas Kompres Hangat Terhadap Penurunan Nyeri Dismenorea Dengan Skala Bourbanis Pada Remaja Putri Di Smpn 1 Kartoharjo Magetan the Effectiveness of Warm Compress on the Reduction of Dismenorea Pain in

- Adolescent Princesses At Smpn 1 Kartoharjo Maget.” 8511: 110–14.
- Hidayatunnikmah, Nina, Anik Latifah, Desta Ayu Cahya Rosyida, and Sella Dwi Safitri. 2022. “Aktivitas Antimikroba Ekstrak Daun Mulberry ( Morus Rubra L ) Terhadap Penghambatan Pertumbuhan Jamur Candida Albicans-In Vitro.” *JIK (Jurnal Ilmu Kesehatan)* 6(1): 175–83.
- Lismaya, Liza Aina, Etty Komariah Sambas, and Soni Hersoni. 2021. “Saat Menstruasi Pada Remaja Putri.” 1.
- Lowdermilk, D, L, Perry Shannon E, cashion Kitty. 2013. *Buku Keperawatan Maternitas*. Edisi 8. Elsevier (Singapura): Salemba Medika.
- Mutasya, Fitrah Umi, Edison Edison, and Hasnar Hasyim. 2016. “Faktor-Faktor Yang Berhubungan Dengan Usia Menarche Siswi SMP Adabiah.” *Jurnal Kesehatan Andalas* 5(1): 233–37.
- Natali. 2013. *Konsep Dan Penerapan Kompres Hangat*. Jakarta : EGC.
- Priatiningrum, A. C., & Elsanti, D. (2020). Perbedaan Self Tapping Dan Senam Dismenore Terhadap Perubahan Tingkat Dismenore Primer Pada Mahasiswi Putri. *Jurnal Keperawatan Muhammadiyah, September*, 202–206.
- Reeder, Martin & koniak-Griffin. 2013. *Keperawatan Maternitas Kesehatan Wanita*.
- Remaja, Pada. 2020. “10.36419/Avicenna.V3I2.413.” 3(2): 17–24.
- Rini, Fina Sancaya, and Yanti Nuryanti. 2020. “Pengaruh Senam Yoga Terhadap Dismenorea Pada Remaja Putri di Pondok Pesantren Sirojul Mubtadi ’ in Tahun 2020.” 2: 14–20.
- Sarifudin. 2011. *Himpunan Penyuluhan Kesehatan Pada Remaja, Keluarga, Lansia Dan Masyarakat*. Jakarta : TIM.
- Sugani & Priandarini. (2011). Cara Cerdas Untuk Sehat : In *Rahasia Hidup Sehat Tanpa Dokter*. Transmedia.
- Sugiyono. 2015. *Metode Penelitian Kuantitatif, Kualitatif, Dan R&D*. Bandung: Alfabeta.
- Ulfa, N. M., Antonilda Ina, A., & Gayatina, A. K. (2021). Pengaruh Terapi Relaksasi Benson Terhadap Skala Nyeri Dismenore Pada Mahasiswi Keperawatan Stikes St. Elisabeth Semarang. *Jurnal Ilmu Keperawatan Maternitas*, 4(1), 47–56. <https://doi.org/10.32584/jikm.v4i1.1012>
- Uliyah. M dan Hidayat, A. (2015). *Praktikum Klinik*. In *Kererampilan Dasar Praktek Klinik Untuk Kebidanan*. Salemba Medika.
- Yulita. (2015). *Efektivitas Kompres Hangat*. Yayasan Bina Pustaka.

## Auricular Acupuncture on Uterine Point on PGF<sub>2α</sub> Levels and First-Stage of Labor Duration among Primigravida Women

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### ABSTRACT

Duration of labor is influenced by four factors, including the power or uterus contraction. Labor contractions begin with a decrease in the progesterone hormone levels and an increase in the oxytocin hormone levels which is initiated by prostaglandins (PGF<sub>2α</sub>). Auricular acupuncture on uterine point is located in the triangular fossa which is innervated by the trigeminal nerve and the vagus nerve. Stimulation on the uterine point can send a wave of stimulation to the central nervous system in the posterior hypothalamus to produce oxytocin. This study aims to analyze the effectiveness of auricular acupuncture on uterine point on PGF<sub>2α</sub> levels and the duration of the first stage of labor among primigravida women. This was a true experimental study with a two-group pretest-posttest design. The total sample of the study was 48 women in labor who were selected through a randomized control trial and met the inclusion criteria of low-risk pregnancy. Data were analyzed using the Wilcoxon and Mann Whitney tests. The results of the study revealed that auricular acupuncture on uterine point significantly increased PGF<sub>2α</sub> levels ( $p=0.002$ ), ( $201.29 \pm 132.916$ ) compared to the deep-breath relaxation group  $132.08 \pm 93.530$ . Auricular acupuncture on uterine point was proven to shorten the duration of the first stage of labor ( $440.3 \pm 72.94$ ;  $440.00$ ) when compared to the deep breathing relaxation group ( $517.6 \pm 101.00$ ;  $507.50$ ) with a very significant difference ( $p=0.004$ ). In conclusion, auricular acupuncture on uterine point was effective in shortening the duration of labor by increasing PGF<sub>2α</sub> levels.

*Lama persalinan dipengaruhi oleh empat faktor, diantaranya faktor power atau kontraksi. Kontraksi persalinan diawali dengan penurunan hormone progesterone dan meningkatnya hormone oksitosin yang diinisiasi oleh prostaglandin (PGF<sub>2α</sub>). Akupunktur auricular titik uterus terletak pada trianggula fossa yang dipersarafi nervus trigeminus dan nervus vagus. Menstimulasi titik Uterus dapat mengirim gelombang rangsangan ke susunan saraf pusat pada hipotalamus posterior memproduksi Oksitosin. Tujuan menganalisis efektifitas akupunktur auricular titik Uterus terhadap PGF<sub>2α</sub> dan lama persalinan kala I primigravida. Metode penelitian true experimental design dengan metode two-group pretest-posttest design. Jumlah sampel penelitian 48 ibu inpartu kala I yang dipilih secara randomice control trial dan memenuhi kriteria inklusi primigravida resiko rendah. Data dianalisis menggunakan uji Wilcoxon dan Mann Whitney. Hasil penelitian akupunktur aurikular titik Uterus meningkatkan kadar PGF<sub>2α</sub> ( $p=0,002$ ), meningkat bermakna ( $201,29 \pm 132,916$ ) dibandingkan dengan kelompok relaksasi nafas dalam  $132,08 \pm 93,530$ ). Akupunktur aurikular titik Uterus memperpendek lama persalinan kala I ( $440,3 \pm 72,94$ ;  $440,00$ ) jika dibandingkan dengan kelompok relaksasi nafas dalam ( $517,6 \pm 101,00$ ;  $507,50$ ) sehingga ada perbedaan yang sangat bermakna ( $p=0,004$ ). Kesimpulannya akupunktur aurikular titik Uterus efektif memperpendek lama persalinan dengan meningkatkan kadar PGF<sub>2α</sub>.*

## Introduction

Prolonged labor is caused by abnormal cervical dilation. Slow cervical dilation is due to the absence of a fetal head descending which may press the cervix. At the same time, there is cervical edema which make it difficult for the cervix to dilate and causes an increase in secarea action. In addition, prolonged labor can also caused by abnormal uterine contractions. Abnormal contractions may lead to labor complications. In average, the duration of the first stage of labor in primigravida is 13.5 hours. The labor process is said to be prolonged in primigravida if the duration of the first stage of labor in the latent phase lasts more than 20 hours and the cervical dilation is less than 1.2 cm/hour. Based on data derived from the Indonesian Demographic and Health Survey in 2017, one of determinants of the incidence of prolonged labor is primigravida ( $p < 0.0001$ ) (Annisya, 2020). The indirect impact of prolonged labor is Maternal Mortality Rate (MMR). In East Java Province in 2020, MMR due to infections increased from 0.38% in 2019 to 1.42% (East Java Provincial Health Office, 2020).

To overcome prolonged labor, midwives usually provide active mobilization care, try to meet nutritional needs and complementary contraction stimulation such as deep breathing relaxation or acupressure (Latifah, 2022). If non-invasive measures are not successful, and the time limit for labor has been exceeds, a referral is made.

Auricular acupuncture is a part of non-pharmacological complementary therapy which has been developed as medical acupuncture. The complex nervous system, namely the great auricular nerve, the lesser occipital nerve from C2 and C3, the trigeminal nerve, the temporal auricular nerve, the facial nerve, the vagus nerve, and the glossopharyngeal nerve in the external ear underlie studies related to the trigeminal. Previous studies among primigravida women reported a significant difference in the duration of labor between the two groups,  $p = 0.008$  (first stage) and  $p = 0.001$  (second stage) (Mahboubeh Valiani, Masoumeh Azimi, Zahra Mohebbi Dehnavi & Pirhadi, 2018), which showed a faster duration in the intervention group. Furthermore, duration of the active phase was significantly shorter in auriculotherapy group than the control group ( $176.2 \pm 1$  min vs.  $342.8 \pm 87.2$  min,  $< 0.001$ ) (Mahboubeh Valiani, Masoumeh Azimi, Zahra Mohebbi Dehnavi & Pirhadi, 2018).

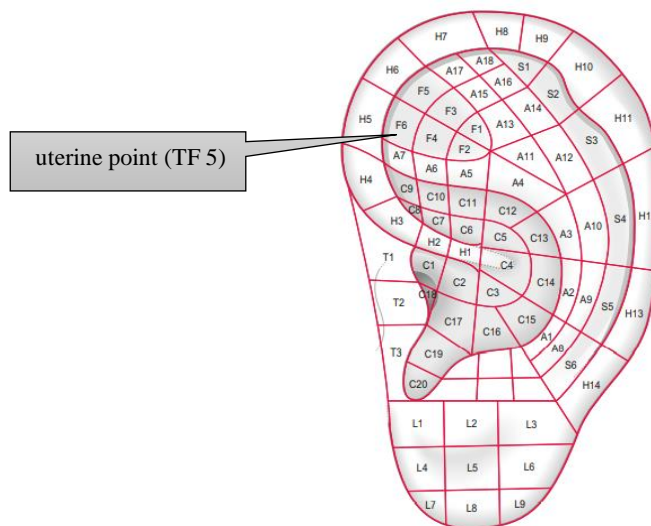
In this study, the researchers are intended to prove that auricular acupuncture on uterine point could affect the duration of labor by knowing whether there was a change in the levels of  $\text{PGF}_{2\alpha}$  as an oxytocin receptor that initiates uterine contractions.

## Methods

This was a true-experimental study with a two-group pretest-posttest design. The sample size was determined based on the number of term pregnant women who had an estimated due date in November 2021 to April 2022 at PMB Yefi Marliandiani Surabaya as many as 48 mothers. The samples involved women at the active phase of the first stage of labor that met the inclusion criteria, namely primigravida, gestational age between 38-41 weeks, Puji Rochyati's score was less than 6 or low risk pregnancy, and without complications. Women included in high-risk pregnancy and never had ANC were excluded from the study. Informed consent was taken from the subjects who were willing to give birth at the

PMB, when they visited the clinic for a third trimester pregnancy check. The study subjects were assigned into 2 groups, the intervention group that was given auricular acupuncture on uterine point and the control group that was given deep breathing relaxation. The independent variable was auricular acupuncture on uterine point. Meanwhile, the dependent variable was duration of active phase of the first stage of labor with the levels of prostaglandins ( $\text{PGF}_{2\alpha}$ ) as an intermediate variable.  $\text{PGF}_{2\alpha}$  was taken from 2 cc of venous blood samples of the study subjects by analysts, before and after treatment, analyzed at the GAKI laboratory, Universitas Diponegoro, Semarang after all serum samples were collected. Duration of labor was assessed by using observation sheets and partographs.

Auricular acupuncture on uterine point intervention was carried out immediately after the study subjects were examined and diagnosed at the latent phase of the first stage of labor with the cervical dilation of 4 cm until the end of the active phase of the first stage of labor ( $\varnothing$  9-10 cm). The administration of auricular acupuncture at the uterine point used a press needle at both the right and left ears of the study subjects in the triangular fossa (TF 5). Both ears in such area were given antiseptic of 70% alcohol, then the ear needle was placed at the uterine point, once every 30 minutes for 5 minutes the ear needle was stimulated clockwise to create deqi. The researchers administered auricular acupuncture to uterine point. Previously, researchers had carried out medical acupuncture training with LP3A certificate number SD40-20-07-0718. The control group was given deep breathing relaxation guided by a midwife who had attended Normal Childbirth Care (APN) training. Data were analyzed using the Wilcoxon and Mann Whitney tests. This study has been approved bases on ethical clearance issued by the Faculty of Medicine, Universitas Diponegoro No.352/EC/KEPK/FK-UNDIP/IX/2021.



**Figure 1.** Uterine point

## Results

The current study was conducted at the Private Practice Midwives (PMB) at Surabaya and Sidoarjo, which have been certified as Bidan Delima. The sample size was 48 respondents, with the following characteristics:

**Table 1.** Characteristics of Respondents

Characteristics	Auricular Acupuncture n=24	Deep breathing relaxation n=24	p value
<b>Age</b>	24.0±2.69; 24.5 (18-29)	24.7±3.03; 24.5 (18-29)	0.4*
<b>Education</b>			
- Junior High School	1 (4.2%)	1 (4.2%)	0.4**
- Senior High School	22 (9.6%)	19 (79.2%)	
- Higher Education	1 (4.2%)	4 (16.7%)	
<b>Employment status</b>			
- Housewife	19 (79.2%)	22 (91.7%)	0.4**
- Teacher	1 (4.2%)	0 (0.0%)	
- Private	4 (16.6%)	2 (8.3%)	
<b>Gestational Age</b>	38.8±0.98; 39.0 (37-40)	38.6±0.88; 39.0 (37-40)	0.6***

\*unpaired t test

\*\*X<sup>2</sup> test

\*\*\*Mann-Whitney test

Data presented in table 1 showed that the mean age of the study subjects in the deep breathing relaxation group was slightly older, namely 24.7±3.03 years compared to the auricular acupuncture group of 24.0±2.69 years. The results of statistical tests showed that there was no significant difference in the mean age ( $\rho=0.4$ ). The level of education of the study subjects was mostly high school. The results of statistical tests showed that there was no significant difference in the distribution of the level of education between the auricular acupuncture group and the deep breathing relaxation group ( $\rho=0.4$ ).

Most of study subjects were unemployed or housewives. The results of statistical tests showed that there was no significant difference in the distribution of employment status in the auricular acupuncture group and the deep breathing relaxation group ( $\rho=0.4$ ). The mean gestational age in the auricular acupuncture group was slightly older, namely 38.8±0.98 months compared to the deep breathing relaxation group of 38.6±0.88 months. The results of statistical test showed that there was no significant difference in the mean gestational age ( $\rho=0.6$ ).

**Table 2.** Serum Prostaglandin (PGF<sub>2 $\alpha$</sub> ) Levels in the Auricular Acupuncture and Deep Breathing Relaxation Groups

PGF <sub>2<math>\alpha</math></sub> Level	Group		p value
	Auricular Acupuncture (n=24)	Deep breathing relaxation (n=24)	
<b>Pre-test</b>			
$\bar{X} \pm SD$	199.00±114.553; 168.00	159.17±105.445; 141.00	0.2**
Median	(49-446)	(45-482)	
Min-max			
<b>Post-test</b>			
$\bar{X} \pm SD$	201.29±132.916; 143.00	132.08 ±93.530; 95.50	0.02**
Median	(52-476)	(39-330)	
Min-max			
<b>Delta</b>			
$\bar{X} \pm SD$	2.29±47.065; 6.50	-27.08±52.31; -19.500	0.02**
Median	(-112.0-141.0)	(-188.0-79.0)	
Min-max			
<b>p value</b>	0.8 *	0.006 *	

\*Wilcoxon test

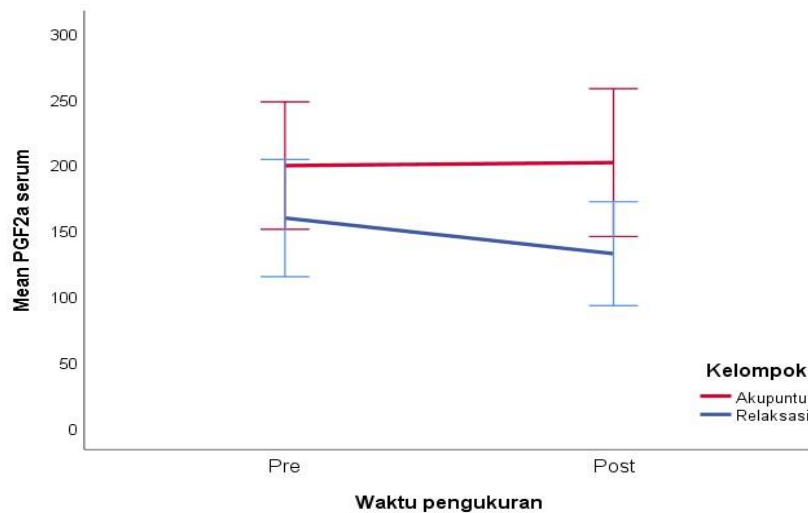
\*\*Mann-Whitney test

In table 2 it was shown that serum PGF<sub>2 $\alpha$</sub>  levels pre-treatment in auricular acupuncture group of 199.00±114.553 pg/mL was higher compared to the deep breathing relaxation group of 159.17±105.445 pg/mL, but the difference is not significant ( $\rho=0,2$ ). Post treatment, the serum levels of PGF<sub>2 $\alpha$</sub>  in the

auricular acupuncture group were  $201.29 \pm 132,916$  pg/mL, which was significantly higher than the deep-breathing relaxation group of  $132,08 \pm 93,530$  pg/mL ( $p=0.002$ ).

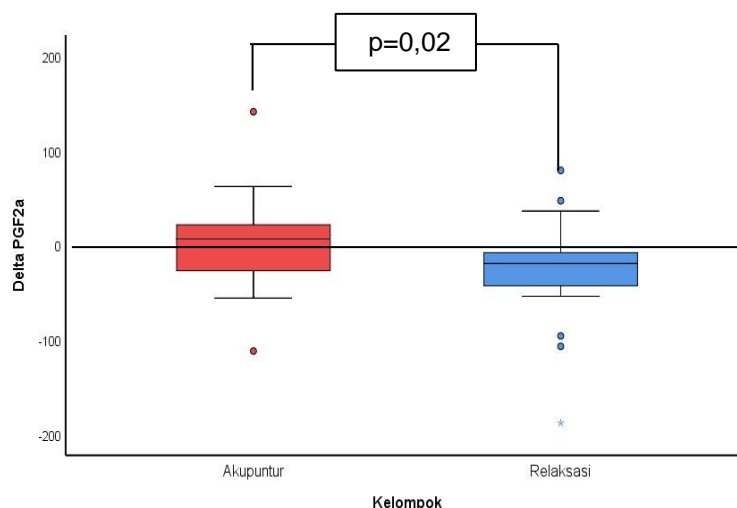
The mean serum delta  $PGF_{2\alpha}$  level in the auricular acupuncture group was lower but the value was positive by  $2.29 \pm 47.065$ . This indicated an increase in serum  $PGF_{2\alpha}$  levels. The results of statistical tests showed that the increase was not significant ( $p=0.8$ ). The mean serum delta  $PGF_{2\alpha}$  level in the deep breathing relaxation group was higher, but the value was negative by  $-27.08 \pm 52.31$ . This indicated a significant decrease in  $PGF_{2\alpha}$  levels in the deep breathing relaxation group ( $p=0.006$ ).

Changes in  $PGF_{2\alpha}$  serum levels of study subjects in the auricular acupuncture group and deep breathing relaxation during pre and post treatment are presented in Figure 2.



**Figure 2.** Changes in serum  $PGF_{2\alpha}$  levels of study subjects in the auricular acupuncture and deep breathing relaxation groups at pre and post treatment

Delta  $PGF_{2\alpha}$  levels in the auricular acupuncture and deep breathing relaxation groups are shown in Figure 3.



**Figure 3.** Serum delta  $PGF_2$  levels in the auricular acupuncture and deep breathing relaxation groups

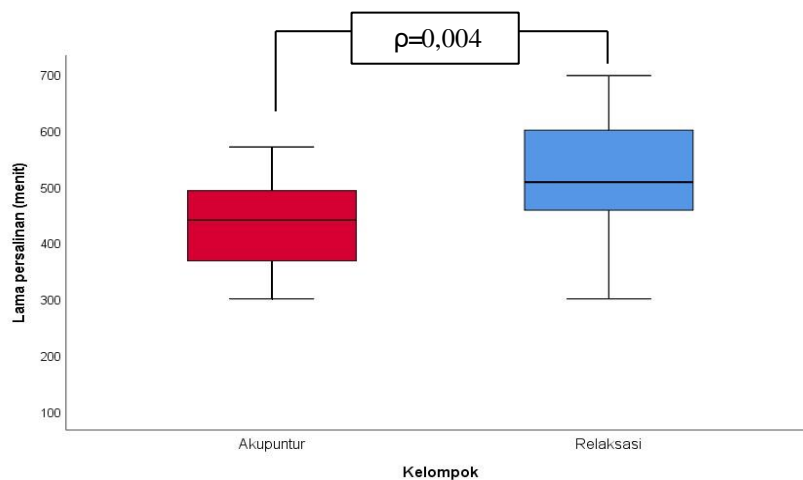
Figure 2 showed a significant difference between the serum delta  $PGF_2$  levels between the auricular acupuncture group and the deep breathing relaxation group ( $p=0.002$ ).

**Table 3.** Duration of labor (minutes) in the auricular acupuncture and deep breathing relaxation groups

Duration of labor		Group		p value
		auricular acupuncture	deep breathing relaxation	
Post	$\bar{X} \pm SD$	440.3±72.94; 440.00	517.6±101.00; 507.50	0.004*
	Median	(300-570)	(300-697)	
	Min-max			

\*Mann-Whitney test

The duration of labor in the auricular acupuncture group was shorter by 440.3±72.94; 440.00 when compared to the deep breathing relaxation group by 517.6±101.00; 507.50 which indicated a very significant difference ( $p=0.004$ ). The duration of labor in the auricular acupuncture and deep breathing relaxation groups is presented in Figure 4.



**Figure 4.** Duration of Labor in the Auricular Acupuncture and deep Breathing Relaxation Groups

**Table 4.** Duration of Labor in the AA Group and Deep Breathing Relaxation Group

Group	Duration of Active Phase of the First Stage of Labor	
	Abnormal (> 6 hours)	Normal (≤6 hours)
Deep breathing relaxation	18 (75.0%)	6 (25.0%)
Auricular acupuncture	8 (33, 0%)	16 (67.0%)

Value  $\chi^2=4.269p=0.03$

Control Event Rate (CER)=0.75 (75%)

Experimental Event Rate (EER)=0.33 (33%)

Absolute Risk Reduction (ARR)=75% – 33%=42%

Relative Risk Reduction (RRR)=(75.0 – 33.0)/75.0= 56%

Number Needed to Treat (NNT)=1/42=0.024=2

Relative Risk=3.0 (95% Confidence Interval/CI)=(1.44 to 6.23)

Data presented in table 4 indicated the incidence of abnormal duration of labor in the deep breathing relaxation group was 18 cases (75%) while in the auricular acupuncture it was 8 (33%). The absolute risk reduction or ARR was 42% and the relative risk reduction or RRR was 56%. Such findings indicated that auricular acupuncture had clinical benefits in reducing the incidence of abnormal duration of labor. The number of patients that must be given auricular acupuncture to prevent 1 occurrence of abnormal duration of labor was 2 people. The study findings also showed that auricular acupuncture had good economic value because it only requires 2 people who are given auricular acupuncture to prevent 1 case of abnormal duration of labor. Relative Risk (RR)=3.0 (95% CI 1.44-6.23) meant that auricular acupuncture treatment had three times clinical benefits compared to deep breathing relaxation in reducing the incidence of prolonged labor.



## Discussion

The results of this study indicated that there was no significant difference in the two groups related to age, level of education and the level of anxiety. Thus, there was a biased effect on the results of the analysis because changes in the dependent variable were due to the treatment given. The age of the study subjects ranged from 18-29 years, where the mean age of the Deep Breathing Relaxation group was slightly older than the AA group, but the difference was not significant ( $p=0.4$ ). Such finding indicated that the majority of the age of the study subjects was included in the reproductive age group which is physiologically still strong enough to withstand labor pain. Younger women have more intense pain sensory than mothers at an older age. Women at young age tend to have unstable psychological conditions that may trigger anxiety so that the pain experienced is getting stronger. Age is used as a determining factor for tolerance to pain. The results of the study conducted by Melese Siyoum regarding the relationship between age and labor pain reported an OR=5.85 (95% CI 2.14-15.98) and better pain control among women aged 19 to 24 years, almost six times than women aged more than 30 years. This is a possibility since the physical endurance of the women in labor in such age range is stronger than in the age group less than 18 years and those who are more than 30 years old (Siyoum & Mekonnen, 2019).

Most of study subjects in the two groups had the level of education of high school, but there was no significant difference ( $p=0.5$ ). The education level of the study subjects was related to access to information about labor pain. Mothers with low education are identical to the lack of knowledge, information and understanding about labor pain. The results of a study conducted by Ernawati Umar reported that the lowest level of pain was found in study subjects with higher level of education ( $p=0.028$ ) with an OR of 8,586 (95% C: 12,520-14,134) meaning that women in labor with junior high school education had an 8.5 times chance of experiencing labor pain compared to women with senior high school education (Umar, 2021).

The results of this study proved that the auricular acupuncture on uterine point intervention had a significant effect on the duration of active phase of the first stage labor among primigravida by 440.3 minutes, shorter than the control group. The difference in labor duration was statistically significant ( $p=0.004$ ). A previous study reported that auricular acupuncture was more effective in reducing labor pain and shortening the duration of labor compared to the body acupuncture group (Hawker, Mian, Kendzerska, & French, 2011). Another study compared auricular acupuncture and body acupuncture, reporting that auricular acupuncture was significantly effective in reducing labor pain and shortening the active phase of labor ( $p<0.001$ ) compared to the other 2 groups (Alimoradi, Kazemi, Gorji, & Valiani, 2020).

Duration of labor is influenced by 5 factors, including the power factor of uterine contractions. Uterine contractions cause labor pain so as to cause cervical ripening. Uterine contractions, cervical dilation and stretching of the pelvic floor, vagina and perineum during labor lead to uterine tissue ischemia. Uterine tissue ischemia damages cells or tissues and is followed by the release of various chemicals including prostaglandins, leukotrienes, thromboxane, histamine, bradykinin, P substance, and

serotonin. Cervical ripening is accompanied by invasion of the stroma by inflammatory cells where there are chemo-attractants that introduce inflammatory cells into the cervix. The inflammatory process is related to cytokines, and in labor cytokines play a role in 3 processes, namely cervical ripening, stimulation to weaken amniotic membranes until rupture and increase myometrial contractions. Interleukins are molecules that mediate communication between leukocytes (Dubicke et al., 2010; Bowen, Chamley, Keelan, & Mitchell, 2002; Romero, 2002). Proinflammatory cytokine interleukins (IL)-1beta, IL-6, IL -8, and tumor necrosis factor (TNF) alpha were identified in reproductive tissues during labor.

Interleukin-1 $\alpha$  and TNF influence the decidua to produce prostaglandins, especially PGE<sub>2</sub> and PGF<sub>2 $\alpha$</sub> . Prostaglandin F<sub>2 $\alpha$</sub>  acts on the myometrium in the formation of cell-to-cell gap junctions and oxytocin receptors so that depolarization will spread to the myometrium, resulting in an increase in intracellular calcium ions. Calcium binding to calmodulin activates myosin-like chain kinases on actin and myosin cause myometrial fiber shortening and contraction (Dubicke et al., 2010; Schlembach et al., 2009). In fetal membranes, IL-6 and TNF alpha are expressed by stromal cells, decidua, infiltrating leukocytes, and extravillous trophoblast. Interleukin 8 as one of the pro-inflammatory interleukins plays a role in mediating the infiltration of inflammatory cytokines into the myometrium during labor.

Increased prostaglandins as oxytocin receptors will eventually affect the production of oxytocin. Oxytocin has both direct and indirect actions. The direct action of oxytocin in the myometrium produces regular and effective contractions, while the indirect action of oxytocin on the decidua will increase the production of prostaglandins (PGF<sub>2 $\alpha$</sub> ) (Thornton, Browne, & Ramphul, 2020; Jordan & Singer, 2006). In this study, auricular acupuncture on uterine point was proven to increase the PGF levels, so that uterine contractions remain strong, and this further affected the duration of labor.

## Conclusions

Auricular acupuncture on uterine point was effective in decreasing the duration of labor by increasing the levels of prostaglandins (PGF<sub>2 $\alpha$</sub> ). Further research with a larger sample size is needed, so that it can be applied primary health care facilities. Such practice should be easily accessible by the community, especially women in labor to shorten the duration of labor and reduce the length of care. The results of this study can be applied at broader scope and replicated in multidisciplinary research.

## References

- Alimoradi, Z., Kazemi, F., Gorji, M., & Valiani, M. (2020). Effects of ear and body acupressure on labor pain and duration of labor active phase: A randomized controlled trial. *Complementary Therapies in ...*. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0965229920301655>
- Annisya, W. (2020). Determinan Kejadian Persalinan Lama Kala I Di Indonesia (Analisis Data Survei Demografi Dan Kesehatan Indonesia 2017 ) (Sriwijaya). Retrieved from [https://repository.unsri.ac.id/35175/3/RAMA\\_13201\\_10011181621004\\_0209088803\\_01\\_front\\_ref.pdf](https://repository.unsri.ac.id/35175/3/RAMA_13201_10011181621004_0209088803_01_front_ref.pdf)
- Latifah, Anik, Desta Ayu Cahya Rosyida, Yuni Khoirul Waroh, Setiawandari, S. (2022). PELATIHAN

AKUPRESURE UNTUK KESEHATAN IBU DAN ANAK SEBAGAI UPAYA PENCEGAHAN STUNTING DI DESA KREMBUNG KECAMATAN KREMBUNG. *LENTERA (JurnalPengabdian)*, 2(2), 264–270. <https://journal.stikesyarsimataram.ac.id/index.php/lentera/article/view/208/87>

- Bowen, J. M., Chamley, L., Keelan, J. A., & Mitchell, M. D. (2002). Cytokines of the placenta and extra-placental membranes: Roles and regulation during human pregnancy and parturition. *Placenta*, 23(4), 257–273. <https://doi.org/10.1053/plac.2001.0782>
- Dinas Kesehatan Provinsi Jawa Timur. (2020). Profil Kesehatan Provinsi Jawa Timur 2019. In *Dinas Kesehatan Provinsi Jawa Timur.*, Retrieved from [www.dinkesjatengprov.go.id](http://www.dinkesjatengprov.go.id)
- Dubicke, A., Fransson, E., Centini, G., Andersson, E., Byström, B., Malmström, A., ... Ekman-Ordeberg, G. (2010). Pro-inflammatory and anti-inflammatory cytokines in human preterm and term cervical ripening. *Journal of Reproductive Immunology*, 84(2), 176–185. <https://doi.org/10.1016/j.jri.2009.12.004>
- Hawker, G. A., Mian, S., Kendzerska, T., & French, M. (2011). Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF. *Arthritis Care and Research*, 63(SUPPL. 11), 240–252. <https://doi.org/10.1002/acr.20543>
- Jordan, J. A., & Singer, A. (2006). The Cerviks. In H. W. J. III & M. I.Sahfi (Eds.), *e-conversion - Proposal for a Cluster of Excellence* (Second Edi). Australia: Blackwell
- Mahboubeh Valiani, Masoumeh Azimi, Zahra Mohebbi Dehnavi, S. M., & Pirhadi, M. (2018). The effect of auriculotherapy on the severity and duration of labor pain. *Journal of Education and Health Promotion*, 7, 101. [https://doi.org/10.4103/jehp.jehp\\_141\\_17](https://doi.org/10.4103/jehp.jehp_141_17)
- Romero, R. (2002). *Preterm Labor, Intrauterine, Infection, and the Fetal Inflammatory Response Syndrome*. 3(5), 73–85.
- Schlembach, D., Mackay, L., Shi, L., Maner, W. L., Garfield, R. E., & Maul, H. (2009). Cervical ripening and insufficiency: From biochemical and molecular studies to in vivo clinical examination. *European Journal of Obstetrics and Gynecology and Reproductive Biology*, 144(SUPPL 1), 70–76. <https://doi.org/10.1016/j.ejogrb.2009.02.036>
- Siyoun, M., & Mekonnen, S. (2019). Labor pain control and associated factors among women who gave birth at Leku primary hospital, southern Ethiopia. *BMC Research Notes*, 12(1), 1–5. <https://doi.org/10.1186/s13104-019-4645-x>
- Thornton, J. M., Browne, B., & Ramphul, M. (2020). Mechanisms and management of normal labour. *Obstetrics, Gynaecology and Reproductive Medicine*, 30(3), 84–90. <https://doi.org/10.1016/j.ogrm.2019.12.002>
- Umar, E. (2021). Factors that Contributed the Management of Stage 1 Labor Pain Maternity Mothers the Delivery Room Dr. Derajat Prawiranegara Hospital Serang in 2019. *KnE Life Sciences*, 2021, 475–489. <https://doi.org/10.18502/cls.v6i1.8638>

## Development of “Alat Bantu Pengambilan Keputusan ber-KB” Application

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### ABSTRACT

Women of childbearing age are very vulnerable to having difficulty in determining a proper contraceptive method due to poor knowledge about the safety of these contraceptive methods. Counseling with Decision-Making Aids is an important thing in the provision of family planning services. WHO has developed Decision-Making Tool as a manual family planning decision aid which was adapted by BKKBN and STARH as “Alat Bantu Pengambilan Keputusan ber-KB”. Such tool is made in the form of a booklet with two sides which is still rarely used by midwives when conducting family planning counseling. This study aims to analyze the results of trial on application-based “ABPK” product. This was a study with the Research and Development method. The study population was all midwives who provided family planning services as many as 10 people and Women of Childbearing Age who visited Sukorejo Community Health Center, Pasuruan for family planning service in August–October 2020 as many as 40 people. The samples involved Women of Childbearing Age who met the inclusion criteria selected with total sampling. The study instrument used here was a questionnaire. Data were analyzed using qualitative descriptive analysis technique. The results of the study showed that the developed “ABPK ber-KB” application was considered good and feasible to be used as a counseling media with a value of 86%. In addition, this android-based application medium was relatively easy to use, more interesting, and informative.

*Wanita Usia Subur (WUS) sangat rentan mengalami kesulitan menentukan kontrasepsi. Hal ini karena ketidaktahuan tentang keamanan metode kontrasepsi tersebut. Konseling dengan Alat Bantu Pengambilan Keputusan menjadi hal penting dalam pemberian pelayanan KB. WHO telah mengembangkan Decision-Making Tool yang merupakan alat bantu keputusan ber-KB manual, yang diadaptasi oleh BKKBN dan STARH menjadi Alat Bantu Pengambilan Keputusan (ABPK) ber-KB. ABPK berbentuk booklet dengan dua sisi bagian yang masih jarang digunakan oleh Bidan saat melakukan konseling KB. Penelitian ini dilakukan untuk menganalisis hasil uji coba produk “ABPK” berbasis media Aplikasi. Desain penelitian menggunakan metode Research and Development. Populasi penelitian adalah seluruh bidan yang memberikan pelayanan KB sebanyak 10 orang dan WUS yang ingin ber-KB di Puskesmas Sukorejo Pasuruan bulan Agustus–Oktober 2020 sebanyak 40 orang. Sampel adalah bidan dan WUS yang memenuhi kriteria inklusi dengan total sampling. Instrumen penelitian berupa kuesioner. Analisis data dengan teknik analisis deskriptif kualitatif. Hasil penelitian menunjukkan bahwa media Aplikasi “Alat Bantu Pengambilan Keputusan Ber-KB” yang dikembangkan dianggap baik dan layak untuk digunakan sebagai media penyuluhan dengan persentase nilai 86%. Media aplikasi berbasis android ini relatif mudah digunakan, lebih menarik dan lebih informatif.*

## **Introduction**

On average, women of childbearing age have difficulty in determining the choice of contraception type. This can be seen from the percentage of active family planning (KB) participants among PUS in 2020 which was only 67.6% (Indonesian Health Profile, 2020). The limited choice of contraceptive methods and lack of knowledge about the safety of each method are the main factors which cause such condition. The other factors to consider are health status, potential side effects, consequences of failure, number of children desired, husband's approval, and cultural values in society. Therefore, counseling using Decision Making Tools as an integral part that is very important in providing family planning services (Saifuddin, 2008).

Quality counseling is one of the determinants of the success of the Family Planning program. Providing complete and accurate information will greatly affect the understanding of prospective acceptors on the family planning method to be chosen. Prospective acceptors are expected to be able to identify their respective health conditions before finally deciding to use one of the family planning methods. Thus, guaranteeing complete information about contraceptive methods is needed in making decision to get contraceptive services (Yusraini, 2012).

Contraceptive method in women of childbearing age needs to be planned early. Counseling regarding the plan to use contraception should be able to provide optimal benefits for prospective acceptors. The effectiveness of this counseling implementation can be increased by using supporting instruments, one of which is the "Alat Bantu Pengambilan Keputusan ber-KB" or further called ABPK. By using the right ABPK, midwives will find it easier to convey correct information according to the conditions of prospective acceptors. And vice versa, the prospective acceptors will also find it easier to understand the information conveyed with the help of images and charts as illustrations. Thus, prospective acceptors and their husbands can understand it better regarding the need for their reproductive rights and can make decisions to use quality contraception (Herlyssa, Mulyati S, Dairi M, 2014).

Counseling is an interactive process of exchanging information between clients and officers which aims to help clients in identifying needs, choosing the best solution and making decisions that are most appropriate to their conditions. Counseling about family planning during pregnancy can meet the contraceptive needs of women after childbirth (BKKBN et al., 2014). The motivation of Couples of Childbearing Age in using contraception right after childbirth can be improved when midwives provide counseling during pregnancy (MoH RI, 2014). Tang et al (2013) published that the use of educational script counseling media about LARC (Long Acting Reversible Contraception) used in North Carolina was not able yet to increase the use of LARC among 6 months postpartum women. Therefore, more systematic use of counseling media is still needed.

The Decision-Making Tool for Family Planning Clients and Providers (DMT) has been developed by WHO as a tool for clients and job aids as well as a manual reference for providers. DMT is effective as a tool for healthcare workers in increasing their understanding regarding Family Planning and assisting clients in making decisions about the use of certain contraceptive methods (Kim and

Muller, 2008). DMT was adapted by the BKKBN and Sustaining Technical Achievements in Reproductive Health (STARH) into a Decision-Making Tool (ABPK) as one of the family planning counseling instruments (BKKBN, 2015).

ABPK contains a lot of clear information about the type of contraception, how to use it, the risks of use, benefits, the side effects and how to overcome them, effectiveness, the possibility of changing methods, and flexibility in use (MoH RI, 2012). Such application also provides a lot of information related to manage clients with special conditions, such as young clients, aged 40 years, postpartum, and HIV. The use of “Alat Bantu Pengambilan Keputusan ber-KB” has also been shown to be effective in increasing KB participation after abortion (Nurchasanah, 2011).

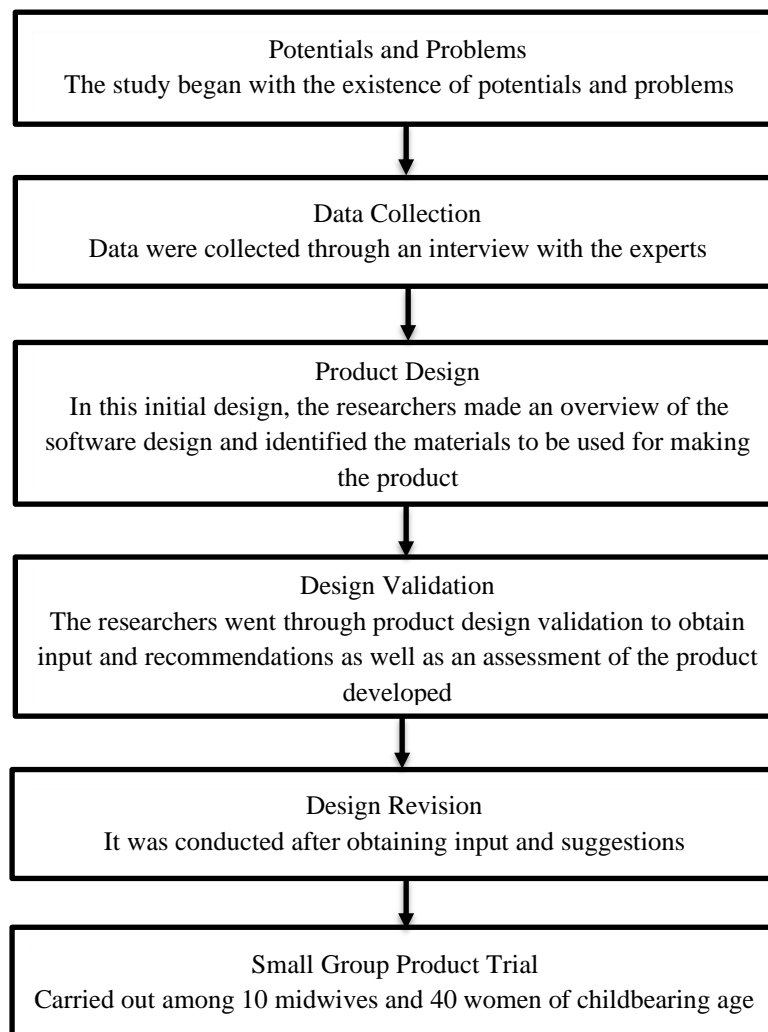
ABPK is a tool that midwives can use during the counseling process for prospective acceptors to determine the type of KB, help solve the problems, provide technical references/info about KB and visual tools for training the new providers (Directorate General of Development of Nutritional and Mother and Child Health, Ministry of Health of the Republic of Indonesia, 2008). So far, ABPK is in the form of a booklet consisting of two parts, namely the front page as the main information for prospective acceptors and the back page which contains more detailed information about the contraceptive method to be explained (Ningrum, 2016). ABPK is easy for midwives to use and contains information in the form of attractive images so that prospective acceptors can easily understand it. However, unfortunately, in providing counseling to Women of Childbearing Age, midwives rarely use ABPK (Lia Nurcahyani, Dyah Widyastuti, 2020). The results of a preliminary study conducted by researchers among 10 midwives who provide family planning services showed that 4 people occasionally used ABPK in Family Planning counseling, and 6 people rarely used ABPK in in Family Planning counseling.

Based on the results of the preliminary study, the researchers are intended to develop ABPK in the form of an application that can be installed on a smartphone or computer, so that it can assist midwives in providing Family Planning counseling to Women of Childbearing Age to make the right decisions for proper contraceptive method. The specific objectives of this study were: (1) Exploring potential problems according to the study topic; (2) Collecting data through experts as material for consideration in planning the "Alat Bantu Pengambilan Keputusan ber-KB" application; (3) Designing media requirements for the "Alat Bantu Pengambilan Keputusan ber-KB" application; (4) Validating the design through an assessment on media needs for the "Decision Making Tool for KB" Application; (5) Revising the design after the expert validation on "Alat Bantu Pengambilan Keputusan ber-KB" application and (6) Analyzing the results of product trial on media needs for the “Alat Bantu Pengambilan Keputusan ber-KB” application

## **Methods**

This study applied the Research and Development method. The population in this study involved midwives who provided KB services and Women of Childbearing Age who visited the Sukorejo CHC, Pasuruan for Family Planning Service in August – October 2020. The samples were 10 midwives and

40 women of childbearing age who met the inclusion criteria (planned for contraceptive method and are willing to be respondents), who were selected through total sampling technique. The study instrument used here was a questionnaire and a checklist which contained the subjects and aspects to be observed. The questionnaire was developed by the researchers and had been tested for validity using the Spearman Rank correlation analysis which obtained  $r$  of  $\geq 0.30$  for all question items and reliability using Cronbach's Alpha which obtained  $r$  of  $> 0.60$  for all question items. Thus, the study instrument was valid and reliable. Data collection using this instrument was adjusted to the Likert scale type, with the criteria from very positive to very negative with a score of 4-0. The development steps taken by the researchers are illustrated in the following diagram:



**Figure 1.** Steps for developing the application

#### Step 1: Potentials and Problems

This study began with the potential and problems found based on the needs analysis. Researchers conducted a needs analysis by collecting data through books, journals, and magazines. The results of the data collection were analyzed and concluded to design the ABPK application so as to create an application which can provide maximum benefit to users. The results of the data from the interview with the coordinator midwife found that midwives rarely

used ABPK while providing Family Planning services. Moreover, if the family planning services were carried out outside the CHC, the manual APBK was never brought.

#### Step 2: Data Collection

Data were collected by conducting interviews with the coordinating midwife regarding the use of the existing ABPK and how to use it while providing Family Planning services.

#### Step 3: Product Design

Product design started from determining the application design. The number of pages from the APBK in the form of application was the same as the Manual ABPK. Therefore, when using the application, midwives no longer need to re-learn the ABPK. Besides can be installed on Android, this application can also be installed on a computer.

#### Step 4: Design Validation

Application design validation was conducted to obtain criticism and recommendations as well as an assessment of the applications developed by the researchers. Design validation was carried out by experts, namely 1 IT expert and 10 midwives who provided Family Planning services. Based on these criticisms and recommendations, the advantages and disadvantages of applications that have been developed were found and application improvements could be made.

#### Step 5: Design Revision

Design revisions were made after receiving criticism and recommendations. Researchers revised the application developed based on the results of expert validation.

#### Step 6: Group App Trial

At this stage, the researchers tested the application on the study subjects of 40 Women of Childbearing Age using a questionnaire as a data collection on the application medium developed. This trial was conducted to find out the limitations and shortcomings of the developed application. This step was carried out after the application trial was conducted on respondents of 40 Women of Childbearing Age who obtained family planning services at Sukorejo CHC. The results were then analyzed to determine the feasibility of the product.

#### Data Collection Stages:

<b>Activity</b>	<b>Data Collection Technique</b>	<b>Respondent</b>
<b>Preliminary Study</b>	Assessment of data and information through interview	Coordinator Midwife
<b>Expert Validation</b>	Interview regarding product feasibility questionnaire with 1 (one) IT expert and 10 midwives	1 (one) IT expert, and 10 midwives
<b>Small Group Trial</b>	Assessment using questionnaire	40 Women of Childbearing Age who obtained family planning services

#### Data analysis:

Descriptive qualitative analysis was applied on the study data that described the results of application development in the form of ABPK Application. The results of data analysis were further used as the basis for revising the developed application.



Questionnaire data regarding the responses of women and a team of experts were analyzed using descriptive statistics through the following criteria:

1. Converted the assessment results from qualitative to quantitative data by using a Likert scale.
2. Calculated the average score by using the formula:

$$\bar{x} = \frac{\sum x}{N}$$

Description:

$\bar{x}$  = Mean Score

$\sum x$  = Total Score

$N$  = Number of Respondents

3. Changed the mean score into a qualitative value (Eko Putro Widoyoko, 2009) based on the assessment of the counseling media of “Alat Bantu Pengambilan Keputusan ber-KB” application with a minimum score of B (Good). If the mean value provided by material experts, media experts, midwives, and the responses of Women of Childbearing Age was B, then such application was declared feasible.

## Results

This section describes the results of the development of extension media for KB Decision Making Tools based on Research and Development steps.

### 1. Problems

The stage of needs analysis was conducted by the researchers before developing the ABPK media to find out the existing potentials and problems. The first step was a literature study from books, journals, and the internet to obtain data to be concluded and analyzed as a reference for developing the product. Furthermore, the researchers conducted a field study at the study site (Sukorejo CHC). The researchers conducted interviews with the Coordinator Midwife and several midwives who were responsible for family planning services at the CHC. Based on the results of the interview, it was found that the problem to be considered to develop better counseling was ABPK in the form of application that could be installed on smartphones and computers. In this step, the researchers conducted an assessment through interviews.

### 2. Information/Data Collection

The researcher further conducted a preliminary study at Sukorejo CHC to collect data and information to be used as material for planning the application. The researchers conducted interviews with the Coordinator Midwife and all the midwives involved to determine the problem of counseling media used in Family Planning services. Based the results of data collection, researchers obtained information that Family Planning counseling services carried out at Sukorejo CHC were still rarely done and still used manual ABPK media. Based on these problems, the researchers created the ABPK application as a counseling medium in providing family Planning services.

### 3. Product Design

- a. App Design Concept

Researchers compiled a concept map that contained an overview of making applications that had been adapted to the needs analysis. This concept map also contained the limitations of the media that will be made by the researcher. Product design began with determination of application to be made. Researchers design the application in the form of menu buttons and explanations. After the slides and explanations were collected, the researchers combined them using the Apache Cordova application to create the appropriate product design.

b. Media Creation Process

The researchers prepared tools and materials/software to be used to create ABPK applications, such as PCs/Computers with an internet browser installed. The supporting software used was Apache Cordova. Furthermore, researchers produced applications using the software with the help of App Inventor to assist program computers and create software applications, especially for systems based on the Android operating system.

The material used was the same as that on the manual flipchart ABPK in 94 pages containing: an introduction, types of contraception, advantages and disadvantages, side effects, and management of side effects. These materials were made in the form of an application with a menu list as shown below:



Figure 2. List menu of ABPK Application

c. Post Media Creation

This is the step wherein the finished application in the form of an installer/driver was installed on a Smartphone or laptop.

4. Design Validation

Design validation is done to get suggestions and input in making media. The researcher gave an assessment sheet to media experts from the Health Polytechnic of Malang, Department of Applied Health, and material experts from the Malang District Health Office, to see the feasibility of the media from the material and application design aspects. The validation step carried out by the researcher was to visit the experts, namely lecturers of media experts and material experts who were appointed as validators and were asked to assess and provide input on the advantages and disadvantages of the

products developed. The limitation and shortcomings of the developed application were then formulated. Limitations that had been identified were then revised and used as a basis for improvement to produce a better product as expected.

a. Expert Revision

Material Experts:

The finished product was tested by material experts to know whether there were errors in the material or content of animation video in the learning media product. Recommendations obtained by researchers when conducting trial activities with material experts were as follows:

**Table 2.** Revision obtained from the Material Expert

Revision	Follow-up
Add the list menu	Add the list menu
The material was good, but the interface was too small, and sometimes it's difficult to install	Improve the display, improve the installation process

Media Expert:

The finished product is then tested by media expert so that the researchers know whether there are deficiencies in terms of application, appearance, quality, and product results. This is intended for the use of media to be easily understood by WUS so that they can make appropriate decisions on family planning.

Suggestions received by researchers when conducting product testing activities for media expert are as follows:

**Table 3.** Revision from the Media Expert

Revision	Follow-up
Text and background lack contrast	Change the background and text color
Should be accompanied by a user manual for the application	Make a reference book/application usage guidelines

The product is repaired after getting input from media experts and asking media experts to assess the effectiveness of the product and validate the product regarding its feasibility to proceed to the next stage.

b. Expert Assessment Results

Material Experts:

The material experts in this study were 10 midwives at Sukorejo CHC who provided family planning services. After viewing and trying the ABPK Application, the following validation results were obtained:

**Table 4.** Validation Results from the Material Experts

Aspects Assessed	Score	Maximum Score	%	Description
Materials and Learning Objectives	41	55	74.4	Good (Feasible, no revision required)

Based on the results of the validation questionnaire above, a score of 41 was obtained out of total score of 55. It can be concluded that the material for the ABPK Application was in a good category. This is in line with Ketamo's (2010) statement that the media created must adhere to the existing materials and objectives so as to be appropriate with the field under study.

Media Expert:

The media expert in this study was a person from CV. Mount Mas. After seeing and trying the ABPK Application, the following validation results were obtained:

**Table 5.** Validation Results from the Media Expert

Aspects Assessed	Score	Maximum Score	%	Description
Media Aspect and Media Technique Quality	62	85	72.9 %	Good (Feasible, no revision required)

Based on the results of the validation questionnaire above, a score of 62 was obtained out of total score of 85. It can be concluded that the media material for the ABPK Application was in a good category.

c. Results of the trial of “Alat Bantu Pengambilan Keputusan ber-KB” Application

The use of the ABPK Ber-KB application aims to make it easier for WUS to understand the material presented during counseling. In addition, the benefits for midwives are to be more effective and efficient in the use of media so that they can assist WUS in making decisions regarding the use of contraceptives according to their needs.

Previously, the medium used at the Sukorejo CHC was the manual ABPK in the form of a flipchart consisting of 192 pages. This flipchart is quite large with a size of 24 cm x 31 cm and a weight of about 200 grams. It is perceived of being less effective when carried and is rarely used as a counseling medium for WUS who want to have family planning. Based on these reasons, the researcher made several differences which can be seen in the form and method of use of the media. The old medium (manual ABPK) is still in the form of a flipchart consisting of 192 pages. It is large and heavy with a fairly expensive price, and not all midwives have it. So, it was rarely used when providing family planning counseling. Meanwhile, the new medium is in the form of an application that can be installed on Android or a computer. So, there is no need to carry flipcharts when providing counseling. Family Planning service providers can have it at any time by installing the application.

5. Design Revision

After the media was assessed by media expert and material experts, then the media was revised according to inputs and criticism derived from media expert. Furthermore, the product went to the next step.



**Figure 3.** Results of application revision

## 6. Product Trial

At this stage, the researchers conducted a trial of the application to the study subjects, namely 40 Women of Childbearing Age who visited Sukorejo CHC for family planning services in the Sukorejo CHC to determine the limitations and shortcomings of the application. This product trial step was conducted using a questionnaire containing an assessment towards the developed application. Then the researchers used the respondents' assessments as material for the improvement of the developed media. The results of the assessment among Women of Childbearing Age were as follows:

**Table 6.** Media Feasibility Results by Women of Childbearing Age

Aspect Assessed	Score	Maximum Score	%	Description
Application Quality and Effectiveness among Audiences	47.6	55	86%	Good (Feasible, no revision required)

## Discussion

The development of the product of "Decision Making Tool for Family Planning" Application was conducted by researchers using an R&D model. The media development applied Apache Cordova and App Inventor software which refers to the storyboard concept that has been created by the researchers. The existing products could be said to be feasible and was appropriate to be used for the family planning counseling process in the community. The process of developing the "Decision Making Tool for Family Planning" application was carried out through several development stages and validation stages from experts to obtain an animated video counseling media product that was categorized as feasible. This development process went through several stages of material and media tests.

Based on the data obtained in the process of "Alat Bantu Pengambilan Keputusan ber-KB" application development, it can be seen that the product was declared to be feasible for family planning counseling and could help Women of Childbearing Age in understanding the material about family planning. Further, it can assist women in making decisions to choose proper contraceptive method. This can be observed in the data obtained during the content validation process by material and media experts.

Based on the data derived from the test results of the product, "Alat Bantu Pengambilan Keputusan ber-KB" application was said to be valid/feasible by the material experts and could be applied to assess its feasibility in the counseling process. The counseling medium in the form of "Alat Bantu Pengambilan Keputusan ber-KB" application can be said to be valid/feasible regarding the aspect of media technique quality since the test obtained a percentage of 72.9% of the maximum value of 100%.

The assessment provided by material experts regarding the aspects of learning material showed that the medium was in the good category. This can be interpreted that the program objective was achieved. Wina Sanjaya (2013) states that the media used by healthcare workers must be appropriate and directed to achieve the goal of counseling. Media is not used as an entertainment tool, or not solely used to make it easier for extension workers to deliver material, but really to help people learn by the goals to be achieved. This is also supported by the theory of Arsyad, Azhar (2008) that audiovisual is a way of producing or delivering material using mechanical and electronic machines to convey audio and visual messages.

Through the data obtained from media expert, it can be interpreted that the "KB Decision Making Tools" learning application was involved in good category regarding the materials and learning objectives with a percentage of 74.4%. Furthermore, regarding the aspect of program display, it was in a good category with a percentage of 60%. This is in accordance with the theory explained by Omar Hamalik in Arsyad, Azhar (2008) that audio-visual media has characteristics that can attract audience interest. On the other hand, the third aspect regarding the technical quality and effectiveness of the medium, such product was stated to be good with a percentage of 80%. This is in accordance with the theory according to Arsyad (2008) that the techniques used in audio-visual media meet the requirements and are quite satisfactory. These results are based on the reference range of the product category to be assessed as the good category and can be considered appropriate for the feasibility test in the counseling process (Ningrum et al., 2016). It can be concluded that the "Alat Bantu Pengambilan Keputusan ber-KB" application was good in terms of media quality. The display aspect of the program was stated to be good and the effectiveness aspect was stated to be good. Thus, the "Alat Bantu Pengambilan Keputusan ber-KB" application could be declared feasible to be applied in the counseling process.

Based on the data derived from the media feasibility test, the product was found to be feasible. The feasibility test process was conducted during the counseling process towards 45 respondents at Sukorejo CHC with the result of 86% in a very good category. Such finding is in line with the theory proposed by Wina Sanjaya (2013) that audio-visual media can generate motivation and stimulate participants to learn well, the media can generate new desires and interests and the media can control the audience's learning speed.

Based on the description of media feasibility, the media created by the researcher was included in the good category and could be said to be feasible to be applied in the education and counseling process. Respondents agreed that the "Alat Bantu Pengambilan Keputusan ber-KB" application was more interesting than flipchart, not boring, and could add insight into contraception more easily.

The android-based application developed by this research was considered easy to use and effective to deliver education to the public. A study conducted by Nugroho (2011) in Siti Masfiah (2016) reported that health education using audio-visual media tended to be better since video media was more interesting and informative. This statement is also supported by the theory which states that video media can convey factual messages as well as fictional, informative, and educative (Arsyad, Azhar. 2008). Audio-visual media are considered to be able to attract attention, increase knowledge and change one's behavior (Brown H. Douglas, 2014).

## **Conclusions**

Based on data derived from the analysis results, it can be concluded that: (1) The problems encountered included the rarely use of manual ABPK media by midwives when conducting counseling; (2) Data collection was conducted using literature study and field study; (3) The design of the manuscript and product of "Alat Bantu Pengambilan Keputusan Ber-KB" Application had been adjusted to the problems and data obtained; (4) The score of product feasibility was 74.4% with a feasible category; (5)

There was a revision of the media in accordance with the inputs and recommendations given by media experts and material experts; and (6) Based on the results of trials among Women of Childbearing Age, "Alat Bantu Pengambilan Keputusan Ber-KB" application media was developed well and was suitable for use in counseling with a score of 86%.

## References

- Arsyad, Azhar. 2008. *Media Pembelajaran*. Jakarta: PT Raya Grafindo Persada
- Bobak IM, Lowdermilk DL, Jensen MD, 2005. *Buku Ajar Keperawatan Maternitas (Maternity Nursing) Edisi 4*, Maria A Wijayarti dan Peter Anugerah (penterjemah). Jakarta: EGC.
- Brown H. Douglas. 2014. *Principles of Language Learning and Teaching*. Upper Saddle River: Pearson.
- Cunningham, Gary F. 2006. *Obstetric William edisi 21*. Jakarta: EGC
- Directorate General of Development of Nutritional and Mother and Child Health. Ministry of Health of the Republic of Indonesia, 2008
- Eko Putro Widoyoko 2009. *Evaluasi Program Pembelajaran*. Yogyakarta: Pustaka Belajar
- Evans Arthur T, 2007. *Manual Obstetric, 7th Edition*. Wolters Kluwer Lippincott Williams & Wilkins
- Herlyssa, Mulyati S, Dairi M. 2014. Penggunaan WHO WHEEL CRITERIA dan Alat Bantu Pengambilan Keputusan (ABPK) Dalam Pemilihan Kontrasepsi Pasca Persalinan. *J Ilmu dan Teknol Kesehat (2)*:9–18
- Hidayat,A. 2010. *Metode Penelitian Kebidanan dan Teknik Analisis Data*. Surabaya: Salemba Medika
- Husaini Usman and Purnomo Setiady Akbar. 2011. *Metodologi Penelitian Sosial*. Jakarta: Bumi Aksara
- Ketamo, H. & Suominen, M. 2010. Learning-by-Teaching in Educational Game: Educational Outcome, User Experience and Social Networks. *Journal of Interactive Learning Research, 21(2)*, 237-255.
- Kim and Muller 2008. Very high resolution stereo DTM extraction and its application to surface roughness estimation over Martian Surface. *The International Archives of The Photogrammetry, Remote Sensing and Spatial Infortion Sciences; XXXVII.Part B4: Beijing*
- Lia Nurcahyani, Dyah Widyastuti, 2020. Alat Bantu Pengambilan Keputusan (ABPK) Ber-KB Digital Sebagai Inovasi Media Konseling Keluarga Berencana. *Jurnal Imiah Bidan Vol. V (2)*: 10-23
- Manuaba. 2007. *Pengantar Kuliah Obsetri*. Jakarta: EGC
- Ministry of Health of the Republic of Indonesia. 2013. *Profil Kesehatan Indonesia 2012*. Jakarta: Ministry of Health of the Republic of Indonesia
- Mochtar Rustam, 2008. *Sinopsis Obstetri*. Jakarta: EGC
- Nana, Sudjana. 2008. *Media Pengajaran*. Surabaya: Pustaka Dua
- National Family Planning Coordinating Board (BKKBN). 2014. *Analisis Tindak Lanjut SDKI 2012*. Jakarta: Reporting and Statistical Directorate
- National Family Planning Coordinating Board (BKKBN). 2015. *Laporan Hasil Pelayanan Kontrasepsi Februari 2015*. Jakarta: Reporting and Statistical Directorate
- Ningrum, Nyna Puspita, Rihardini, Tetty, Ayu, Desta, Rosyida, Cahya, Kesehatan, Fakultas Ilmu, & Menstruasi, Apikasi Kalender. (2016). *Penggunaan aplikasi kalender menstruasi guna meningkatkan kesehatan reproduksi remaja di kelurahan gunung anyar tambak*. 68–71.
- Nusa, Putra. 2011. *Research and Development*. Jakarta: PT. Raja Grafindo Persada
- Nursalam. 2008. *Konsep Dan Penerapan Metodologi Penelitian Ilmu Keperawatan*. Jakarta: Salemba Medika.

- Nurchasanah 2011. Pengaruh Alat Bantu Pengambilan Keputusan ber\_KB (ABPK) terhadap Keikutsertaan KB pada Ibu Pasca Abortus Randomized Controlled Trials (RCT) di Kota Yogyakarta. Yogyakarta: FK UGM
- Oxorn, H, William, R Forte, 2010. Ilmu kebidanan patologi & fisiologi persalinan. Yogyakarta: Essentia Medika Foundation
- Prawirohardjo, 2006. Buku Panduan Praktis Pelayanan Kesehatan Maternal dan Neonatal. Jakarta: YBPSP
- Purwoko. 2000. Penerimaan Vasektomi dan Sterilisasi Tuba. Thesis. Medical Faculty of Diponegoro University. Semarang
- Saifuddin. 2008. Ilmu Kebidanan. Jakarta: YBPSP
- Sarwono. 2005. Ilmu Kebidanan. Jakarta: YBPSP
- Siti Masfiah, dkk. 2017. Efektivitas pelatihan media audio visual terkait anemia ibu hamil dalam peningkatan kompetensi petugas penyuluh kesehatan di kabupaten banyumas. Jurnal Kesmas Indonesia; Vol.8: 3
- Sugiyono. 2011. Metode penelitian kuantitatif kualitatif dan R & D. Bandung: Alfabeta
- Survey Demografi Kesehatan Indonesia, 2012. BPS-BKKBN-KemenKes RI. Measure DHS.ICF International
- Tang JH, et al. 2013. Characteristics associated with interest in long-acting reversible contraception in a postpartum population. *Contraception*;88(1):52–7
- Wina Sanjaya. 2013. Media Komunikasi Pembelajaran. Jakarta: Prenada Media Grup
- Yusraini. (2012). Pengaruh Pemberian Konseling oleh Petugas Kesehatan terhadap Pengetahuan Ibu tentang Pemilihan Alat Kontrasepsi Jangka Panjang di Wilayah Kerja Puskesmas Desa Lama Kabupaten Langka. Faculty of Public Health. North Sumatera University.



## Analysis of Factors Related to Behavior towards Visual Inspection with Acetic Acid Test among Women of Childbearing Age and Elderly Women

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### ABSTRACT

Cervical cancer is second leading cause of mortality among women. Cervical cancer is caused by Human Papillomavirus (HPV) infection. 70% of patients with cervical cancer come to health services in advanced staged, even though if symptoms are detected earlier. 43% of cancer disease can be prevented and 1/3 of cases can be cured when the symptoms are detected early. The simplest early detection, which effective and efficient for detection of cervical cancer is Visual Inspection with Acetic Acid (VIA) test. However, almost 50% of patients who were diagnosed cervical cancer never had VIA test before. This study aims to analyze factors related to behavior towards VIA test among women of childbearing age and in elderly women. Case control study was conducted among 181 participants based on the inclusion criteria of women aged >15 years old and married or ever had sexual intercourse. Rasch model test, t-test, chi square test and logistic regression were applied to analyze the data. The analysis results showed that there was a significant relationship between the age at first marriage, marriage frequency and knowledge with behavior towards VIA test. An individual's chance of not having VIA test by criteria of first married age of <20 years old, getting married >1 time, having low motivation and less knowledge was 94%. It can be concluded that knowledge was dominant factor related behavior towards VIA test.

*Kanker serviks menduduki peringkat kedua yang menyebabkan kematian bagi penderitanya. Kanker serviks diakibatkan dari infeksi Human PapilomVirus (HPV). 70% perempuan yang mengalami kanker serviks datang ke fasilitas kesehatan dalam kondisi stadium lanjut, padahal 43% penyakit kanker dapat dicegah dan 1/3 kasus dapat sembuh jika gejala diketahui secara dini. Deteksi dini yang paling sederhana, efektif dan efisien untuk mendeteksi kanker serviks salah satunya melalui dengan pemeriksaan IVA. Namun hampir 50% dari penderita yang terdiagnosis kanker serviks tidak pernah pemeriksaan IVA. Tujuan dilakukannya penelitian ini adalah menganalisis faktor yang berhubungan dengan perilaku pemeriksaan IVA pada perempuan usia subur dan lansia. Penelitian kasus kontrol dilakukan pada 181 orang responden dengan kriteria usia >15 tahun, menikah atau pernah berhubungan seksual. Uji Rasch model, uji t, chi square dan regresi logistik digunakan untuk menganalisis kesimpulan dari hasil penelitian. Hasil analisis menunjukkan bahwa terdapat hubungan yang bermakna antara usia pertama menikah, frekuensi menikah, dan pengetahuan dengan pemeriksaan IVA. Peluang seseorang untuk tidak memeriksakan IVA dari kriteria usia pertama menikah <20 tahun, responden yang menikah >1 kali, yang memiliki motivasi dan pengetahuan kurang adalah sebesar 94%. Kesimpulan penelitian adalah pengetahuan merupakan faktor yang paling dominan mempengaruhi perilaku pemeriksaan IVA.*

## **Introduction**

Cancer is a disease that initially begins with the uncontrolled growth of abnormal cells in certain organs or tissues of the body, which then attack adjacent parts of the body or other organs (WHO, 2018). In 2020, the global incidence of newly detected cancer cases was estimated at 19.21 million cases and the mortality due to this disease was 9.9 million people. 49.3% of new cancer cases were found in Asia, and 58.3% of cancer deaths were also found in Asia (Globocan, 2020a).

Every year, 311.000 women die because of cervical cancer. In this area, 80% of this disease is diagnosed when the woman's condition has entered an advanced stage (WHO, 2020). Globally, cervical cancer is the fourth leading cause of death for women in 2020 after breast cancer, lung cancer and colon cancer. The incidence of cervical cancer is 6.5% with a total of 9 million cases (Globocan, 2020b).

In Indonesia with a total population of 273 million people, cancer was detected in 396.914 people and death caused by cancer reached 234.511 people. Cervical cancer is the second most common type of cancer with an incidence of 17.2% of total new cases. 21.003 deaths of women in Indonesia was due to cervical cancer (Globocan, 2020b).

80% of cervical cancer cases are caused by infection with Human Papillomavirus (HPV) types 16 and 18, which have oncogenes of E6 and E7, and can be transmitted through sexual intercourse. There are 100 identified types of HPV, but only 13 types that cause cervical cancer. When a virus infects the body, it makes two harmful proteins that cause certain genes to become inactive, thereby inactivating the development of tumor-protective genes. Both cause aggressive growth and genetic mutations in uterine lining cells (Andrijono, 2018). Not all abnormal cells become cancerous, but they can develop into a cancer called Cervical Intraepithelial Neoplasia (CIN). This condition is synonymous with dysplasia. The development of cervical cancer can be divided into several stages including: mild dysplasia stage which lasts five years, moderate dysplasia stage which lasts three years, severe dysplasia which lasts one year, followed by cancer stages from stage 0 to stage IV b (Fusco, 2008).

World Health Organization (WHO) states that 43% of cancers can be prevented with a healthy lifestyle and 1/3 of all cases can be cured if the symptoms are recognized early. Early stage of cervical cancer can be diagnosed by cytology through VIA test (WHO, 2020). Almost 50% of cervical cancer patients have never had an VIA test (WHO, 2020). The VIA test is a method for the early detection of a possible cervical cancer using an acetic acid concentration of 3-5%. Visualization by inspection can assess cervical cellular dysplasia. The VIA test was first introduced in March 1924 by Hinselmann. The technique was introduced through a cervical swab containing 3-5% acetic acid and pressed for about a minute to assess changes in the cervix. The concentration of acetic acid affects abnormal epithelial cells and increases the osmotic pressure of the extracellular fluid. Under such condition, hypertonic extracellular fluid attracts intracellular fluid, leading to cell membrane dysfunction and decreasing the distance between epithelial cells. When viewed under light, the collapsing epithelial cells cannot transmit light to the stroma, so they reflect light and appear white (Kemenkes, 2015).

The Precede-Proceed theory introduced by Lawrence Green (1980), states that behavior can be influenced by three determinants including predisposing factors (knowledge, attitudes, culture and

values); supportive factors (healthcare facilities such as hospitals and medications); and driving factors (health care workers and indigenous peoples). The WHO states that these three factors are not the only factors that can change a person's behavior. The presence of violence/coercion, rules and education can also influence behavior change. Influential factors for behavior towards VIA test include age, educational level, employment status, knowledge, family support, and support from healthcare workers (Crosby, 2011; Handayani, Arum, & Setiyawa, 2017).

The increasing phenomenon of cancer prevalence in Indonesia is currently a complicated problem. 1 in 1000 Indonesian women will develop cervical cancer. In fact, 80% of patients come for medication and treatment at an advanced stage, and 94% of them die within two years. Awareness of the importance of cancer prevention is one strategy to overcome this problem. Prevention can be done in two ways, primarily through vaccination and secondarily through early detection or screening. A simple and inexpensive screening method is visual inspection with acetic acid test.

The national target for cervical cancer screening is reaching 34 million women in 2025. Considering that the number of Indonesian women population aged 20-65 was 59.473.500 in 2020, the national target in 2025 will surely be difficult to be achievable if the scope of investigation is only 8% per year (Statistics of Indonesia, 2020). Therefore, in order to accelerate the achievement of the national target, efforts must be made to increase coverage of cervical cancer screening. Observing the situation by considering women's risk factors correlated with behavior towards VIA test will help various parties formulate strategies to anticipate and motivate women in order to consciously undertake VIA test.

This study aims to analyze the relationship between age, education, employment status, parity and age at first marriage, marriage frequency, knowledge, motivation and behavior towards VIA test.

## **Methods**

This was a quantitative study with a case-control design. The dependent variable for this study was the behavior towards VIA test. Independent variables of this study included knowledge, motivation, attitudes, age, employment status, parity, age at first marriage, marriage frequency and level of education were identified as confounding variables. The study was conducted from October 2019 to February 2020. The sample size was calculated using the Slovin formula with an absolute accuracy of 5% and a confidence level of 95%, so it was obtained 164 respondents. To avoid possible drop-outs, 10% was added so that the required total sample was 181 respondents, who were assigned into 58 groups who had ever performed VIA test and 123 people who had never performed VIA test.

The study samples were collected in the area of hamlet 003, Tanah Tinggi Village, Johar Baru, Central Jakarta District. Samples were selected using a simple random sampling technique with computerization to select respondents representing 13 neighborhoods in the area of hamlet 003 and were assigned into two categories; those who had ever performed VIA test and those who never had VIA test. The number of populations per neighborhood against the number of samples needed was estimated. The number of samples per neighborhood was as follows: 10-9-13-13-15-11-15-10-13-19-10-16-15-14. Inclusion criteria included women aged >15 years old, married, or ever had sexual intercourse. Exclusion criteria included women with a history of cervical cancer and those who were unwilling to

participate in the survey. Selected respondents who were willing to participate in this study were asked to sign an informed consent form which stated information regarding the study. Then a questionnaire involving personal identity data, 20 questions on knowledge, 20 questions on motivation and 13 questions on attitude was delivered. The questionnaire used have passed the validity and reliability tests at a 95% confidence level, with a Cronbach's alpha values of 0.821 for the questions of knowledge; 0.841 for the questions of motivation and 0.799 for the questions of attitude.

Data processing was conducted systematically. Test for normality of data applied the Liliefors test. Data with normal distribution were analyzed using the t-test. Data that were not normally distributed were changed into means to generate data in the form of categories and analyzed by the chi-square test. Data were transformed with a measurement scale using a Likert scale through Rasch model analysis to generate data in terms of categories and then were re-analyzed using the chi-square test. Decision making in multivariate analysis used a logistic regression test. Computer-aided statistical test applied Winsteps and SPSS 22 software.

## Results

The study was conducted among 181 selected respondents. Two groups were identified in this study. There were 58 people (32%) in the group who had ever performed VIA test and 123 people in the group who had never performed VIA test.

**Table 1.** Results of the Transformation of Knowledge, Attitude and Motivation

Variable	Cut-off point
Knowledge*	Median 75
Attitude in the group who had ever performed VIA test**	Mean (logit) 54.77
Attitude in the group who had never performed VIA test**	Mean (logit) 50.58
Motivation in the group who had ever performed VIA test**	Mean (logit) 65.29
Motivation in the group who had never performed VIA test**	Mean (logit) 65.22

\* Analyzed using Liliefors's test

\*\* Analyzed using Rasch model

Table 1 shows the results of transforming knowledge, attitude and motivation variables into categorical variables. In the next step, knowledge above 75 is classified as good knowledge and below 75 as less knowledge. Attitudes in the VIA study group are transformed into supportive and non-supportive attitudes with a cut-off point of 54.77. Attitudes in the group who never had the VIA test were transformed into supportive and non-supportive attitudes with a cut-off point of 50.58. The motivation in the group that had the VIA test was converted into less and good motivation with a cut-off point of 65.29. Motivation in the group who never had VIA test was broken down into less and good motivation with a cut-off point of 65.22.

**Table 2.** Characteristics of Respondents Regarding Behavior towards VIA test

Variable	Never had VIA test	Ever had VIA test	P value	OR (95% CI)
<b>Age</b>				
Mean	46.89	44.26		
Median	44.00	44.50	0.357*	-1.722 – 6.408
Min-Max	19-85	20-74		
<b>Employment status</b>				
Unemployed	106 (58.6%)	47 (26%)		
Employed	17 (9.4%)	11 (6%)	0.501**	1.459 (0.635 – 3.355)
<b>Parity</b>				
≥3	49 (27.1%)	23 (12.7%)	0.981**	1.008

Variable	Never had VIA test	Ever had VIA test	P value	OR (95% CI)
<3	74 (40.9%)	35 (19.3%)		(0.532 – 1.907)
<b>Age at first marriage</b>				
<20 years old	43 (23.8%)	12 (6.6%)	0.050**	2.060
≥20 years old	80 (44.2%)	46 (25.4%)		(0.987 – 4.299)
<b>Marriage frequency</b>				
>1 time	17 (9.4%)	2 (1.1%)	0.034**	4.491
1 time	106 (58.6%)	56 (30.9%)		(1.001 – 20.136)
<b>Education</b>				
Primary level	74 (40.9%)	33 (18.2%)	0.799**	1.144
Higher level	49 (27.1%)	25 (13.8%)		(0.608 – 2.154)

\* Analyzed using t-test

\*\* Analyzed using chi square

Table 2 shows that the mean age of the respondents was 44 and 46 years. The results of the analysis indicated that there was no significant relationship between age and towards behavior VIA test ( $p$ -value=0.357 >0.05). Most of respondents in the two groups were unemployed, the majority of respondents were housewives and did not earn any money from their families. Bivariate analysis showed that there was no significant relationship between employment status and behavior towards VIA test ( $p$ -value=0.501 >0.05). Regarding the part, most of respondents in both groups had a parity of <3. Statistically, there was no significant relationship between parity and behavior towards VIA test.

Most of respondents in both groups were married at the age of >20 years old. However, looking at a total of 181 respondents, almost half (30.4%) were married before the age of 20 years old. The results of statistical tests showed that there was a significant relationship between age at first marriage and behavior towards VIA test ( $p$ -value=0.050 <0.05). Close relationship analysis showed that respondents who were married >20 years of age were 2 times more likely to do VIA test (OR=2,060). In general, respondents married only once. However, a small proportion (10.5%) of respondents had married more than one time. The results of the analysis showed that the marriage frequency was significantly related to the behavior of the VIA test ( $p$ -value=0.034 <0.05). The OR value of 4.491 indicated that respondents who had married once were 4.5 times more likely to perform VIA test.

Out of a total of 181 respondents, most (59.1%) of respondents had the primary level of education. In this case, the primary education in question referred to a 9-year compulsory education set by the government, up to upper secondary level. Also, the dominance looked the same in both groups, the percentage variance was higher for respondents with primary education in both groups that had ever performed VIA test and had never performed VIA test at all. Further analysis showed that there was no significant relationship between level of educational and behavior towards VIA test.

**Table 3.** Relationship between Motivation, Attitude and Knowledge with Behavior towards VIA test

Variable	Had never performed IVA test	Had ever performed VIA test	P value	OR (95% CI)
<b>Motivation</b>				
Poor	73 (40.3%)	42 (23.2%)	0.124*	0.556
Good	50 (27.6%)	16 (8.8%)		(0.282 – 1.097)
<b>Attitude</b>				
Non-supportive	72 (39.8%)	33 (18.2%)	0.835*	1.070
Supportive	51 (28.2%)	25 (13.8%)		(0.569 – 2.011)
<b>Knowledge</b>				
Poor	51 (28.2%)	12 (6.6%)	0.010*	2.715
Good	72 (39.8%)	46 (25.4%)		(1.309 – 5.632)

The results of the analysis described in table 3 showed that most of respondents (63.5%) were poorly motivated to perform VIA test. The results of the bivariate analysis showed that there was no significant relationship between motivation and behavior towards VIA test ( $p\text{-value}=0.124 >0.05$ ). Table 3 also revealed that most of respondent (58%) had a non-supportive attitude to perform VIA test. The results of the analysis showed that there was no significant relationship between attitude and VIA test, as evidenced by the  $p$  value of  $0.835 >0.05$ . 39.8% out of a total of 181 respondents in the group who had never performed VIA test had a good knowledge regarding VIA test. Likewise, 24.5% of respondents in the group that had ever performed VIA test had a good knowledge regarding VIA test. The results of the analysis using the chi-square test showed that knowledge was significantly related to the behavior regarding VIA test ( $p\text{-value}=0.010 <0.05$ ). The power of exposure was completed with an  $OR=2.715$ , meaning that respondents with a good knowledge had a 2.7 times higher chance of having VIA test than respondents with poor knowledge.

**Table 4.** Logistic Regression Analysis of Age at First Marriage, Marriage Frequency, Motivation and Knowledge with Behavior towards VIA test

Variable	Coef ( $\beta$ )	SE ( $\beta$ )	Wald	P value	Exp.B (95% CI)
First marriage at the age of <20 years	0.521	0.393	1.761	0.184	(0.78-3.637)
Marriage frequency of >1 time	1.348	0.787	2.932	0.087	(0.823-17.994)
Poor motivation	-0.687	0.361	3.614	0.057	(0.248-1.022)
Poor knowledge	0.928	0.387	5.766	0.016	(1.186-5.398)
Constant	0.682	0.316	4.668	0.031	

Hoshmer and Lemeshow tests=0.838

Logistics Regression Equation=0.977

From table 4 it was known that the logistic regression model could explain the data well, as evidenced by the Hoshmer and Lemeshow test values of  $>0.05$ . The multivariate analysis showed that the most important factor influencing the VIA test in area of hamlet 003, Tanah Tinggi Village, Johar Baru District, Central Jakarta was knowledge. This is supported by the knowledge analysis results with the lowest  $p$ -value ( $p\text{-value}=0.016$ ) and the highest proximity ( $Wald=5.766$ ). The results of this multivariate analysis applied the enter method. The results of the calculation using the logistic regression probability formula obtained a value of 0.977, which meant that the probability that a person did not perform VIA test from the criteria for age at first marriage <20 years, marriage frequency of >1 time, had poor motivation and knowledge was 97.7%.

## Discussion

VIA test is one of the preventive examinations recommended by the WHO for the early detection of cervical cancer. The advantages of the VIA test are that it meets the criteria for a good screening test and this test is comparable to pap smear and HPV or colposcopy regarding the sensitivity and specificity (Nuranna, 2012). The VIA test can be performed at any time during the menstrual cycle, pregnancy, and postpartum care. This test may be performed on women who are suspected or known to have a sexually transmitted disease or HIV/AIDS. Predisposing factors that trigger cervical cancer include age in first sexual intercourse <20 years old, multiple sexual partners, history of chlamydia or gonorrhea, particularly HIV/AIDS, having mother or sister with cervical cancer, history of abnormal pap smear

results, and smoking. In addition, women with immune-compromised problems (eg HIV/AIDS) or chronic corticosteroid users (eg, medications for asthma or lupus) are more likely to develop cervical cancer if they are infected with HPV (Moh RI, 2015).

VIA test is one of the efforts that can be easily performed by someone to detect cervical cancer early. However, usually a woman comes to the health care system late in the final stage of cancer. This is because cervical cancer does not cause any symptoms that patients experience in the early stages. Furthermore, patients are not screened regularly for cervical cancer, and this may reduce the chances of recovery from advanced disease (WHO, 2020).

Cervical cancer is the second leading cause of death in women after breast cancer (Globocan, 2020a; WHO, 2018). WHO recommends that cancer can be optimally treated with a greater chance of cure if someone carries out regular screening. Cervical cancer screening can be performed by pap smear, colposcopy and VIA test. The VIA test is one of the simple tests that is simple, inexpensive and leads to conclusions immediately. Sectional dysplasia can be identified with a smear containing 3-5% cervical acetic acid (Sari & Abdiana, 2019).

The results of the analysis showed that not all observed characteristics were related to the VIA test. Age at first marriage and frequency of marriage were factors which were related to behavior towards VIA test. The results of the study found that age, employment status, parity, and education were not significantly related to an individual's decision to take a VIA test. This is consistent with a study conducted by Putu Ika Widayanti in Yogyakarta on 2017, which found that education and employment status did not have a significant relationship with VIA test (Widayanti, Tyastuti, & Hernayanti, 2018). The study finding is also in line with a study conducted by Sri Dew Handayani on 2017 that age and parity did not have significant relationship with VIA test (Handayani et al., 2017). However, a study conducted in 2019 in Cibinong, Indonesia, found that age was significantly related to VIA test (Pebrina, Kusmiyanti, & Suriyanto, 2019).

Age and parity cannot be used as a benchmark to assess whether or not an individual desires to take an IVA test. This is influenced by several aspects that determine a person's decision. According to Harvey in Sabri Alisub it is explained that maturity is not always affected by age (Sabri, 2007). The maturity to think wisely and determine behavior when dealing with a problem were influenced by other factors such as knowledge and emotional maturity. In fact, maturity of thought is directly proportional to age, but under certain conditions it is inversely proportional. Factors of experience and understanding influence how a person thinks and acts (Sabri, 2007).

So far it has been assumed that the relationship between age at first marriage and frequency of marriage using the VIA test is influenced by one's own knowledge. Women who have a good understanding of the risk factors for cervical cancer have a higher awareness of having VIA test. The move is believed to be one of the efforts to help women detect cervical cancer early. A person's decision to have VIA test is influenced by several other factors and is linked to health behavior. Health behavior can be interpreted as an individual's response to stimuli related to health status (Siregar, Panggabean, & Simbolon, 2021). This condition manifests itself in the form of knowledge, perceptions, attitudes,

support from health care workers, use of facilities, and even of take the medicine (Crosby, 2011; Dewi, 2014).

It is well known that knowledge is the most significant factor which influence a person to decide whether they want to take a VIA test or not. The results of this study are consistent with the study conducted by Sri Dewi Handayani and Siregar (Handayani et al., 2017; Siregar et al., 2021). The relationship between knowledge and VIA test was also found in the study conducted by Sidabutar (Sidabutar, 2018). However, the attitudes and motivations in this study are inconsistent with the findings of a study on the same topic (Sidabutar, 2018). Another study conducted by multiple researchers found that knowledge was significantly related to VIA test (Nurhayati, 2019; Purwanti, Handayani, & Kusumasari, 2020).

Lewin (1951) describes behavior as being related to individual and environmental characteristics. Here, motivation, personality traits and social interactions can be identified as characteristics. Environment has a major impact on behavior change, and the impact is even more significant than the individual characteristics. Therefore, relationship between these two factors in determining a person's behavior becomes very complex (Crosby, 2011; Dewi, 2014; Sabri, 2007).

Regarding behavior change decisions, a person's attitude influences behavior based on rationality and life implications. Behavior is developed not only by general attitudes but by specific attitudes towards stimuli. Attitudes and subjective norms influence decisions in determining a person's behavior. These two things make up interest and behavioral intention. The subjective norm can be interpreted as belief in the actions of others in order for us to follow the pattern. The interplay of attitudes, subjective norms, and interests form the determinants that a person believes in whether the behavior is important or not (Kusnadi, 2015).

Green proposed that behavior is influenced by three factors, including predisposing, supportive and motivating factors. These factors were identified in healthcare workers' knowledge, attitudes, motivation, health facilities, and support (Crosby, 2011).

Knowledge can be interpreted as information gained through learning efforts about some information. Knowledge can be the basis for decisions and actions to deal with a problem. There are several factors that influence knowledge, including education, employment status, age, interest or motivation, experience, and information. It is undeniable that education is one of the most influential factors in someone's knowledge. The higher a person's level education, the easier it is for him or here to obtain information, which in turn increases knowledge. Similar to work, this condition creates an environment that allows a person to interact with one another, resulting in experiences that influence knowledge. In line with these two factors, age becomes an internal influence that can change a person's perspective and thought patterns to become more mature (Kusnadi, 2015; Purwanti et al., 2020; Sidabutar, 2018).

Attitude is a reaction or response that is still closed to an object's stimulus. Attitude is followed up as a willingness to act based on motivational purpose. In fact, attitudes are formed after someone knows information and has experienced an event. Attitudes can be shaped as a medium of



communication, meaning that they function as a chain of links between individuals and their groups (Nurhayati, 2019; Siregar et al., 2021; Widayanti et al., 2018).

Martin Fishbien and Ajzen found that there was a relationship between attitudes and behavior which was also related to beliefs derived from norms and intentions. This theory was introduced as the theory of reasoned behavior or reasoned action. Furthermore, this theory was modified by Ajzen into a theory of planned behavior which includes three aspects including belief, motivation and awareness (Mahyarni, 2013).

In this study, it is assumed that the tendency of women not to have VIA test was influenced by attitudes, but this did not change the behavior, since the awareness of carrying out an early screening due to some fears affecting the next, life was not changed. The study found that some respondents feared pain, either fear of pain during the exam, fear of repeated use of the instrument (sterility of the instrument), or fear of knowing the results. All this information forms the confidence in the person not to do IVA test. Several other factors influencing individual attitudes are known information (knowledge) found through past experiences or through mass media/social media, the influence of information provided by others, and emotional factors.

Motivation is intended to bring about changes in behavior. Woodworth mentions that there are three motivational traits that can influence behavior, including: intensity, direction, and persistence (Widayanti et al., 2018). However, if any of these three traits are found to be weak, the individual's behavior cannot be changed. The weakness of the drive that causes the individual to avoid a behavior leads to a tendency to repeat the behavior believed to be true. In this study, it was concluded that motivation had no significant association with VIA test, which could be caused by several other factors affecting VIA test behavior and motivation. These factors include habits, attitudes, norms, traumatic experiences, sociocultural, environmental, perceptions and reactions of other individuals or groups.

## **Conclusions**

Based on the results of the examinations carried out, several conclusions can be drawn. First, only a small proportion of women of childbearing age and elderly women had ever performed VIA test. Furthermore, there was a relationship between age, employment status, level of education and knowledge with behavior towards VIA test. The dominant factor which influenced behavior towards VIA test found in this study was knowledge. Therefore, increasing knowledge is one of the strategies that can be implemented to encourage people to undertake VIA test. One of the activities that involve the community in order to increase knowledge is the activation of peer groups in every community activity.

In addition, to improve the quality of the theory found, there should be further research by using any of the educational methods to increase the level of public knowledge.

## References

- Andrijono. (2018). Meningkat, Kasus Kanker Serviks Baru di Indonesia 32.469 jiwa di 2018. Retrieved from <https://sains.kompas.com/read/2019/02/20/125618223/meningkat-kasus-kanker-serviks-baru-di-indonesia-32469-jiwa-di-2018?page=all>
- Statistics of Indonesia. (2020). BPS: 270,20 juta Penduduk Indonesia Hasil Survey 2020. Retrieved from <https://www.bps.go.id/news/2021/01/21/405/bps--270-20-juta-penduduk-indonesia-hasil-sp2020.html>
- Crosby, R. (2011). What is Planning Model? An Introduce to PRECEED-PROCEED. *J Public Health Dent*.
- Dewi, L. (2014). Faktor-faktor yang Berhubungan Dengan Perilaku Perempuan Usia Subur Dalam Deteksi Dini Kanker Serviks Dengan Metode Pemeriksaan Inspeksi Visual Asetat (IVA) di Wilayah Kerja Puskesmas Tanjung Hulu Pontianak Timur Tahun 2014. *J ProNers*.
- Fusco, E. (2008). History of Cospolcopy: A Brief Biography of Hinselmann. *J Prenat Med*.
- Globocan. (2020a). Cancer Today. Retrieved from [https://gco.iarc.fr/today/online-analysis-pie?v=2020&mode=population&mode\\_population=continents&population=900&populations=900&key=total&sex=0&cancer=39&type=1&statistic=5&prevalence=0&population\\_group=0&ages\\_group%5B%5D=0&ages\\_group%5B%5D=17&nb\\_items=7&g](https://gco.iarc.fr/today/online-analysis-pie?v=2020&mode=population&mode_population=continents&population=900&populations=900&key=total&sex=0&cancer=39&type=1&statistic=5&prevalence=0&population_group=0&ages_group%5B%5D=0&ages_group%5B%5D=17&nb_items=7&g)
- Globocan. (2020b). Indonesia: Cancer Today. Retrieved from <https://gco.iarc.fr/today/data/factsheets/populations/360-indonesia-fact-sheets.pdf>
- Handayani, S. D., Arum, S. D. N. S., & Setiyawa, N. (2017). *Faktor-faktor Yang Mempengaruhi Perilaku Pemeriksaan IVA pada Perempuan Usia Subur di Desa Penyak Kecamatan Koba Kabupaten Bangka Tengah Tahun 2017*. Politeknik Kesehatan Kemenkes Jogja, Yogyakarta.
- Ministry of Health of the Republic of Indonesia. (2015). Situasi Penyakit Kanker.
- Kusnadi, D. (2015). Pengambilan Keputusan Dalam Perilaku Organisasi. *Jurnal Ilmiah Universitas Batanghari Jambi*, 15(2).
- Mahyarni, M. (2013). Theory of Reasoned Action dan Theory of Planned behavior (Sebuah Kajian Historis Tentang Perilaku). *Jurnal El-Riyasah*.
- Nuranna, L. (2012). Cervical Cancer Prevention Program in Jakarta, Indonesia: See and Treat Model in Developing Country. *J Gynecol Oncol*, 147-152.
- Nurhayati, N. (2019). Hubungan Pengetahuan dan Sikap Ibu Usia Subur dengan Pemeriksaan IVA di Puskesmas Sungai Limau. *Jurnal Akademika Baiturrahim Jambi*, 8(1).
- Pebrina, R. J., Kusmiyanti, M., & Surianto, F. (2019). Faktor-faktor yang Berhubungan dengan Pemeriksaan Inspeksi Visual Asam Asetat (IVA) di Puskesmas Cibinong Tahun 2019. *Jurnal Penelitian dan Pengembangan Pelayanan Kesehatan*, 3(2), 106-113.
- Purwanti, S., Handayani, S. D., & Kusumasari, R. V. (2020). Hubungan Tingkat Pengetahuan tentang IVA dengan Perilaku Pemeriksaan IVA. *Jurnal Kesehatan Poltekkes Kemenkes RI Pangkalpinang*, 8(1). doi:<https://doi.org/10.32922/jkp.v8i1.179>
- Sabri, A. (2007). *Psikologi Pendidikan*. Jakarta: Pedoman Ilmu Jaya.
- Sari, R. P., & Abdiana. (2019). Upaya Peningkatan Cakupan Pemeriksaan Inspeksi Visual Dengan Asam Asetat (IVA) di Dina Kesehatan Kota Solok. *Jurnal Kesehatan Andalas*, 8(3), 635-641.
- Sidabutar, S. (2018). Model Keputusan Perempuan Usia Subur Terhadap Niat Deteksi Dini Kanker Serviks dengan Test IVA. *Jurnal Penelitian Kesehatan Suara Forikes*, 9(3), 181-190.
- Siregar, M., Panggabean, H., & Simbolon, J. (2021). Faktor-faktor Yang Mempengaruhi Perilaku Pemeriksaan VIA test Pada Perempuan Usia Subur di Desa Simatupang Kecamatan Muara Tahun 2019. *Jurnal Kesehatan Masyarakat dan Lingkungan Hidup*, 6(1), 32-48.
- WHO. (2018). Cancer. Retrieved from [https://www.who.int/health-topics/cancer#tab=tab\\_1](https://www.who.int/health-topics/cancer#tab=tab_1)

- WHO. (2020). Cervical Cancer Free Future InfoGraphics. Retrieved from [https://www.who.int/docs/default-source/cervical-cancer/events/who-framework-invasive-cx-ca-infographic-final.pdf?sfvrsn=62358f73\\_4](https://www.who.int/docs/default-source/cervical-cancer/events/who-framework-invasive-cx-ca-infographic-final.pdf?sfvrsn=62358f73_4)
- Widayanti, P. I., Tyastuti, S., & Hernayanti, M. R. (2018). *Hubungan Dukungan Suami, Motivasi dan Sikap Dengan Perilaku Pemeriksaan Inspeksi Visual Asam Asetat (IVA) Pada Pasangan Usia Subur di Wilayah Kerja Puskesmas Wirobrajan Kota Yogyakarta Tahun 2017*. Health Polytechnic of Yogyakarta.

## Effect of Acupressure at ST 36 & SP 6 Points on Hemoglobin Levels among Adolescent Girls: Preliminary Study

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### ABSTRACT

Menstruation is one of signs of puberty in adolescent girls. The process of menstruation often affects hemoglobin levels in adolescent girls regarding the incidence of anemia and may also have a negative effect on the growth and development of adolescent girls. In addition to the iron tablet supplementation program, several non-pharmacological methods can be applied as an alternative to increase hemoglobin levels among adolescent girls with anemia, one of which is acupuncture and acupressure methods. This was a pre-experimental study with a one group pretest posttest design. The population involved 25 adolescent girls at Taruna Pembangunan Intensive High School in Surabaya according to the inclusion criteria. In further stage, the samples were trained how to perform acupressure at Zusanli (ST36) point and Sanyinjiao (SP 6) point every 2 days for 10 minutes which was carried out for 2 months from September to November 2021. Data that had been collected were tested for homogeneity and analyzed by Wilcoxon test. Before acupressure, almost half of the respondents had Hb levels of 11-12 mmHg (44%), and 7 respondents had Hb levels of <11 mmHg. After acupressure therapy, more than half of the respondents had Hb levels of 13-14 mmHg (53%). The Wilcoxon signed rank test obtained a p value = 0.000 (<0.05) which meant that there was a difference between Hb levels in pre-test and post-test. Thus, it can be concluded that there was an effect of acupressure at ST36 and SP 6 points on the increase in hemoglobin levels among adolescent girls. However, there is a need for further research on acupressure method which involved more samples and subjects with different levels of anemia, so as to confirm the effectiveness of acupressure on the increase in hemoglobin levels.

*Menstruasi merupakan tanda datangnya masa pubertas pada remaja putri. Proses pengeluaran darah menstruasi sering kali beresiko mempengaruhi kadar hemoglobin pada remaja, yaitu terjadinya anemia dan dapat menimbulkan efek yang negatif bagi tumbuh kembang remaja putri. Selain program pemberian Tablet Tambah Darah (TTD), beberapa metode non farmakologi dapat digunakan sebagai alternatif dalam membantu meningkatkan kadar hemoglobin pada remaja putri dengan anemia, salah satunya adalah dengan metode akupunktur dan akupresur. Penelitian ini menggunakan pra-eksperimental design dengan rancangan one group pretest posttest design. Pengambilan sampel menggunakan purposive sampling yaitu 25 remaja putri di Sekolah Menengah Atas Intensif Taruna Pembangunan Surabaya sesuai dengan kriteria inklusi, yaitu usia 12 – 18 tahun, saat pemeriksaan Hb tidak sedang haid, bersedia melakukan akupresur secara mandiri. Tahap selanjutnya sampel dilatih cara melakukan akupresur pada titik Zusanli (ST36) dan titik Sanyinjiao (SP 6) 2 hari sekali selama 10 menit yang dilakukan selama 2 bulan dari September hingga November 2021. Data yang telah terkumpul diuji homogenitas dan dianalisis dengan wilcoxon. Sebelum mendapatkan akupresur, hampir setengahnya responden mempunyai kadar Hb antara 11-12 mmHg (44%), tujuh remaja putri mempunyai kadar Hb < 11 mmHg. Setelah melakukan terapi akupresur, lebih dari separuh responden kadar Hb remaja putri naik antara 13-14 mmHg (53%). Hasil uji Wilcoxon signed rank test p value = 0.000 (<0.05) di mana artinya ada perbedaan antara Hb pre-test dan Hb post-test, sehingga dapat disimpulkan ada pengaruh akupresur titik ST36 dan SP 6 terhadap peningkatan kadar haemoglobin pada remaja putrid. Namun perlu adanya penelitian pengembangan lanjutan tentang metode akupresur dengan sampel yang lebih luas dan dengan subyek yang memiliki kadar anemia yang berbeda-beda, sehingga dapat dilihat efektifitas peran akupresur dalam peningkatan kadar hemoglobin.*

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## **Introduction**

Menstruation is one of signs of puberty in adolescent girls. The process of menstruation often affects hemoglobin levels in adolescent girls regarding the incidence of anemia and may also have a negative effect on the growth and development of adolescent girls. Conditions that may arise as a result of anemia include decreased concentration in learning, sub-optimal growth indicated by constant height, and decreased physical ability (Pudiastuti, 2012).

Data derived from Basic Health Research in 2018 showed that 32% of adolescents in Indonesia had anemia, meaning that of 10 adolescent girls, there were 3-4 who suffer from anemia. Such condition can illustrate that approximately 7.5 million adolescents in Indonesia are at risk of experiencing delays in growth, development and cognitive abilities; and are susceptible to infectious diseases. This condition can be aggravated by factors of low nutrition and lack of physical activity.

In addition to the iron tablet supplementation program, several non-pharmacological methods can be applied as an alternative to increase hemoglobin levels among adolescent girls with anemia (Iswati, Ayu, & Rosyida, 2019). Many studies regarding administration of family medicinal plants have been conducted, while interventions through acupressure and acupuncture have not been widely reported. The result of previous study reported that combination between acupuncture and mung bean juice could increase hemoglobin levels among patients (Utami, 2019).

Fulfillment of nutrition in adolescents requires real action, not only from the health sector, but must be supported by various parties. Therefore, it is necessary to develop non-pharmacological methods. This novel innovation was not carried out to replace conventional methods, but as a companion in efforts to fulfill nutrition and treat anemia in adolescent girls. Adolescents who have difficulty in consuming iron tablets can choose the acupressure method as an alternative method. In this study, the researchers are intended to determine the effect of acupressure at Zusanli (ST36) and Sanyinjiao (SP 6) points on the increase in hemoglobin levels among adolescent girls in Surabaya.

## **Methods**

This was a pre-experimental study with a one group pretest posttest design. The population involved adolescent girls at Taruna Pembangunan Intensive High School in Surabaya according to the inclusion criteria. The inclusion criteria included adolescent girls aged 12-18 years, not in menstrual period at the time of Hb examination, and were willing to perform independent acupressure at home. The study samples were selected by purposive sampling to obtain a sample size of 25 respondents. In further stage, the samples were trained how to perform acupressure at Zusanli (ST36) point and Sanyinjiao (SP 6) point every 2 days for 10 minutes which was carried out for 2 months from September to November 2021. Based on previous study, acupuncture which was a given 12 times (2 days for 10 minutes) in combination with green beans could increase Hb levels (Utami, 2019). Examination of Hb levels was carried out 2 times, namely before treatment and after treatment, using an electric Hb meter (easy touch gchb). Researchers created a WhatsApp group to monitor and observe respondents involved. Data that had been collected were tested for homogeneity and analyzed by Wilcoxon test.

**Results**

**Table 1.** Characteristics of Respondents

Variable	Frequency		P-value
	n=25	(%)	
<b>Age (years)</b>			
a. 15	7	28	0.003
b. 16	10	40	
c. 17	5	20	
d. 18	3	12	
<b>Weight (Kg)</b>			
a. < 50	7	28	0.165
b. 50-60	15	60	
c. > 60	3	12	
<b>Height (cm)</b>			
a. <150	4	16	0.017
b. 150-160	12	48	
c. >160	9	36	
<b>HB level (gram/dL) (pre-test)</b>			
a. <11	7	28	0.005
b. 11-12	11	44	
c. 13-14	7	28	
<b>HB levels (gram/dL) (post-test)</b>			
a. <11	3	12	0.019
b. 11-12	9	36	
c. 13-14	13	52	

Based on the table above, it can be observed that almost all characteristic variables had a p value of <0.05 data were not normally distributed. Most of the respondents aged 16 years (40%), more than half of respondents had a weight of 50-60 kg (60%), and almost half of respondents had a height of 150-160 cm (48%). Before acupressure, almost half of the respondents had Hb levels of 11-12 mmHg (44%), and 7 respondents had Hb levels of <11 mmHg. After acupressure therapy, more than half of the respondents had Hb levels of 13-14 mmHg (53%).

**Table 2.** Analysis Results of the Wilcoxon Signed Ranks Test

	N	Mean Rank	Sum of Ranks	Asymp. Sig. (2-tailed)
<b>Post-test – pre-test</b>	Negative Ranks	0 <sup>a</sup>	.00	.00
	Positive Ranks	22 <sup>b</sup>	11.50	253.00
	Ties	3 <sup>c</sup>		
	Total	25		.000

In Based on the table above, it can be observed that N, the mean rank and sum of ranks had a value of 0. Data showed that there was an increase in the Hb levels from pre-test to post-test. A total of 22 young women experienced an increase in Hb levels after acupressure at ST 36 and SP 6 points, with a mean increase of 11.50 and positive rating of 253.00.

The results of the Wilcoxon signed rank test obtained a p value = 0.000 (<0.05) which indicated difference between Hb levels in pre-test and post-test. Thus, it can be concluded that there was an effect of acupressure at ST36 and SP 6 points on the increase in hemoglobin levels among adolescent girls.

**Discussion**

Anemia in adolescent girls has both short-term and long-term impacts. In short-term, adolescent girls with anemia often experience problems with their health and achievement in school. The long-term

impact includes the risk of experiencing complications during pregnancy and causing stunted growth and development of the fetus which further lead to stunting children in the future. Efforts to reduce the prevalence of anemia in adolescent girls which is still high in Indonesia have been carried out since 2014. At that time, the government launched an iron tablet supplementation program for women of childbearing age and pregnant women (Regulation of the Ministry of Health of the Republic of Indonesia, 2014). This program is strengthened by the Circular Letter of the Ministry of Health of the Republic of Indonesia No.HK.03.03/V/0595/2016 concerning iron tablets supplementation for adolescent girls and women of childbearing age. Such program was carried out in junior and senior high schools simultaneously. In fact, this effort has many obstacles. Basic Health Research in 2018 reported that the coverage of iron tablets received by adolescents was 76.2%, of which 1.4% of adolescents received 52 iron tablets, while 98.2% only received <52 iron tablets. The low awareness of adolescent girls regarding the importance of consuming iron tablets as a preventive measure for anemia is influenced by many factors. A study conducted by Risva et al. (2016) among first-year students at the Faculty of Public Health, Universitas Diponegoro, Semarang reported that attitudes, culture and environmental support had a significant relationship with iron tablet consumption. In line with this, a study conducted by Apriningsih et al. (2019) reported that parents played an important role in the adherence of adolescents in consuming iron tablets. In this preliminary study, 73% of respondents had Hb levels of 12 g/dl. Adolescent girls can be defined to have anemia if Hb < 12 g/dl. In order to overcome the incidence of further anemia, many institutions have implemented a government program by providing iron supplements equivalent to 60 mg of elemental iron (in the form of Ferro Sulfate, Ferro Fumarate or Ferro Gluconate) and Folic Acid 0.400 mg at a dose of 1 tablet/week for 1 year (60 tablets/year). However, in reality, many adolescents feel bored with routinely consuming iron tablets for a long period of time. Therefore, acupressure at ST 36 and SP 6 points can provide a solution in overcoming the anemia problems often faced by adolescents. The results of this study showed changes in hemoglobin levels among adolescent girls after acupressure intervention at ST 36 and SP 6 points. According to Traditional Chinese Medicine (TCM) anemia is a condition of blood deficiency that occurs due to deficiency or dysfunction of organs that play a role in producing blood. This deficiency can occur in Zhang's three organs, namely the liver, spleen and kidneys. ST 36 (Zusanli) point is one of the gastric (stomach) meridian points. Acupressure at this point will improve the stomach, kidneys, strengthen Qi, blood as well as body endurance. Meanwhile, the SP 6 (Sanyinjiao) point is the general point of the spleen meridian as the meeting point of the spleen, liver and kidney meridians. Acupressure at this point will strengthen the spleen and kidney in producing blood (Koosnadi Saputra, 2017). One important thing to consider is that acupressure and other complementary measures will be meaningless if it is not balanced with a healthy diet.

## **Conclusion**

It can be concluded from this study that acupressure at ST36 and SP 6 points was effective to be applied as an alternative method in increasing hemoglobin levels in the community (especially among

adolescent girls or women) who do not like taking iron tablets. However, there is a need for further research on acupressure method which involved more samples and subjects with different levels of anemia, so as to confirm the effectiveness of acupressure on the increase in hemoglobin levels.

## References

- Amir, N., & Djokosujono, K. (2019). Faktor-Faktor yang Berhubungan dengan Konsumsi Tablet Tambah Darah (TTD) pada Remaja Putri di Indonesia: Literature Review. *Jurnal Kedokteran Dan Kesehatan*, 15(2), 119.
- Apriningsih, A., Madanijah, S., Dwiriani, C. M., & Kolopaking, R. (2019). Peranan Orang-Tua Dalam Meningkatkan Kepatuhan Siswi Minum Tablet Zat Besi Folat Di Kota-Depok. *Gizi Indonesia*, 42(2), 71.
- Basic Health Research (Riskesdas). (2018). *Badan Penelitian dan Pengembangan Kesehatan Kementerian RI Tahun 2018*. <https://www.kemkes.go.id/article/view/21012600002/remaja-sehat-komponen-utama-pembangunan-sdm-indonesia.html> Accessed on February 25, 2022.
- Istiany, A. & Rusilanti. (2014). *Gizi Terapan*. Bandung: Remaja Rosdakarya.
- Iswati, Retno Setyo, Ayu, Desta, & Rosyida, Cahya. (2019). Relationship between Nutritional Status and the Incidence of Anemia among Children Aged 6 Months - 3 Years. *1st International Conference of Health, Science & Technology (ICOHETECH)*, 56–58.
- Marmi. (2013). *Gizi Dalam Kesehatan Reproduksi*. Yogyakarta: Pustaka Belajar.
- Ministry of Health of the Republic of Indonesia. (2018). *Laporan\_Nasional\_RKD2018\_FINAL.pdf*. Health Research and Development Agency (p. 674).
- Ministry of Health of the Republic of Indonesia. (2016). Surat Edaran Nomor HK.03.03/V/0595/2016 tentang Pemberian tablet tambah darah pada remaja putri dan wanita usia subur. The Ministry of Health of the Republic of Indonesia (pp. 1–3).
- Ministry of Health of the Republic of Indonesia. (2014). Regulation of the Ministry of Health of the Republic of Indonesia Number 88 of 2014 concerning Standards for Iron Tablet for Women of Childbearing Age and Pregnant Women. *Regulation of the Ministry of Health of the Republic of Indonesia*, 1840, 1–8.
- Supariasa, I. D., Bachyar Bakri., & Ibnu F. (2012). *Penilaian Status Gizi*. Jakarta: Penerbit Buku Kedokteran EGC.
- Syatriani, S and Aryani, A. (2010). Konsumsi Makanan dan Kejadian Anemia pada Siswi Salah Satu SMP di Kota Makassar. *Jurnal Kesehatan Masyarakat Nasional* Vol. 4, No. June 6, 2010.
- Utami, Aulia T. (2019). Pengaruh Terapi Akupunktur Terhadap Anemia Menggunakan Titik Xuehai (Sp10), Zusanli (St36) Dan Sanyinjiao (Sp6) Serta Pemberian Nutrisi Kacang Hijau (Vigna Radiata). Tugas Akhir D3 thesis, Universitas Airlangga.
- Koosnadi Saputra (editor). (2017). *Akupunktur dasar/editor, Dr. Koosnadi Saputra, dr., Sp.R*. Surabaya: Airlangga University Press.
- Kosasi, L., Oenzil, fadil., Yanis, Amel., (2014). Hubungan Aktivitas Fisik terhadap Kadar Hemoglobin pada Mahasiswa Anggota UKM Pandekar Universitas Andalas. *Jurnal Kesehatan Andalas*. 2014; 3(2).
- Pudiastuti, R. D. (2012) “3 Fase Penting Pada Wanita (Menarche, Menstruasi dan Menopause)”. PT Elek Media Komputindo. Jakarta.
- WHO. (2018). Adolescent Health: The missing population in Universal Health Coverage, *Www.Who.Int*, pp. 1–32.



## Relationship between Perceived Severity and Compliance with COVID-19 Preventive Behavior among Pregnant Women

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### ABSTRACT

Several risk groups, one of which is pregnant women are susceptible COVID-19. Pregnancy is known as a susceptible condition to COVID-19 infection because it could cause immunity decrease. Therefore, it is necessary to comply with COVID-19 preventive behavior. This study aims to analyze the relationship between perceived susceptibility, perceived severity, perceived obstacle, perceived benefit and self-efficacy with COVID-19 preventive behavior among pregnant women in the work area of Sempaja Community Health Center. This was an observational study with cross sectional design. Samples were selected using purposive sampling technique based on inclusion criteria of pregnant women who lived and registered in the determined work area and had gestational age of more than 12 weeks. There were 194 pregnant women involved as the study samples. Data were analyzed using the Spearman Rank Test. The bivariate analysis revealed that there was relationship between self-efficacy (p value of 0.000), perceived barrier (p value of 0.025), perceived benefit (p value of 0.000), and perceived severity (p value of 0.000) with compliance with COVID-19 preventive behavior. However, there was no relationship between perceived susceptibility and compliance with COVID-19 preventive behavior (p value of 0.287). It can be concluded that the better perception of pregnant women, the better compliance with COVID-19 preventive behavior. It is recommended to increase health promotion in order to keep compliance with COVID-19 preventive behavior.

*Pandemi Corona virus disease (COVID-19) rentan menyerang beberapa kelompok berisiko salah satunya ibu hamil. Kehamilan dapat menurunkan imunitas tubuh, sehingga ibu hamil mudah terpapar COVID-19. Kepatuhan menjalankan protokol kesehatan penting bagi ibu hamil. Tujuan studi ini untuk mengetahui hubungan persepsi kerentanan, persepsi keparahan, persepsi hambatan, persepsi manfaat, dan efikasi diri pada ibu hamil terhadap tindakan kepatuhan pencegahan COVID-19. Desain penelitian yaitu cross sectional. Sampel sejumlah 194 ibu hamil dipilih secara purposif dengan kriteria inklusi tinggal dan terdaftar di wilayah Puskesmas Sempaja dengan usia kehamilan >12 minggu. Data dianalisa menggunakan uji Rank Spearman. Analisa bivariat memperlihatkan bahwa self-efficacy (0.000), persepsi hambatan (p value 0,025), persepsi manfaat (p value 0,000), persepsi keparahan (p value 0,000), berhubungan terhadap tindakan kepatuhan pencegahan COVID-19, sedangkan persepsi kerentanan tidak berhubungan (p value 0,287). Disimpulkan bahwa semakin baik persepsi kesehatan ibu hamil, maka semakin baik pula tindakan kepatuhan pencegahan COVID-19. Disarankan untuk melaksanakan kegiatan sosialisasi mengenai COVID-19 pada ibu hamil secara berkelanjutan sehingga kepatuhan pencegahan penularan dapat terjaga.*

## **Introduction**

The COVID-19 pandemic is still happening, the total number of COVID-19 cases reported globally based on WHO and PHEOC data from the Ministry of Health as of December 5, 2021 is 265.684,258 cases with 5,263,719 deaths in 224 countries and 149 countries that have experienced community transmission. The current trend of COVID-19 cases in the world has shown a downward trend, but the total cases have reached more than 150,000,000 people (Ministry of Health, 2021). At the national level, the distribution of the incidence of this disease almost reaches all regions in Indonesia, including the province of East Kalimantan. Pregnant women are one of the groups who are at risk of being infected.

Pregnancy could induce a decrease in partial immunity and physiological changes, these two factors made pregnant women more susceptible to viral infections (Pradana, Casman, & Aini, 2020). Data showed that 536 pregnant women were tested positive for infection and even 3% of them caused death. Data from the Indonesian Obstetrics and Gynecology Association (POGI) are calculated from the first quarter of 2020 to the second quarter of 2021. Among infected pregnant women, 72% were declared exposed at 37 weeks of gestation and 4.5% required special care. This problem also occurred in the city of Samarinda. The Samarinda City COVID-19 Task Force recorded as many as 28 pregnant women exposed to COVID-19 but this data is in the verification process because not all data on pregnant women have been reported. Both sources of data indicate that quite a lot of pregnant women are infected. This fact encourages the need to increase vigilance and preventive effort in pregnant women.

COVID-19 infection during pregnancy has a greater risk of experiencing severe health impacts that can lead to death compared to the general population (Setyawan, Purnomo, Firdaus, & Nugraheni, 2020). The increased risk of miscarriage, stillbirth, premature birth, tachycardia in the fetus and fetal distress is the impact of COVID-19 infection in pregnant women (Karimi-zarchi et al., 2020). In addition, the presence of congenital diseases in pregnant women such as diabetes mellitus, hypertension and heart disease can increase the risk of experiencing severe symptoms with more severe symptoms (Kostania et al., 2021).

Although the pandemic is still ongoing, COVID-19 prevention behavior has not been optimally adhered to. The research of Hardianti, Erlinawati, & Syafriani (2021) shows that some pregnant women have not complied with COVID-19 prevention behaviors, such as when they do activities outside the home, they do not wear masks, rarely wash their hands with hand sanitizer or soap and do not know the impact of COVID-19 on pregnancy. Most pregnant women (80%) do not know about health protocols to prevent COVID-19. Although all mothers are concern about their pregnancy in the pandemic era, this anxiety does not make them comply with health protocols in their daily activities. When doing activities outside the home, some pregnant women do not take precautions such as leaving the house without a mask, not keeping their distance and participating in crowds (Aritonang, Nugraeny and Siregar, 2020).

According to the Health Belief theory, the individual behavior model is formed by four perceptions, namely Perceived susceptibility (perceived vulnerability), Perceived severity (perceived severity of a health problem), Perceived benefits (benefits of a preventive behavior), Perceived barriers

(the existence of barriers to change), Cues to action (source of information driving action), and Self-efficacy (self-confidence to act (Priyoto, 2014)). These various perceptions and self-efficacy need to be studied to explain the behavior of pregnant women.

Based on the explanations that have been described, this study aims to determine the relationship between perceptions of pregnant women including perceptions of vulnerability, perceived severity, perceived benefits and barriers, as well as self-efficacy against COVID-19 preventive measures.

## Methods

This observational study applied cross sectional design which aims to identify the relationship between perceived susceptibility, perceived severity, perceived obstacle, perceived benefit and self-efficacy with COVID-19 preventive behavior. The independent variables consisted of perceived benefits and obstacles, perceived vulnerability, perceived severity, as well as self-efficacy with variables. The study site was the work area of Sempaja CHC, Samarinda City, which had the top three highest cases of COVID-19. Based on data, there were 75 pregnant women with high-risk pregnancies. The population in this study involved 376 pregnant women, sampling size was calculated using the Slovin method so that the study samples involved 194 pregnant women. The sampling method applied here was purposive sampling with the inclusion criteria of pregnant women whose place of residence was addressed and recorded in the pregnant woman's register book, gestational age of >12 weeks (second trimester) and had a Maternal and Child Health monitoring book. The study instrument used a questionnaire that had been tested for validity and reliability. The data were not normally distributed, then the data were analyzed using the Spearman Rank test.

## Results

Characteristics of the respondents showed that the majority of respondents had an age range of 21 to 25 years (36.6%). The complete data are presented in table 1 below.

**Table. 1** Socio-Demographic Characteristics of Respondents

Characteristics	Frequency	Percentage
	N	%
<b>Maternal Age</b>		
<20	16	8,2
21-25	71	36,6
26-30	54	27,8
31-35	38	19,6
36-40	12	6,2
>40	3	1,5
<b>Maternal Educational Status</b>		
Not graduated	3	1,5
Elementary	6	3,1
Junior High School	23	11,9
Senior High School	108	55,7
Higher Education	54	27,8
<b>Employment status</b>		
Employee	13	6,7
Entrepreneur	12	6,2
Civil servants	4	2,1
Housewife	130	67
Others	35	18

<b>Gestational age</b>		
Second Trimester (13-24 weeks)	76	39,2
Third Trimester (25-40 weeks)	118	60,8
<b>History of Comorbid before pregnancy</b>		
No comorbid	173	89,2
Anemia	8	4,1
Hypertension	13	6,7
<b>History of comorbid in pregnancy</b>		
No comorbid	189	97,4
Anemia	2	1
Hypertension	3	1,5

Table 1 showed that most of the respondents graduated from senior high school as many as 108 pregnant women (55.7%). Furthermore, most of respondents were housewives (67%). Most of respondents were in the third trimester of pregnancy (60.8%). 13 of the 194 pregnant respondents had hypertension (6.7%) and 8 (4.1%) had anemia before pregnancy. Meanwhile, there were 1.5% and 1% of respondents who had hypertension and anemia as comorbid, respectively.

**Table 2.** Relationship between Perceived Vulnerability and Severity with Compliance with COVID-19 Preventive Behavior

Variable		Compliance with COVID-19 Preventive Behavior				Total		<i>r</i>	<i>p</i>
		Poor		Good		N	%		
		n	%	n	%				
<b>Perceived vulnerability</b>	Poor	1	100	0	0	1	100	0.077	0.287
	Fair	54	45.8	64	54.2	118	100		
	good	24	32	51	68	75	100		
<b>Perception of severity</b>	Poor	13	92.9	1	7.1	14	100	0.276	0.000
	Fair	27	50.9	26	49.1	53	100		
	Good	39	30.7	88	69.3	127	100		
Total		79	40.7	115	59.3	194	100		

As shown in table 2, the statistical tests obtained a p-value of 0.287 with a coefficient (*r*) of 0.077. It was revealed that there was no significant relationship between perceived vulnerability and COVID-19 prevention compliance among pregnant women. Analysis of the relationship between perceived severity and compliance with COVID-19 preventive behavior showed a p-value of 0.000 with a coefficient (*r*) of 0.276. It can be concluded that there was a relationship between perceived severity and compliance with COVID-19 preventive behavior among pregnant women and it was classified as a positive relationship.

**Table 3.** Relationship between Perceived Obstacle, Benefit, and Self-Efficacy with Compliance with COVID-19 Preventive Behavior

Variable		Compliance with COVID-19 Preventive Behavior				Total		<i>r</i>	<i>p</i>
		Poor		Good		N	%		
		n	%	n	%				
Perceived obstacles	poor	0	0	4	100	4	100	0.161	0.025
	fair	74	41.6	104	58.4	178	100		
	good	5	41.7	7	58.3	12	100		
Perceived benefits	poor	29	100	0	0	29	100	0.706	0.000
	fair	48	90.6	5	9.4	53	100		
	good	2	1.8	110	98.2	112	100		
Self-efficacy	fair	23	65.7	12	34.3	35	100	0.308	0.000
	good	56	35.2	103	64.8	159	100		
Total		79	40.7	115	59.3	194	100		

The statistic analysis between perceived obstacle and compliance of COVID-19 preventive behavior showed a p-value of 0.025 with a coefficient (r) of -0.161. It meant that there was a significant relationship between perceived obstacle and compliance with COVID-19 preventive behavior among pregnant women. The value of the r coefficient showed a negative sign, meaning that the more pregnant women perceive more obstacles to carrying out preventive behavior, the lower the compliance.

## **Discussion**

This study revealed that there was no significant relationship between perceived vulnerability and COVID-19 prevention compliance among pregnant women. Such finding could be explained based on a study conducted by Basseti (2020) which stated that all pregnant women regardless of age and parity felt the same susceptibility to being exposed to COVID-19 compared to pregnant women in the pre-pandemic period. Although not statistically significant, if we compare based on the proportion of appropriate compliance with COVID-19 preventive behavior, the percentage of respondents who had a good perceived vulnerability was higher (68%) than respondents who had a fair perceived vulnerability (54.2%).

There was a relationship between perceived severity and compliance with COVID-19 preventive behavior among pregnant women and it was classified as a positive relationship. This meant that the more pregnant women perceived COVID-19 as a severe disease, the more compliance they were to perform COVID-19 preventive behavior. It was found that the greater the perceived risk of a disease, the more likely individual to engage in preventive behaviors (Priyoto, 2014). The study finding is similar with a study conducted by I. M. Harahap et al., (2021) which stated that the perceived severity had a strong relationship with COVID-19 prevention behavior because people perceived COVID-19 as a disease that could lead to death.

This significant relationship between perceived obstacle and compliance with COVID-19 preventive behavior among pregnant women was also found in a study conducted by Febriani (2019) which revealed that there was a positive relationship between perceived obstacle and treatment seeking behavior. It is in line with a study conducted by Fadilah, Pariyana, Apriliya, & Syakurah (2020) which presented that perceived obstacle was related to people's compliance with adaptation to new habits. High level of obstacles will reduce behavior change. On the contrary, low level of obstacle will make it easier for individuals to take preventive action (Hall, 2013).

Likewise, the Rank Spearman's analysis showed that there was a relationship between perceived benefit (p-value = 0.00) and self-efficacy (p-value = 0.00) with compliance of COVID-19 prevention behaviour. The coefficient value (r) showed a positive value, meaning that the better the perceived benefit and self-efficacy, the higher the compliance with COVID-19 prevention behavior. Pregnant women with a high perception of the benefits of disease prevention will adhere to prevention behavior. The compliance is influenced by the individual's acceptance of the perceived benefits if individuals prevent before the severity occurs (Afro, Isfiya, & Rochmah, 2020)

Self-efficacy was related to compliance with COVID-19 preventive behavior. Such finding is linear with a previous study which found that self-efficacy was the main factor that encourage pregnant women compliance with the preventive behavior (Mo et al., 2021). It is also supported by a study conducted by Mehanna, E, & L.P (2021) which revealed that women's self-efficacy was strongly correlated with compliance with COVID-19 preventive behavior. When individuals are more confident in their ability to take preventive action, the more likely they would carry out the behavior. A study conducted by Baringbing (2020) concluded that there was a positive correlation between self-efficacy and the behavior of the COVID-19 health protocol carried out by the community. This indicated that the higher the individual's self-efficacy, the more likely she is to take preventive effort against COVID-19.

### Conclusions

The majority of respondents had good compliance with COVID-19 preventive behavior. There were significant relationship between perceived severity, perceived barriers, perceived benefits and self-efficacy on compliance with COVID-19 preventive behavior among pregnant women. Therefore, it is recommended that health services continuously organize education regarding COVID-19 preventive measures to maintain optimal perceived benefit and self-efficacy among pregnant women.

### References

- Afro, R. C., Isfiya, A., & Rochmah, T. N. (2020). Analisis Faktor yang Mempengaruhi Kepatuhan Terhadap Protokol Kesehatan saat Pandemi COVID-19 pada Masyarakat Jawa Timur: Pendekatan Health Belief Model. *Journal of Community Mental Health and Public Policy*, 3, 1–10.
- Aritonang, J., Nugraeny, L., & Siregar, R. N. (2020). Peningkatan Pemahaman Kesehatan pada Ibu hamil dalam Upaya Pencegahan COVID-19. *Jurnal Solma*, 09(2), 261–269.
- Baringbing, N., & Purba, R. M. (2020). Self-Efficacy and COVID-19 Preventive Behaviour. *Jurnal Pemikiran Dan Penelitian Psikologi*, 15(2008), 1–4.
- Bassetti., M., VenaA, Giacobbe DR. (2020). Thenovel Chinese coronavirus (2019nCoV) infections:challenges for fighting the storm. *Eur J Clin Invest* 50(3):e13209.
- Fadilah, M., Pariyana, Apriliya, S., & Syakurah, R. A. (2020). Evaluasi Kepatuhan Masyarakat dalam Menjalankan Adaptasi Kebiasaan Baru Berdasarkan Health Belief Model. *Seminar Nasional AVoER XI*, 168–178.
- Febriani, W. M. (2019). Gambaran Perilaku Pencarian Pengobatan Pada Mahasiswa Fakultas Kesehatan Masyarakat Universitas Airlangga Description of Health Seeking Behavior among Public Health Students , Airlangga University. *Jurnal Promkes: The Indonesian Journal of Health Promotion Ad Health Education*, 7(2), 193–203. <https://doi.org/10.20473/jpk.V7.I2.2019.193-203>
- Hall, K. S. (2013). The Health Belief Model Can Guide Modern Contraceptive Behaviour Research and Practice. *Midwifery Womens Health*, 57(1), 74–81. <https://doi.org/10.1111/j.1542-2011.2011.00110.x>.
- Harahap, I. M., Arnita, Y., & Amalia, R. (2021). Perilaku Pencegahan COVID-19 Berdasarkan Health Belief Model: Literature Review. *Idea Nursing Journal*, XII(1), 43–49.
- Hardianti, E., Erlinawati, & Syafriani. (2021). Hubungan Pengetahuan Ibu Hmail dengan Perilaku Pencegahan Penularan COVID-19 di Wilayah Kerja Puskesmas Pedamaran Kecamatan Perkaitan Kabupaten Rokan Hilir. *Jurnal Ilmiah Ilmu Kesehatan*, 1(1), 47–55.

- Karimi-zarchi, M., Neamatzadeh, H., Dastgheib, S. A., Abbasi, H., Mirjalili, S. R., Behforouz, A., ... Bahrami, R. (2020). Vertical Transmission of Coronavirus Disease 19 ( COVID-19 ) from Infected Pregnant Mothers to Neonates : A Review. *Fetal and Pediatric Pathology*, 39(3), 246–250. <https://doi.org/10.1080/15513815.2020.1747120>
- Kemkes. (2021). No Title. Retrieved from <https://covid19.kemkes.go.id/>
- Kostania, G., Damayanti, M., Prabasari, S. N., Ningsih, D. A., Raidanti, D., Ivantarina, D., ... Maolinda, W. (2021). *Buku Digital Adaptasi Kebiasaan Baru dalam Kebidanan di Era Pandemi Covid-19*. (Q. E. S. Adnani & D. R. Pangestuti, Eds.) (Edisi 2). CV Penulis Cerdas Indonesia.
- Mehanna, A., E, Y. A. M., & L.P, D. E. (2021). Public Adherence to Precautionary Measures and Preventive Guidelines Against COVID-19 in Sudan: An application of the Health Belief Model. *Cold Spring Harbor Laboratory*. <https://doi.org/https://doi.org/10.1101/2020.12.25.20248859>
- Mo, P. K. H., Fong, V. W. I., Song, B., Di, J., Wang, Q., & Wang, L. (2021). Association of Perceived Threat, Negative Emotions, and Self-Efficacy With Mental Health and Personal Protective Behavior Among Chinese Pregnant Women During the COVID-19 Pandemic: Cross-sectional Survey Study. *Journal of Medical Internet Research*, 23(4), 1–19. <https://doi.org/10.2196/24053>
- Pradana, A. A., Casman, & Aini, N. (2020). Pengaruh Kebijakan Social Distancing pada Wabah COVID-19 Terhadap Kelompok Rentan di Indonesia. *Jurnal Kebijakan Kesehatan Indonesia*, 9(2), 61–67.
- Priyoto. (2014). *Teori Sikap dan Perilaku dalam Kesehatan* (Pertama). Nuha Medika.
- Setyawan, A., Purnomo, F. A., Firdaus, J. A., & Nugraheni, A. (2020). Sosialisasi Peningkatan Pengetahuan Ibu Hamil dan Balita dalam Pemantauan Secara Mandiri Pada Era Pandemi COVID-19 di Kelurahan Ngesrep Semarang. *Seminar Nasional Pengabdian Kepada Masyarakat UNDIP 2020*, 549–554.

## Effect of Back Massage on the Intensity of Labor Pain

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### ABSTRACT

Labor is the process of expulsion of the fetus the uterus through the birth canal. Every woman labor must experience labor pain. Labor pain is physiological because it is caused by uterine distension and cervical dilation. Based on a preliminary study among 6 women in labor, 100% of respondents experienced pain, 33.3% of respondents responded to the pain by grinning and hissing, and were able to follow orders provided by healthcare workers well. 50% of respondents responded to pain by shouting, crying, and sometimes were able to follow orders provided by healthcare workers. Furthermore, 16.7% of respondents responded to pain by crying hysterically, screaming and pulling nearby objects. This study aims to analyze the effect of back massage in reducing pain intensity during the active phase of the first stage labor. This was a pre-experimental study with a pretest post-test one group design. Data were collected using an observation sheet. Study samples were primiparous and multiparous women in the active phase of the first stage of labor (20) at Private Practice Midwife of Mrs. "I" Mancar Peterongan Jombang. Samples were selected through accidental sampling technique. Before the back massage was performed, most of respondents experienced very severe pain (40%). After back massage, most of respondents experienced moderate pain (50%). Spearman's Rank correlation test obtained Spearman's Rank count of (0.6) > Spearman's Rank table of 0.4 which indicated that there was an effect of back massage in reducing pain intensity during the active phase of the first stage of labor. It can be concluded that the intensity of labor pain could be reduced by applying back massage.

*Persalinan adalah proses keluarnya janin dalam rahim melalui jalan lahir. Setiap ibu bersalin pasti mengalami nyeri persalinan. Nyeri persalinan merupakan hal yang fisiologis karena disebabkan distensi uterus dan peregangan serviks. Berdasarkan studi pendahuluan dari 6 inpartu 100% mengalami nyeri, 33,3% merespon nyerinya menyeringai, mendesis, dan dapat mengikuti perintah dari tenaga kesehatan dengan baik. 50% merespon nyeri dengan berteriak, menangis, terkadang bisa mengikuti perintah tenaga kesehatan. 16,7% merespon nyeri dengan menangis histeris, berteriak serta menarik benda didekatnya. Penelitian ini bertujuan menganalisis pengaruh massage punggung terhadap penurunan intensitas nyeri persalinan kala I fase aktif. Jenis penelitian pre eksperimental dengan teknik pretest post-test one group design, instrumen penelitian lembar observasi. Sampel ibu bersalin primipara dan multipara kala I fase aktif (20) di PMB Ny. "I" Mancar Peterongan Jombang. Tanggal 09–28 Mei 2022. Sampling yang digunakan aksidental. Sebelum dilakukan massage punggung sebagian besar responden merasakan nyeri yang sangat (40%). Setelah dilakukan massage punggung sebagian besar responden mengalami nyeri sedang (50%). Uji korelasi Spearman's Rank diperoleh Spearman's Rank hitung (0,6) > Spearman's Rank tabel (0,4) artinya ada pengaruh massage punggung terhadap penurunan intensitas nyeri persalinan kala I fase aktif. Kesimpulan yang didapatkan adalah intensitas nyeri persalinan dapat berkurang setelah dilakukan massage punggung.*



## **Introduction**

Labor is a process of expulsion of the fetus from the uterus through the birth canal. Childbirth is a natural thing that will be experienced by every pregnant woman. Labor is divided into 4 stages. In the first stage, the cervix dilates until 10 cm (Henderson, 2015). The first stage is also called the cervical dilation period. The second stage is called the expulsion stage. Due to the contraction and force of pushing, the fetus is pushed out until it is born. In the third stage of labor, the placenta separates from the uterine wall. Furthermore, the fourth stage starts from the delivery of the placenta until 2 hours after delivery (Prawirohardjo, 2014).

Labor pain is natural discomfort during labor. Labor pain is not new condition but has been known for a long time. Pain is unique and different for each individual. Pain usually experienced by a woman when facing the active phase of the first stage of labor. In this phase, the contractions will last longer and more frequently. Back pain will get worse in this phase and emotionally the woman also feels restless and her self-confidence begins to waver (Mander, 2014).

If a mother experiences excessive anxiety (stress), it will lead to the formation of catecholamines or stress hormones. Excessive levels of catecholamines in the active phase of the first stage of labor can reduce blood flow to the uterus, which further reduce the oxygen supply available to the fetus, resulting in hypoxia in the fetus (Long C, 2016). Severe and prolonged labor pain can affect ventilation, namely hyperventilation with a respiratory rate recorded of 60-70 times/minute. Such condition can affect the acid-base balance of the circulatory system, resulting in alkalosis. The real danger of alkalosis during labor is a decrease in oxygen transfer to the fetus. Alkalosis can also induce uterine vasoconstriction, prolonged labor. Increased ventilation along with the use of energy to push during the second stage of labor can increase maternal oxygen consumption thereby worsening fetal oxygen (Cunningham, 2013). Furthermore, the experience of emotional pain can cause distress due to serious emotional pain which may lead to postpartum depression (Mander, 2014).

Due to significant effect of labor pain, it is necessary to have pain control methods. Pain control methods can be divided into 2 types, namely pharmacological and non-pharmacological methods. Pharmacological methods include inhalation analgesia, opioid analgesia, regional analgesia/anesthesia, and general anesthesia. On the other hand, non-pharmacological methods include homeopathy, aromatherapy, hypnosis, visualization of labor, auditory and visual images, relaxation, and back massage (Danuatmaja, B dan Meiliasari, 2014).

Back massage technique is the simplest pain therapy technique and uses human soft reflexes to hold, rub or squeeze the painful body part. Pain in the first stage is transmitted by afferent nerve fibers (sympathetic fibers) from the 10th, 12th thoracic nerves, and lumbar nerves to the back. Giving back massage is considered to close the pain gate because it is able to inhibit the pain transmission towards higher centers in the central nervous system. One of the advantages of back massage technique is to create psychological effect that can reduce anxiety (Mander, 2014).

Based on a preliminary study conducted on March 19–23, 2022 at Private Practice Midwife of Mrs. "I", there were 6 women in labor and they were only recommended to perform deep breaths. 100%

of respondents experienced pain, 33.3% of respondents responded to the pain by grinning and hissing, and were able to follow orders provided by healthcare workers well. 50% of respondents responded to pain by shouting, crying, and sometimes were able to follow orders provided by healthcare workers. Furthermore, there was 1 woman (16.7%) who responded to pain by crying hysterically, shouting and pulling nearby objects and also constantly straining uncontrollably.

Based on the background that has been described, it is necessary to investigate the effect of back massage in reducing pain intensity during the active phase of the first stage labor. It is expected that women in labor can carry out the delivery process smoothly without worrying about the pain that will be experienced so that their mentality becomes stronger since back massage can relieve the labor pain.

**Methods**

This was a pre-experimental study with a pre-test post-test one group design (Notoatmodjo, 2014). The study subjects were 20 mothers with normal delivery who experienced labor pain. Sampling was made based on accidental technique namely total sampling, namely all women in the active phase of the first stage of labor from cervical dilation of 4-9cm. Statistical test used the Spearman Rank correlation test with the significance level based on a p value of <0.05.

This study used an observation sheet to measure the level of pain based on the Faces Pain Rating Scale (Hidayat, 2015). Pain measurement was performed before and after back massage. Bivariate analysis was carried out to determine whether there was an effect of independent variable, namely back massage on the dependent variable of the intensity of labor pain. To prove the effect, the Spearman Rank test was applied to determine the difference in treatment between the two sample/treatment groups with the condition that the data were normally distributed. At the statistical significance level of  $p < 0.05$ , there was an effect of back massage in reducing pain intensity during the active phase of the first stage of labor. This study has been approved bases on ethical clearance issued by School of Health Science Insan Cendekia Jombang No.012/KEPK/ICME/V/2022

**Results**

Table 1 revealed that before being given back massage 40% of respondents experienced very severe pain and 15% of respondents experienced moderate pain.

**Table 1.** Distribution of Pain Intensity among Women in Labor in Before Back Massage

Pain variable	Frequency	Percentage (%)
No pain	0	0%
Mild pain	0	0%
Moderate pain	3	15%
Severe pain	5	25%
Very severe pain	8	40%
Pain was unbearable	4	20%
Total	20	100%

Labor pain is discomfort during labor that is natural. Pain perception is a highly subjective and complex event that is influenced by factors that trigger nociceptor-nociceptor stimulus and nociceptor impulse transmission.

Table 2 revealed that before being given back massage 50% of respondents experienced moderate pain and 20% of respondents experienced severe pain

**Table 2.** Distribution of Pain Intensity among Women in Labor in After Back Massage

<b>Pain variable</b>	<b>Frequency</b>	<b>Percentage (%)</b>
No pain	0	0%
Mild pain	6	30%
Moderate pain	10	50%
Severe pain	4	20%
Very severe pain	0	40%
Pain was unbearable	0	20%
<b>Total</b>	<b>20</b>	<b>100%</b>

The results of the study regarding the intensity of labor pain in the active phase of the first stage after back massage revealed a decrease the intensity of pain. Before being given a back massage the level of pain that was expressed with a very painful level was 40%. After a back massage it decreased to 0%. 25% women experienced severe pain before back massage, decreased to 20% after back massage. There were 20% of women who experienced unbearable pain before back massage, and after back massage it decreased to 0%. Furthermore, there were 15% of women who experienced moderate pain before back massage, and it decreased to 50% after back massage. Meanwhile, there was no woman who experienced mild pain before back massage, and after back massage it becomes became 30% and none of the women experienced no pain.

Table 3 revealed that before back massage and after back massage 0% of respondents had no pain, 30% of respondents experienced mild pain, 65% of respondents experienced moderate pain, 45% of respondents experienced severe pain, 40% of respondents experienced very severe pain, and 20% of respondents experienced unbearable pain.

**Table 3.** Cross-tabulation of the effect of back massage in reducing pain intensity during the active phase of the first stage of labor

<b>Back Massage</b>	<b>Labor pain</b>						<b>Total</b>
	<b>NP</b>	<b>Mild</b>	<b>Moderate</b>	<b>Severe</b>	<b>Very Severe</b>	<b>Unbearable</b>	
Before back massage	0 (0%)	0 (0%)	3 (15%)	5 (25%)	8 (40%)	4 (20%)	20 (100%)
After back massage	0 (0%)	6 (30%)	10 (50%)	4 (20%)	0 (0%)	0(0%)	20 (100%)

The results of the study regarding the intensity of labor pain showed that before back massage, the level of pain that was expressed with a very painful level was 40%. Meanwhile, after back massage, most of respondents experienced moderate pain as much as 50%. The comparison of labor pain before and after back massage showed that 40% of very severe pain and 20% of unbearable pain were significantly reduced became 0%. Thus, it was proven that back massage could significantly reduce the pain intensity pain during the active phase of the first stage of labor, especially 60% primiparous and 40% multiparous women involved in this study.

The results of data analysis on the effect of back massage in reducing pain intensity during the active phase of the first stage of labor at Private Practice Midwife of Mrs. "I" Mancar Peterongan Jombang using the Spearman Rank test showed that there was an effect of back massage in reducing pain intensity during the active phase of the first stage of labor.

## **Discussion**

The results showed that before the back massage was performed, most of respondents experienced very severe pain (40%). Such pain was expressed by a very sad face, complaining, grinding teeth, closing eyes or mouth tightly or opening eyes or mouth wide. There were 25% of women in labor who experienced severe pain which was expressed by a very sad face, hissing and wrinkling the forehead. 20% of respondents experienced unbearable pain which was expressed by a very scared face, crying, screaming and biting her lip, and the women could not stand the pain. There were 15% of women in labor who experience moderate pain which was expressed by a less happy face, grinning, hissing, and could still bear the pain. In this study, there were no women who experienced mild pain and none who had no pain.

Uterine contractions cause cervical dilatation and effacement as well as uterine ischemia (decreased blood flow resulting in a local oxygen deficit) due to contraction of the myometrial arteries. Pain impulses in the first stage of labor are transmitted through the spinal nerve segments of T 11 – 12 and the accessory nerves of the lower thoracic and upper lumbar sympathetic nerves. This pain originates in the lower abdomen and radiates to the lumbar region of the back and down the thigh. Usually the mother experiences this pain only during contractions and is free of pain in the interval between contractions (Mochtar, 2013).

Based on the results of observations through observation sheets, it could be seen different pain threshold and facial expressions of each individual. Such responses were caused by uterine contractions that lead to cervical dilation and effacement, as well as uterine ischemia. Pain during labor that occurs in the first stage due to uterine contractions will cause 2 events, namely cervical dilatation and effacement and uterine ischemia (decreased blood flow which lead to reduced O<sub>2</sub> levels in the uterus) (Priharjo, 2013).

Pain experienced by the women during labor comes from the cervical dilation and stretching of the lower birth canal. Vasoconstriction can also be in the first stage of labor due to uterine contractions, which may result in uterine ischemia due to a decrease in blood flow and a lack of O<sub>2</sub> supply to the uterus (Priharjo, 2013). According to Bobak (2015), labor pain is a natural discomfort during labor caused by strong uterine contractions and tension of the supporting ligaments, cervix, vagina, bladder and rectum, stretching of the cervix, pelvic floor muscles and vagina. According to Priharjo (2013) pain experienced by a woman during childbirth is a sense of discomfort, both mild and severe. Labor pain is physiological because it is caused by uterine distension, cervical dilation, and stretching of the lower birth canal. This is in accordance with the opinion of Tamsuri (2016) that pain lead to various expressions made by a client such as crying, grimacing, screaming hysterically, restless, anxious, tired face, lethargy and sweat which fills the face and the patient cannot follow the order provided healthcare workers properly. The client's response to this pain can be influenced by the body's ability to tolerate pain.

This study revealed that back massage could reduce the intensity of labor pain. This can be seen from the response of the women when the back massage was performed. They became more comfortable

and the women felt being cared for. The labor process that is considered painful will be reduced by a gentle touch on the area of pain. Giving back massage is one of midwifery cares. Comfortable conditions and the attention of healthcare workers really help smooth the delivery process, especially reducing the intensity of labor pain. This is in accordance with the opinion of Mander (2014), that back massage can make women in labor more refreshed, relaxed, and comfortable during labor. The tactile stimulation and positive feelings that develop when caring and empathic forms of touch act to strengthen the effect of back massage for pain control.

The study finding is supported by Danuatmaja B dan Meiliasari (2014) that giving back massage during labor makes the mother feel closer to the person who cares for her. The presence of someone who cares and wants to help is a source of strength when a woman is sick, tired and afraid. In addition, a friendly delivery room environment can reduce anxiety among women in labor. Such opinion is also supported by Potter (2015) that pain during labor can be reduced if the woman concerned has been motivated and prepared to undergo the labor process. The presence of husbands, other family members, healthcare workers, who are supportive and attentive and foster self-confidence are very instrumental in reducing pain.

According to Mander (2014) back massage not only causes pure physiological effect but it is more widespread. Psychological effect through massage can reduce anxiety by blocking the lumbar 1 to lumbar 5. This can close the gate of pain due to changes in the sympathetic nervous system. Pain impulses are inhibited so that the pain stimuli do not reach a higher center, namely the central nervous system so that tension and anxiety can decrease and the pain experienced can be reduced.

According to Potter (2015) back massage can cause the release of endorphins, thereby blocking the transmission of larger and faster A-beta sensory nerve fibers. This process reduces pain transmission through small diameter C and delta-A fibers. The synaptic gate closes the transmission of pain impulses. This is supported by Tamsuri (2016) that back massage has the effect of reducing anxiety and muscle tension. Stimulation of back massage is believed to stimulate large diameter fibers so that they are able to block or reduce pain impulses.

Factors that influence labor pain are parity, age, type, culture, knowledge on pain and its causes, meaning of pain, unsupportive delivery environment, unaccompanied birthing mother, fear and anxiety, stress, and fatigue. According to Mander (2014), another factor that significantly influences pain response is the presence of closest people and their attitude towards the client. Individuals from different socio-cultural groups have different expectations about the person to whom they express their complaints about pain. Individuals experiencing pain often rely on family members or close friends for support, assistance or protection. Even though one still feels pain, the presence of someone she loves will minimize loneliness and fear. If there are no family or friends, the pain response often makes the mother even more depressed. Therefore, the presence of family members or husbands is very important for women in labor.

Primiparous women often experience longer and more painful pain intensity compares to multiparous women (Muhiman, 2016). Primiparous women require a stronger cervical stretch because

there has never been a stretch. This is what causes stronger contractions in the first stage which can lead to higher anxiety and doubts about their ability to cope with labor pain (Simkin, P dan Ancheta, 2015). They usually focus to focus solely on the pain. Thus, the experience factor in labor greatly affects labor pain.

The main goal of back massage using the effleurage technique is relaxation. Three to ten minutes of back massage can lower blood pressure, slow heart rate, increase breathing, and stimulate natural pain-relieving endorphins. This back massage can reduce the pain experienced by women in labor since the massage is performed so as to prevent the pain response to reach the nervous system. The release of endorphins can reduce pain. Massage can also provide comfort to mothers in labor due to perception that they are treated well and cared for (Tamsuri, 2016).

This statement is also supported by Danuatmaja, B dan Meiliasari (2014) that back massage can stimulate the production of endorphins that relieve pain naturally. According to Tamsuri (2016) massage stimulates the body to release endorphins which can relieve pain naturally. Stimulation of back massage is believed to stimulate large diameter fibers so that they are able to block or reduce pain impulses. This opinion is supported by Mander (2014) that giving back massage back massage can block the lumbar 1 to 5, which is considered to close the pain gate because it is able to inhibit the pain transmission towards higher centers in the central nervous system. Thus, tension and anxiety can be reduced and the pain experienced can simultaneously be reduced.

## **Conclusions**

Based on the discussion and analysis results, it can be concluded that there was an effect of back massage in reducing pain intensity during the active phase of the first stage of labor. Before the back massage was performed, most of respondents experienced severe pain. After back massage, most of respondents experienced moderate pain. Thus, the intensity of labor pain could be reduced by applying back massage.

## **References**

- Bobak, Irene. M., Lowdermilk., and J. (2015). *Buku Ajar Keperawatan Maternitas* (4th ed.). EGC.
- Cunningham FG Dkk, G. N. F. (2013). *Obstetri Williams* (23rd ed.). EGC.
- Danuatmaja, B dan Meiliasari, M. (2014). *Persalinan Normal Tanpa Rasa Sakit*. EGC.
- Henderson, C. (2015). *Buku Ajar Konsep Kebidanan*. EGC.
- Hidayat, A. A. A. (2015). *Metode Penelitian Kebidanan & Tehnik Analisis Data*. Salemba Medika.
- Long C, B. (2016). *Perawatan Medikal Bedah*. Jakarta : EGC. EGC.
- Mander, R. (2014). *Nyeri Persalinan*. EGC.
- Mochtar, R. (2013). *Sinopsis Obstetri Fisiologi dan Patologi edisi 2*. Jakarta: EGC (2<sup>nd</sup> ed.). EGC.
- Muhiman, M. (2016). *Penanggulangan Nyeri Pada Persalinan*. FKUI.
- Notoatmodjo, S. (2014). *Metodologi Penelitian Kesehatan*. PT Rineka Cipta.
- Potter. (2015). *Fundamental Keperawatan Konsep, Proses dan Praktik*. EGC.

- Prawirohardjo, S. (2014). *Ilmu Kebidanan*. PT Bina Pustaka Sarwono Prawirohardjo.
- Priharjo, R. (2013). *Perawatan Nyeri dalam Pemenuhan Kebutuhan Istirahat Pasien*. EGC.
- Simkin, P dan Ancheta, R. (2015). *Buku Saku Persalinan*. EGC.
- Tamsuri, A. (2016). *Konsep Dan Penatalaksanaan Nyeri*. EGC.

## Husband's Role in Perinatal Depression during the New Normal Period of the Covid-19 Pandemic in Sewon Sub-District

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### ABSTRACT

The Covid-19 pandemic has greatly impacted the welfare and health of the community, which also lead to a perinatal mental health problem. Perinatal depression is not only due to hormonal fluctuations experienced by perinatal women, but also by the emotional challenges of having to keep a vulnerable newborn baby alive, while the mother gets little rest. Since a woman often lacks rest, the husband's participation in perinatal care can reduce stress on perinatal women. This study aims to determine the relationship between husband's participation and the incidence of perinatal depression during the Covid-19 pandemic. This was an observational analytical study with a cross sectional approach. The study population involved perinatal women and their husbands in Sewon Sub-District. Twenty-eight perinatal women lived in Sewon Sub-District participated in this study. The samples of 0-1month postpartum women were selected through simple random sampling technique. Data were analyzed using chi square test. The results revealed that 51.4% respondents had mild postpartum depression because their husbands participated in infant care. The chi-square value was 17.754 (higher than X<sup>2</sup> table of 5.591) with a p-value of 0.000<0.05. Thus, H<sub>0</sub> was rejected, meaning that there was a relationship between husband's participation in infant care and postpartum depression in Sewon Sub-District.

*Pandemi Covid-19 sangat berdampak pada kesejahteraan dan kesehatan masyarakat, hal tersebut menjadi permasalahan kesehatan mental perinatal. Depresi Perinatal tidak hanya disebabkan oleh gejala hormonal yang dialami oleh ibu perinatal, namun juga oleh tantangan emosional karena harus menjaga bayi baru lahir yang rentan agar tetap hidup, sementara ibu sendiri hanya mendapatkan sedikit istirahat. Dengan kondisi ibu yang kurang istirahat dibutuhkan partisipasi suami dalam perawatan perinatal dapat mengurangi stress pada ibu perinatal. Tujuan dari penelitian ini untuk mengetahui hubungan partisipasi suami dengan kejadian depresi perinatal pada saat pandemi Covid-19. Penelitian ini dilakukan dengan metode analitik observasional dengan pendekatan cross sectional. Populasi dalam penelitian ini yaitu ibu pada masa perinatal dan pasangannya di Kecamatan Sewon. Dua puluh delapan ibu perinatal dari Kecamatan Sewon berpartisipasi dalam penelitian ini. Sampel menggunakan simple random sampling usia 0-1 bulan pascapersalinan. Analisis data menggunakan chi square. Hasil ditemukan responden depresi postpartum rendah dikarenakan suaminya ikut berpartisipasi dalam pengasuhan bayinya sejumlah 51,4%. Nilai chi-square sebesar 17.754 dengan p-value 0.000. Hal ini menunjukkan p-value 0.000 < 0,05 atau X<sup>2</sup> hitung (17.754) lebih besar dari X<sup>2</sup> tabel (5.591), sehingga H<sub>0</sub> ditolak artinya ada hubungan antara partisipasi suami dalam pengasuhan bayi dengan depresi postpartum di Kabupaten Bantul.*



## **Introduction**

The World Health Organization (WHO) declared Severe Acute Respiratory Syndrome Coronavirus-2 (SARS CoV-2) a 2019 new coronavirus (Covid-19) as an international public health emergency in January 2020, and on March 11, 2020, it was declared a global pandemic (Cucinotta & Vanelli, 2020; World Health Organization, 2020). Due to the rapid spread of Covid-19 and an increase in cases in various regions in Indonesia, finally the President of the Republic of Indonesia declared an emergency response status along with Large-Scale Social Restrictions Policy in the context of accelerating the management of Covid-19 in the Regulation of the Minister of Health of the Republic of Indonesia Number 9 of 2020 (Unicef, 2021). Previous studies on similar epidemics, namely Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome Coronavirus (MERS) reported that social isolation and disruption of health services had a negative impact on mental health and psychological well-being (Jeong et al., 2016; Liu et al., 2012).

During the COVID-19 pandemic, pregnant and postpartum women must face the accompanying quarantine measures and disruptions in medical practice. This can cause adverse effects in the form of mental disorders before and after childbirth (Rosyida et al., 2021). Prenatal and postnatal psychological disorders may cause disruption of physical activity, nutrition, and sleep/rest of pregnant and postpartum women. It will further affect the mood of pregnant and postpartum women which leads to negative consequences to women in the form of perinatal depression as well as to infants and children. Psychological disorders includes cognitive, emotional, behavioral, and behavioral outcomes and also reduced physical activity (Coussons-Read, 2013; Cuijpers et al., n.d.; Yan et al., 2020). During the Covid-19 pandemic, the psychological well-being of women during the postpartum period is often neglected (Chen & Lucock, 2022). Data derived from previous studies on mental disorders among pregnant and postpartum women concluded that barriers in utilizing midwifery services such as access to healthcare facilities were influenced by treatment costs, lack of transportation facilities, long distances (Nisar et al., 2016) and husband's participation (Firouzan et al., 2019). Timely intervention is helpful in reducing mental disorders (Xiang et al., 2020)

The prevalence of perinatal-postnatal depression varies in developed countries, ranging from 10-15% during the first year of birth. Based on 47 studies conducted in 18 low- and middle-income countries, the prevalence of postpartum depression was 18.6% (Z. Wang et al., 2021). A study released by the Maternal Mental Health Alliance in 2014 revealed that an estimated 10-20% of women worldwide suffered from perinatal mental illness (Perinatal Mental Health | Maternal Mental Health Alliance, n.d.), and 31% of them had a previous mental health problem (Bailey & Gaskin, 2021). However, in Indonesia there is no data on cases of perinatal mental health disorders. The search results on the Indonesian Ministry of Health's website with the keywords of postpartum depression only showed national health profiles regarding the mild emotional mental disorder in general, and no cases of depression were found, specifically in perinatal period.

Husband's participation is one of the factors that influence the incidence of perinatal depression among perinatal women. Husband's participation is a process of responding with actions that support

both behavior and psychology to a difficulty or problem experienced by his partner (Antoniou et al., 2021). Physiologically and epidemiological evidence showed that husband's participation in perinatal care could reduce stress experienced by women (Ghosh et al., 2010). Furthermore, another study revealed that pregnant women who got support from their families and husbands would have an increased affection for the fetus during pregnancy, thereby reducing the level of depression and postpartum anxiety compared to women who lacked support from their husbands or families (Ross, 2012). Husband's involvement in perinatal care will help assert women's autonomy and support women's capacity to care for themselves and their babies (Tokhi et al., 2018).

The effect of husband's participation on the incidence of perinatal depression during the new normal period of the Covid-19 pandemic should be considered, especially in the context of the success of the SDG's program to reduce infant and maternal morbidity or mortality rates. A husband who actively participates in the form of psychological and behavioral support can facilitate access to the use of perinatal care and preparation for referral. Thus, this study is designed to analyze the relationship between husband's participation and the incidence of perinatal depression during the new normal period of the Covid-19 pandemic in Sewon, Bantul, Yogyakarta, Indonesia.

## **Methods**

From December 2020 to May 2021, an analytical survey was conducted in Sewon Sub-District, Yogyakarta, Indonesia. The researchers applied an observational analytic method with a cross sectional approach. The population of this study involved women in the perinatal period and their husbands who lived in Sewon Sub-District, Yogyakarta, Indonesia. The survey was conducted on twenty-eight postpartum women and their partners, with the following criteria: 1) being in the postpartum period; 2) had no health problems, both physical and mental and/or medication; and 3) the women and partners were willing to participate in this study. Postpartum women who experienced perinatal depression or second pregnancy and were excluded from the study. 28 study samples were selected through a simple random sampling technique out of 40 people in the population. There were two variables observed, namely the incidence of perinatal depression as the dependent variable and the husband's role as the independent variable.

Before the researchers conducted the study, permission at the institution was made and data were then collected. Data were collected using a questionnaire and EPDS sheets. After the data were obtained, statistical test through chi-square test was conducted with the SPSS software. Data collection during the covid-19 pandemic was carried out by filling in data through a google form which was distributed and validated by video calls by researchers. The data were then processed according to research ethics by editing, coding, scoring, tabulating to obtain percentages.

## Results

Table 1. Distribution of respondents by demographic characteristics

Description	N (28)	Percentage (%)
<b>Age</b>		
20-24	6	21.4
25-29	8	28.6
30-34	12	42.9
35-39	2	7.1
40-44	0	0
<b>Employment Status</b>		
Private employee	3	10.7
Teacher	5	17.9
Housewife	9	32.1
Factory Worker	4	14.3
Farmer	2	7.1
Healthcare Worker	5	17.9
<b>Level of Education</b>		
Junior High School	2	7.1
Senior High School	17	60.8
Academy (D1/D2/D3/D4)	3	10.7
College (S1/S2/S3)	6	21.4
<b>Daily Living</b>		
Family	16	57.1
Independent	12	42.9

Source: Primary Data

Based on the table on demographic characteristics, regarding employment status, it was found that most of respondents (42.9%) aged 30-34 years and 32.1% were housewives. Regarding the level of education, most of respondents (60.8%) had a level of education of High School/MA/Vocational High School/equivalent. Furthermore, regarding daily living, most of respondents (57.1%) lived with their families.

Table 2. Cross tabulation of the relationship between husband's role and perinatal depression

Perinatal Depression	Husband's Participation							X <sup>2</sup> count	(P)	X <sup>2</sup> table
	Yes	%	No	%	N	%				
Mild	14	51.4	0	0	14	51.4	17.754	.000	5.591	
Moderate	4	14.3	6	20	10	34.3				
Severe	1	2.9	3	11.4	4	14.3				
Total	19	68.6	9	31.4	28	100				

Source: Primary Data

Based on table 2, 51.4% respondents had mild perinatal depression because all of their husbands participated in infant care. The chi-square value was 17,754 (higher than X<sup>2</sup> table of 5.591) with a p-value of 0.000<0.05. Thus, H<sub>0</sub> was rejected, meaning that there was a relationship between husband's participation in infant care and postpartum depression in Sewon Sub-District.

## Discussion

The results of the study in Sewon Sub-District among 28 respondents can be observed in table 2. In general, it was revealed that husband's participation had an effect on the incidence of post-partum depression. In this study, it can be observed in table 1 that regarding maternal age, 42.9% of respondents aged 30-34 years. At that age range, women are considered to have mental and reproductive function maturity. Meanwhile, based on the employment status, it was found that most of respondents were housewives by 32.1%. Based on the characteristic of education as one of the influential factors for

behavior, it is believed that higher education will affect one's knowledge to create positive behavior changes (Notoatmodjo, 2010). The results of this study showed that most of respondents had husband participation as many as 19 respondents (68.6%). Out of them 14 respondents (51.4%) had mild postpartum depression, 4 respondents (14.3%) had moderate postpartum depression, and 1 respondent (2, 9%) had severe postpartum depression. These findings were influenced by the level of education of respondents who had junior high school/MTs education by 7.1% and most of respondents had a level of education of high school/MA/equivalent as many as 17 respondents (60.8%). Therefore, the process of curiosity or seeking information and communication with partners was getting better.

The husband's words/attitudes towards his wife after giving birth and the husband's participation in helping with household chores certainly had a major impact on wife's mood. The fluctuating emotions or moods of postpartum women are influenced by hormonal changes, and it requires the husband's participation in caring for, entertaining, and supporting physical and mental health. If married couples live with their parents (especially mother-in-law), the wives in the postpartum period have to deal with mother-in-laws and husbands. In such circumstances, the husband must maintain a balance between being grateful to his parents and comforting his wife, and sometimes this balance is difficult to maintain, thus, causing a detrimental stimulant to the wife (Y. Y. Wang et al., 2017). This is in accordance with the result of a study conducted in Hongkong (Lau & Wong, 2008) which found that family-related social support, which was dominated by marital relations, followed by relationships with mother-in-law was the most important factor in the incidence of postpartum depression.

In mainland Chinese society (Li et al., 2020) as many as 17.3% of respondents were identified to have significantly more symptoms of postpartum depression, with the influential factors of intensive involvement of mother-in-law in participants' lives (living with, caring for them, or discriminating the women), lacked of husband's support, cesarean delivery, and insufficient breastfeeding (formula feeding). The husband's active participation during pregnancy helps strengthen the couple's relationship during the postpartum period. Active husband involvement consists of four interrelated elements, namely helping with a positive attitude, providing instrumental support, emotional support, and positive responses to important moments. These four elements are considered to increase trust, create more mature relationships, greater love, as well as good communication (Eddy & Fife, 2021).

The results of the current study among 28 respondents showed that husband's participation was related to the incidence of Postpartum Depression. The husband's continuous support during the delivery process is considered beneficial to reduce maternal dissatisfaction with the delivery process. One study found that the male partner of postpartum women was a significant source of factors associated with PPD symptoms among women (Kakyo et al., 2012). Another study revealed that women who were supported by their husbands reported lower anxiety and lower rates of depression (Sapkota et al., 2013). Pregnant and postpartum women as a special vulnerable group are more likely to suffer from psychological problems after experiencing an emergency which will increase the risk of mental disorders (Thapa et al., 2020). In a study conducted by (Anchan & Janardhana, 2020) on the effect of lifestyle-based training for married couples on postpartum anxiety and postpartum depression among

189 couples, it was found that training carried out for both parties was more effective in reducing depression and anxiety scores than training for only the wife.

Husband's participation is also formulated in the SIAGA campaign with the aim of reminding husbands about the importance of proper care and emergency preparedness for mothers during pregnancy, childbirth, and postpartum. However, it was found that the husband's participation was more effective when accompanying women during antenatal care visits in Indonesia. A husband must always be ready to help and prepare for any complications such as providing enough money for treatment and preparing blood donations, in addition to ensuring the partner gets adequate rest and proper nutrition and helps identify danger signs (Ginja et al., 2018).

In a clinical trial on the effect of husband's participation in physiological childbirth classes on the quality of life of pregnant women, the husband's involvement expected by the couple were not only through supports access to health services both during pregnancy and postpartum checkups, but also supports proper nutrition during pregnancy and helps the wives in completing household chores (Tokhi et al., 2018). In addition, a study conducted by (Dehcheshmeh et al., 2014) reported an increase in quality-of-life scores, especially around mental health. In a clinical trial among 442 pregnant women in Nepal, it was found an effect of prenatal health training on maternal use of health services and their readiness for delivery. It was shown that health-related information and behaviors were superior to women who were trained together with their husbands, compared to women who were trained alone or not trained at all (Mullany BC et al., 2009).

Likewise, family support is a significant factor in maternal depression. Mothers who had strong family support were less likely to experience PPD (Ria et al., 2018). Support is the most powerful and consistent personal predictor of personal adjustment. Families are the main source of support for postpartum maternal health (Reid & Taylor, 2015). Based on a Cochrane (2012) review entitled psychosocial and psychological interventions to prevent postpartum depression, one of the limitations of the study was that couples were not specifically involved in any preventive intervention (Dennis & Dowswell, 2013).

During the Covid-19 period, pregnant and postpartum women were at risk for infection and Covid-19 symptoms (Shuman et al., 2022). Increased anxiety and confusion about the risk of infection can affect the women's mental health in terms of emotional, social, and physical aspects (Goyal & Selix, 2021). Previous studies during the Covid-19 period found many descriptions of stressors affecting mental health after childbirth (Thapa et al., 2020; Zanardo et al., 2020). A study further reported that there was an increase in postpartum depression during the Covid-19 pandemic, but this had no effect on the bond between mother and baby (Erten et al., 2022). Although postpartum women experience stress due to restrictions during the COVID-19 pandemic, it also had positive effects to women such as spending more time with babies, getting more rest, as well as having more time for breastfeeding and bonding with their babies (Wilson et al., 2022).

Therefore, the husband's participation during the COVID-19 pandemic is the main strength in this study. For further research, training intervention can be carried out by involving husbands in an effort

to prevent perinatal depression, since the pregnancy period, in accordance with the principles of clinical trials. The limitation of this study was regarding the characteristics of the respondents which need to be further analyzed, namely education and the availability of instrumental or emotional social support such as a place to live with mother-in-laws which can also affect the maternal outcomes.

## Conclusions

Based on the results of the study, it was revealed 51.4% of husbands actively participated in caring for the infant. The statistical analysis obtained a p-value of 0.000. Thus, there was a significant relationship between husband's participation in infant care and the incidence of perinatal depression during the Covid-19 pandemic. It is expected that husbands are willing to be involved in perinatal care and provide positive motivation and care since because family support, especially the husband's participation, can psychologically help postpartum women so that they are motivated to maintain their health during the perinatal period. It is also necessary to hold health promotion to married couples regarding the pattern of infant care and the period that the mother will go through after giving birth, so as to establish good communication, and husbands are encouraged to play an active role.

## References

- Anchan, V., & Janardhana, N. (2020). Transformation of attitude through brief psychoeducation program for the husbands of women with postpartum psychiatric disorders. *Asian Journal of Psychiatry*, 5(1). <https://doi.org/10.1016/j.ajp.2019.101841>
- Antoniou, E., Stamoulou, P., Tzanoulinou, M. D., & Orovou, E. (2021). Perinatal mental health; the role and the effect of the partner: A systematic review. In *Healthcare (Switzerland)* (Vol. 9, Issue 11). MDPI. <https://doi.org/10.3390/healthcare9111572>
- Bailey, L., & Gaskin, K. (2021). Spotlight on maternal mental health: A pre-pandemic and post-pandemic priority. *Evidence-Based Nursing*, 24(2), 29–30. <https://doi.org/10.1136/EBNURS-2021-103378>
- Chen, T., & Lucock, M. (2022). The mental health of university students during the COVID-19 pandemic: An online survey in the UK. *PLoS ONE*, 17(1 January). <https://doi.org/10.1371/journal.pone.0262562>
- Coussons-Read, M. E. (2013). Effects of prenatal stress on pregnancy and human development: Mechanisms and pathways. In *Obstetric Medicine* (Vol. 6, Issue 2, pp. 52–57). Royal Society of Medicine Press Ltd. <https://doi.org/10.1177/1753495X12473751>
- Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. In *Acta Biomedica* (Vol. 91, Issue 1, pp. 157–160). Mattioli 1885. <https://doi.org/10.23750/abm.v91i1.9397>
- Cuijpers, P., Franco, P., Ciharova, M., Miguel, C., Segre, L., Quero, S., & Karyotaki, E. (n.d.). *Psychological Medicine Psychological treatment of perinatal depression: a meta-analysis*. <https://doi.org/10.1017/S0033291721004529>
- Dehcheshmeh, F. S., Salehian, T., & Parvin, N. (2014). The effect of spouses' educational classes held for primiparous women referring to Hajar hospital on their quality of life and pregnancy outcomes. In *Iranian Journal of Nursing and Midwifery Research | Special Issue on Health and Wellbeing* (Vol. 19).
- Dennis, C. L., & Dowswell, T. (2013). Psychosocial and psychological interventions for preventing postpartum depression. In *Cochrane Database of Systematic Reviews* (Vol. 2013, Issue 2). John Wiley and Sons Ltd. <https://doi.org/10.1002/14651858.CD001134.pub3>

- Eddy, B. P., & Fife, S. T. (2021). Active Husband Involvement During Pregnancy: A Grounded Theory. *Family Relations*, 70(4), 1222–1237. <https://doi.org/10.1111/fare.12486>
- Erten, Ö., Biyik, İ., Soysal, C., Ince, O., Keskin, N., & Tascı, Y. (2022). Effect of the Covid 19 pandemic on depression and mother-infant bonding in uninfected postpartum women in a rural region. *BMC Pregnancy and Childbirth*, 22(1). <https://doi.org/10.1186/s12884-022-04580-8>
- Firouzan, V., Noroozi, M., Farajzadegan, Z., & Mirghafourvand, M. (2019). Barriers to men's participation in perinatal care: A qualitative study in Iran. *BMC Pregnancy and Childbirth*, 19(1). <https://doi.org/10.1186/s12884-019-2201-2>
- Ghosh, J. K. C., Wilhelm, M. H., Dunkel-Schetter, C., Lombardi, C. A., & Ritz, B. R. (2010). Paternal support and preterm birth, and the moderation of effects of chronic stress: A study in Los Angeles County mothers. *Archives of Women's Mental Health*, 13(4), 327–338. <https://doi.org/10.1007/s00737-009-0135-9>
- Ginja, S., Coad, J., Bailey, E., Kendall, S., Goodenough, T., Nightingale, S., Smiddy, J., Day, C., Deave, T., & Lingam, R. (2018). Associations between social support, mental wellbeing, self-efficacy and technology use in first-time antenatal women: Data from the BaBBLes cohort study. *BMC Pregnancy and Childbirth*, 18(1). <https://doi.org/10.1186/s12884-018-2049-x>
- Goyal, D., & Selix, N. W. (2021). IMPACT OF COVID-19 ON MATERNAL MENTAL HEALTH. *MCN Am J Matern Child Nurs*, 46(2), 103–109. <https://doi.org/DOI:10.1097/NMC.0000000000000692>
- Jeong, H., Yim, H. W., Song, Y. J., Ki, M., Min, J. A., Cho, J., & Chae, J. H. (2016). Mental health status of people isolated due to Middle East Respiratory Syndrome. *Epidemiology and Health*, 38, e2016048. <https://doi.org/10.4178/epih.e2016048>
- Kakyo, T. A., Muliira, J. K., Mbalinda, S. N., Kizza, I. B., & Muliira, R. S. (2012). Factors associated with depressive symptoms among postpartum mothers in a rural district in Uganda. *Midwifery*, 28(3), 374–379. <https://doi.org/10.1016/j.midw.2011.05.001>
- Lau, Y., & Wong, D. F. K. (2008). The role of social support in helping chinese women with perinatal depressive symptoms cope with family conflict. *JOGNN - Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 37(5), 556–571. <https://doi.org/10.1111/j.1552-6909.2008.00273.x>
- Li, Q., Yang, S., Xie, M., Wu, X., Huang, L., Ruan, W., & Liu, Y. (2020). Impact of some social and clinical factors on the development of postpartum depression in Chinese women. *BMC Pregnancy and Childbirth*, 20(1). <https://doi.org/10.1186/s12884-020-02906-y>
- Liu, X., Kakade, M., Fuller, C. J., Fan, B., Fang, Y., Kong, J., Guan, Z., & Wu, P. (2012). Depression after exposure to stressful events: Lessons learned from the severe acute respiratory syndrome epidemic. *Comprehensive Psychiatry*, 53(1), 15–23. <https://doi.org/10.1016/j.comppsy.2011.02.003>
- Mullany BC, Lakhey B, Shrestha D, Hindin MJ, & Becker S. (2009). Impact of husbands' participation in antenatal health education services on maternal health knowledge - PubMed. *JNMA J Nepal Med Assoc*, 48(173), 28–34.
- Nisar, Y. Bin, Aurangzeb, B., Dibley, M. J., & Alam, A. (2016). Qualitative exploration of facilitating factors and barriers to use of antenatal care services by pregnant women in urban and rural settings in Pakistan. *BMC Pregnancy and Childbirth*, 16(1). <https://doi.org/10.1186/s12884-016-0829-8>
- Notoatmodjo, S. (2010). *Promosi Kesehatan: Teori dan Aplikasinya*. Rineka Cipta.
- Perinatal mental health | Maternal Mental Health Alliance*. (n.d.). Retrieved October 24, 2022, from <https://maternalmentalhealthalliance.org/about/perinatal-mental-health/>
- Reid, K. M., & Taylor, M. G. (2015). Social support, stress, and maternal postpartum depression: A comparison of supportive relationships. *Social Science Research*, 54, 246–262. <https://doi.org/10.1016/j.ssresearch.2015.08.009>
- Ria, M. B., Budihastuti, U. R., & Sudiyanto, A. (2018). Risk Factors of Postpartum Depression at Dr. Moewardi Hospital, Surakarta. *Journal of Maternal and Child Health*, 3(1), 81–90. <https://doi.org/10.26911/thejmch.2018.03.01.08>

- Ross, E. (2012). Maternal-fetal attachment and engagement with antenatal advice. *British Journal of Midwifery*, 20(8), 566–575.
- Rosyida, D. A. C., Solichatin, S., Waroh, Y. K., & ... (2021). Training Processing Herbal Plants To Increase Application and Immunity To Children in the Covid-19 Pandemic. *International Journal of ...*, 1(2), 64–71. <https://ije2.esc-id.org/index.php/home/article/view/6>
- Sapkota, S., Kobayashi, T., & Takase, M. (2013). Impact on perceived postnatal support, maternal anxiety and symptoms of depression in new mothers in Nepal when their husbands provide continuous support during labour. *Midwifery*, 29(11), 1264–1271. <https://doi.org/10.1016/j.midw.2012.11.010>
- Shuman, C. J., Peahl, A. F., Paredy, N., Morgan, M. E., Chiangong, J., Veliz, P. T., & Dalton, V. K. (2022). Postpartum depression and associated risk factors during the COVID-19 pandemic. *BMC Research Notes*, 15(1). <https://doi.org/10.1186/s13104-022-05991-8>
- Thapa, S. B., Mainali, A., Schwank, S. E., & Acharya, G. (2020). Maternal mental health in the time of the COVID-19 pandemic. In *Acta Obstetrica et Gynecologica Scandinavica* (Vol. 99, Issue 7, pp. 817–818). Wiley-Blackwell. <https://doi.org/10.1111/aogs.13894>
- Tokhi, M., Comrie-Thomson, L., Davis, J., Portela, A., Chersich, M., & Luchters, S. (2018). Involving men to improve maternal and newborn health: A systematic review of the effectiveness of interventions. *PLoS ONE*, 13(1). <https://doi.org/10.1371/journal.pone.0191620>
- Unicef. (2021). *COVID-19 in Indonesia: Experiences of Children and Families Summary Brief*.
- Wang, Y. Y., Li, H., Wang, Y. J., Wang, H., Zhang, Y. R., Gong, L., Ma, J., Wang, Y., Wang, M. Z., Qiu, S. X., & Yuan, S. X. (2017). Living with parents or with parents-in-law and postpartum depression: A preliminary investigation in China. *Journal of Affective Disorders*, 218, 335–338. <https://doi.org/10.1016/j.jad.2017.04.052>
- Wang, Z., Liu, J., Shuai, H., Cai, Z., Fu, X., Liu, Y., Xiao, X., Zhang, W., Krabbendam, E., Liu, S., Liu, Z., Li, Z., & Yang, B. X. (2021). Mapping global prevalence of depression among postpartum women. *Translational Psychiatry* 2021 11:1, 11(1), 1–13. <https://doi.org/10.1038/s41398-021-01663-6>
- Wilson, A. N., Sweet, L., Vasilevski, V., Hauck, Y., Wynter, K., Kuliukas, L., Szabo, R. A., Homer, C. S. E., & Bradfield, Z. (2022). Australian women’s experiences of receiving maternity care during the COVID-19 pandemic: A cross-sectional national survey. *Birth*, 49(1), 30–39. <https://doi.org/10.1111/birt.12569>
- World Health Organization. (2020, February 11). *WHO Director-General’s remarks at the media briefing on 2019-nCoV on 11 February 2020*. World Health Organization. <https://www.who.int/director-general/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020>
- Xiang, Y. T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., & Ng, C. H. (2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. In *The Lancet Psychiatry* (Vol. 7, Issue 3, pp. 228–229). Elsevier Ltd. [https://doi.org/10.1016/S2215-0366\(20\)30046-8](https://doi.org/10.1016/S2215-0366(20)30046-8)
- Yan, H., Ding, Y., & Guo, W. (2020). Mental Health of Pregnant and Postpartum Women During the Coronavirus Disease 2019 Pandemic: A Systematic Review and Meta-Analysis. In *Frontiers in Psychology* (Vol. 11). Frontiers Media S.A. <https://doi.org/10.3389/fpsyg.2020.617001>
- Zanardo, V., Manghina, V., Giliberti, L., Vettore, M., Severino, L., & Straface, G. (2020). Psychological impact of COVID-19 quarantine measures in northeastern Italy on mothers in the immediate postpartum period. *International Journal of Gynecology and Obstetrics*, 150(2), 184–188. <https://doi.org/10.1002/ijgo.13249>



## Implications of Prenatal Gentle Yoga on Low Back Pain among Women in the Second and Third Trimesters of Pregnancy

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### A B S T R A C T

Back pain during pregnancy is caused by changes in anatomical and hormonal structures. Anatomical changes occur because the role of the spine which is getting heavier to balance the body due to the enlargement of the uterus and fetus. Another cause is an increase in the relaxin hormone which causes the spinal ligaments to be unstable so that it is easy to clamp blood vessels and nerve fibers. This study was conducted by applying prenatal gentle yoga. Yoga movements were carried out for 60 minutes so as to reduce low back pain that is often experienced by pregnant women in the II and III trimesters. This was a Quasi-Experimental study with one group non-equivalent pre-test post-test design. The study samples of 30 women in the II and III trimesters of pregnancy who experienced back pain were selected through total sampling technique. The study was conducted from March to May 2022. The results of the study showed that there was a difference in the mean value before and after being given prenatal gentle yoga intervention in reducing low back pain among women in the II and III trimesters of pregnancy, with a p-value of  $0.000 < 0.005$ . It is recommended that prenatal gentle yoga can be implemented among pregnant women since yoga movements can help pregnant women in managing breathing, preparing for the delivery process and can reduce the symptoms of complaints that are often experienced by pregnant women.

*Nyeri punggung selama kehamilan disebabkan karena perubahan struktur anatomis dan hormonal. Perubahan anatomis terjadi karena tulang belakang yang bertambah berat, untuk menyeimbangkan tubuh seiring membesarnya uterus dan janin. Penyebab lainnya yang terjadi yaitu peningkatan hormone relaksin yang menyebabkan ligamen tulang belakang menjadi tidak stabil sehingga mudah menjepit daerah pembuluh darah dan serabut syaraf. Penelitian ini dilakukan menerapkan prenatal gentle yoga dimana gerakan yoga dilakukan selama 60 menit sehingga dapat mengurangi nyeri punggung (low back pain) yang sering dirasakan pada ibu hamil trimester II dan III. Metode penelitian yang dilakukan menggunakan Quasi eksperimen dengan desain pretest posttest non equivalen one group. Teknik dalam pengambilan sampel pada penelitian ini adalah total sampling. Sampel pada penelitian ini adalah 30 ibu hamil trimester II dan III yang mengalami nyeri punggung. pengambilan sampel dilakukan pada bulan Maret sampai dengan Mei 2022. Hasil Penelitian terdapat perbedaan nilai rata-rata sebelum dan setelah diberikan intervensi prenatal gentle yoga dalam menurunkan low back pain pada ibu hamil trimester II dan III yaitu p-value  $0,000 < 0,005$ . Rekomendasi: Pemberian prenatal gentle yoga dapat dilakukan secara efektif dimana dengan Gerakan yoga tersebut dapat membantu ibu hamil dalam mengelola pernafasan, mempersiapkan diri dalam proses persalinan serta dapat mengurangi gejala keluhan yang sering dialami ibu hamil.*

## **Introduction**

Pregnancy is a natural process experienced by every woman to obtain offspring, Physiological and psychological changes in pregnancy occur due to an increase in the estrogen and progesterone hormones which cause changes in the body of pregnant women so as to make them feel discomfort, among others, in the musculoskeletal system which causes back pain complaints. Such complaints may disappear by doing physical activity of pregnancy exercise as well as prenatal gentle yoga as alternative non-pharmacological methods (Curtiz, Weinrib, and Katz, 2019)

Back pain is a pain that occurs in the lumbosacral area. The intensity increases with the increase in gestational age due to a shift in the center of gravity and changes in posture due to the enlarged weight of the uterus. Back pain in pregnancy occurs due to changes in anatomical and hormonal structures. Anatomical changes occur because the role of the spine which is getting heavier to balance the body due to the enlargement of the uterus and fetus. Another cause is an increase in the relaxing hormone which causes the spinal ligaments to be unstable so that it is easy to clamp blood vessels and nerve fibers (American Pregnancy Organization, 2014). The incidence of back pain during pregnancy is 48-90%. As many as 50% and 70% of pregnant women surveyed in the UK & Scandinavia and in Australia reported back pain, respectively (WHO, 2019)

Yoga is one kind of non-pharmacological therapy that can function to reduce back pain in the III trimester of pregnancy (Dewi, Suharyo, and R Runjati 2017). Yoga can also be performed as a practical effort in harmonizing the body, mind, and spirit. Yoga aims to form a firm posture, as well as to build flexible and strong muscles, and purify the central nerves found in the spine. Yoga in the Third trimester of pregnancy can reduce the complaints and discomforts often experienced by pregnant women during the III trimester of pregnancy, one of which is back pain (Inding and Ilmiati, 2016).

Prenatal Gentle Yoga is part of one of the effective exercises that can reduce pregnancy back pain. Furthermore, Yoga also teaches relaxation, breathing, and body position techniques to improve balance, strength and reduce pain. Yoga movements are emphasized more on breathing techniques that aim to make the body relaxed so as to increase oxygen intake to the brain and into the body system (Aprilia and Richmond, 2019). Prenatal Gentle Yoga will inhibit the increase in sympathetic nerves, so that the hormones that cause deregulation of the body can be reduced in levels. The parasympathetic nervous system, which has a work function opposite to the sympathetic nerve, will slow down or weaken the work of the internal apparatus of the body. As a result, there is a decrease in heart rate, breath rhythm, blood pressure, muscle tension, metabolic rate, and the production of stress-causing hormones. As levels of stress-causing hormones decrease, the whole body begins to function at a healthier level with more energy for healing, restoration and rejuvenation. Thus, pregnant women will feel relaxed along with the decrease in anxiety symptoms (Amalia, 2014).

Based on data obtained from the MAMIYO Clinic as a clinic that serves maternal and child health in Mataram city, there were 350 out of a total of 450 pregnant women (77%) who performed prenatal gentle yoga in 2021. One of the patients who performed prenatal gentle yoga had many complaints due to physical changes in pregnancy. This made her often experience discomforts during pregnancy,

namely pain in the extremities, back pain due to changes in body shape, and she often felt tightness and more difficult to move. Based on the background, it is expected that the provision of Prenatal gentle yoga can manage the mother's breathing, control complaints that are often experienced, optimize the position of the fetus and reduce back pain by forming posture in accordance with its function, and balance body functions so as to relieve pain.

## Methods

This was a quasi-experimental study with a one group non-equivalent pre-test post-test design. This kind of study will produce conclusions by comparing data before and after the intervention. The population in this study involved all women in the II and III trimesters of pregnancy who visited the Mamiyo Clinic in Mataram City in February - April 2022 as many as 30 pregnant women. The study samples were selected through total sampling technique. Prenatal gentle yoga was performed once every 2 weeks for 3 months. Activities were carried out in groups and private classes in accordance with the requests of pregnant women at the Mamiyo clinic in Mataram City. Low back pain experienced by pregnant women will be assessed using a standard questionnaire, namely the Numeric Rating Scale (NRS) measurements taken before and after prenatal gentle yoga. The Numeric Rating Scale (NRS) pain scale is a pain scale used to assess pain in adults. The numerical grading scale is used instead of a word description tool. In this case, the patient assessed the pain by using a scale of 0-10. Scales are typically used when assessing pain intensity before and after an intervention. The analytical test used in this study was a paired t-test. Before the paired t-test was conducted, a data normality test was performed. The normality test obtained a sig value or p value before and after the intervention of 0.137 < 0.005 which meant that the data were normally distributed (Parametric Test). The study had obtained an Ethical Clearance No. 070.1/15/KEP/2022 at NTB Hospital.

## Results

**Table 1.** Frequency Distribution of Characteristics of Women in the II and III Trimesters of Pregnancy

Characteristic	F	%
<b>Age</b>		
At-risk	1	3.3
No Risk	29	96.7
Total	30	100.0
<b>Level of Education</b>		
Low	9	30.0
High	21	70.0
Total	30	100.0
<b>Parity</b>		
Primigravida	21	70.0
Multigravida	9	30.0
Total	30	100.0

Source: primary data, June 2022

Table.1 showed that 1 respondent (3.3%) was in the at-risk age and 29 respondents (96.7%) were in the non-risk age. Regarding the characteristics by the level of education, 9 respondents (30%) had low level of education and 21 respondents (70%) had a high level of education. Furthermore regarding

characteristics by parity, 21 respondents (70%) were primigravida women and 9 respondents (30%) were multigravida women.

**Table 2.** Distribution of the Level of Low Back Pain among Women in the II and III Trimesters of Pregnancy before Prenatal Gentle Yoga

Variable	Pre-test		Post-test	
	F	%	F	%
<b>Low Back Pain</b>				
No Pain	0	0.0	13	43.3
Mild Pain	1	3.3	17	56.7
Moderate Pain	10	33.3	0	0.0
Severe Pain	19	63.3	0	0.0
<b>Total</b>	30	100.0	30	100.0

Source: primary data, June 2022

Table 2 shows the level of low back pain among women in the II and III trimesters of pregnancy before the prenatal gentle yoga intervention. There was no respondent in the category of no pain, 1 respondent (3.3%) was in the category of mild pain, 10 respondents (33.3%) were in the category of moderate pain, and 19 respondents (63.3%) were in the category of severe pain. Meanwhile, after the prenatal gentle yoga intervention, there were 13 respondents (43.3%) in the category of no pain, 17 respondents (56.7%) were in the category of mild pain, and none of the respondents experienced moderate pain and severe pain.

**Table 3.** Mean Difference of the Level of Low Back Pain among Women in the II and III Trimesters of Pregnancy Before and After Prenatal Gentle Yoga

Group	N	Mean±SD	95% Confidence Interval		p-value
			Min	Max	
<b>Prenatal Gentle Yoga</b>					
Pre-test	30	6.96±1.93	5.245	6.820	0.000
Post-test	30	0.93±0.90			

Source: primary data, June 2022

Table 3 presented that before prenatal gentle yoga intervention, the mean level of low back pain was 6.96 and after prenatal gentle yoga intervention, it was 0.93. Such finding indicated that there was a decrease in the level of low back pain 6 times after being given prenatal gentle yoga among women in the II and III trimesters of pregnancy. The results of the paired t-test analysis test showed a significant difference or change before and after prenatal gentle yoga intervention. The probability value/p-value of the paired t-test was 0.000, which meant that there was a difference between before and after treatment, namely the prenatal gentle yoga intervention among women in the II and III trimesters of pregnancy with a p-value of  $0.000 < 0.05$ .

## Discussion

The level of low back pain among respondents after being given prenatal gentle yoga was mostly decreased compared to before prenatal gentle yoga. This is because pregnant women were more disciplined in attending yoga classes and were able to empower themselves as early as possible by training the back and pelvic muscles so as to reduce the symptoms of discomfort experienced during pregnancy by doing yoga classes 24 times for 3 months (Cunningham, 2012). Such back pain complaints can disappear by performing gradual or little-by-little physical movements until the recommended stage

is reached and it is expected that the joint complaints will be relieved. Exercise performed more than two weeks will be more meaningful than exercise in a short period of time (Davidson et al., 2019)

Prenatal gentle yoga effectively provides benefits for pregnant women. Many studies have proven that performing prenatal gentle yoga had advantages for pregnant women, for example a study conducted by (Beddoe et al. 2018) which found a significant decrease in anxiety after prenatal gentle yoga in the intervention group. Furthermore, a study conducted by (Field et al., 2013) which assessed the levels of depression, anxiety, anger, back and leg pain showed that the complaints were relieved after the first session of prenatal gentle yoga. This study compared two groups, namely pregnant women who did prenatal gentle yoga and pregnant women who only received social support. The results of this study revealed that the group who received prenatal gentle yoga experienced a decrease in the levels of depression, anxiety, anger, back pain, and legs when compared to the group that only received social support. Moreover, a study conducted by (Satyapriya et al., 2013) presented that prenatal gentle yoga could reduce the level of anxiety experienced by pregnant women. In fact, pregnant women experience of pain is influenced by several factors, namely age, poor health conditions, psychological and psychosocial problems, degenerative arthritis, smoking habit, sitting or standing for hours, and obesity. To cope with back pain, women may perform exercise, apply hot and cold compresses, correct their body postures and make a consultation. Exercise treatment can be performed through prenatal gentle yoga.

## **Conclusion**

There was a difference in mean values before and after being given prenatal gentle yoga intervention and it was found effective in reducing low back pain among women in the II and III trimesters of pregnancy.

## **Recommendations**

The provision of prenatal gentle yoga exercises must be carried out continuously since such yoga movements can help pregnant women in managing breathing, preparing for the delivery process and can reduce the symptoms of complaints that are often experienced by pregnant women. Yoga practice is very important since it is safe and not too aggressive and can make pregnant women feel comfortable through stiff relief and body stretching.

## **References**

- Amalia. 2014. *Tetap Sehat Dengan Yoga*. Jakarta: Gagas Media.
- America Pregnancy Organisation. 2014. *” Pregnancy We’re Here for You*.
- Aprilia, Yessi, and Richmond. 2019. *Yoga: Tools for Mind and Body Balance*. Jakarta: Gramedia Widiasaran Indonesia.
- Beddoe, A. E., Yang Paul, H. P. Kennedy, Weiss, and K A Lee. 2018. “The Effects of Mindfulness-Based Yoga during Pregnancy on Maternal Psychological and Physical Distress.” *Journal of Obstetric, Gynecologic, and Neonatal Nursing* 38.

- Cunningham, F. 2012. *Ostetri Williams*. Jakarta: Kedokteran EGC.
- Curtiz, Weinrib, and Katz. 2019. "Systematic Review of Yoga for Pregnant Women: Current Status and Future Directions." *Evid Based Complement Alternat Med: Pubmed*.
- Davidson, SL, RJ Bell, Lachina, Holden, and Davis. 2019. "Sexual Function in Wll Women: Stratification by Sexual Satisfaction, Hormone Use, and Menopause Status." *The Journal of Sexual Medicine* 5(5).
- Dewi, CR, H. Suharyo, and R Runjati. 2017. "Effect Of Yoga and Acupressure on Pain and Functional Capability Of Lower Back in Pregnant Mothers During The Third Trimester Of Pregnancy." *Belitung Nursing Journal* 3(6).
- Field, T., M. Diego, J. Deago, and L Medina. 2013. "Yoga and Social Support Reduce Prenatal Depression, Anxiety and Cortisol." *Journal of Bodywork and Movement Therapies* 17.
- Inding, and Ilmiati. 2016. "Pengaruh Senam Hamil Terhadap Perubahan Derajat Nyeri Pada Ibu Hamil Yang Menderita Nyeri Pinggang Bawah (NPB)." *Physical Change During Pregnancy Journal*.
- Iyengar, G. S., and K. Khatab. 2015. "Iyengar Yoga for Motherhood; Safe Practice for Expectant and New Mothers."
- Kemenkes RI. 2018. *Profil Kesehatan Indonesia*. Jakarta: Kemenkes RI.
- Satyapriya, M., R. Nagarathna, V. Padmalatha, and Hr Nagendra. 2013. "Effect of Integrated Yoga on Anxiety, Depression & Well Being in Normal Pregnancy." *Complementary Therapies in Clinical Practice*.
- WHO. 2019. *Monitoring Helath for The SDGs*. Switzerland: Sustainable Development Goals.

## Analysis of Health Belief Model regarding Human Papillomavirus Vaccination among Female Employees at Sukabumi Regency Government

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### ABSTRACT

The high rate of cervical cancer case confirms it as the second most common cancer in Indonesia which required specific management and primary prevention efforts for everyone. The appeal issued by the Ministry of Health regarding HPV vaccination which will be mandatory as an effort to reduce cervical cancer rates in Indonesia. This study aims to analyze the health belief model as the influential factor for the willingness to get HPV vaccination as an effort to prevent cervical cancer among female employees in Sukabumi Regency government in 2022. This was a quantitative study with cross-sectional design. Data were collected among 213 respondents who were selected using purposive sampling technique. The results showed that 50.7% of respondents were willing to get HPV vaccination. Meanwhile, 49.3% of respondents were not willing to get HPV vaccination. There was a relationship between perceived susceptibility, benefit, obstacle, cues to action, and self-efficacy with the willingness to get HPV vaccination. Meanwhile, the perceived severity was not related to the willingness to get HPV vaccination. In the multivariate analysis, it was found that cues to action ( $POR=5,477$ ;  $95\% CI=2,6-11,2$ ) had the most significant effect on willingness to get HPV vaccination. It is expected that the current study can be used as an input for the government of Sukabumi Regency to plan for health promotion programs for every agency regarding cervical cancer, especially HPV vaccination.

*Tingginya kasus kanker serviks sebagai kanker terbanyak kedua yang terjadi di Indonesia membutuhkan perhatian dan upaya pencegahan primer bagi semua orang. Mengingat himbauan dari Kementerian Kesehatan terkait vaksinasi HPV yang akan diwajibkan sebagai upaya menurunkan angka kanker serviks di Indonesia. Penelitian ini bertujuan untuk menganalisis faktor health belief model yang memengaruhi kesediaan melakukan vaksinasi HPV sebagai upaya pencegahan kanker serviks pada pegawai wanita di lingkungan pemerintahan Kabupaten Sukabumi tahun 2022. Penelitian ini menggunakan metode kuantitatif dengan desain cross-sectional. Pengumpulan data dilakukan melalui pengisian kuesioner oleh 213 responden dengan teknik purposive sampling. Hasilnya 50,7% responden bersedia melakukan vaksinasi HPV sebagai upaya pencegahan kanker serviks. Sedangkan 49,3% lainnya tidak bersedia untuk melakukan vaksinasi HPV. Terdapat hubungan antara persepsi kerentanan, manfaat, hambatan, isyarat bertindak, dan keyakinan diri dengan kesediaan melakukan vaksinasi HPV pada pegawai wanita di lingkungan pemerintahan Kabupaten Sukabumi. Sedangkan persepsi keseriusan tidak berhubungan dengan kesediaan melakukan vaksinasi HPV. Pada analisis multivariat diketahui bahwa isyarat bertindak ( $POR=5,477$ ;  $95\% CI=2,6-11,2$ ) yang paling memengaruhi kesediaan melakukan vaksinasi HPV. Diharapkan kepada pemerintah Kabupaten Sukabumi menjadikan penelitian ini masukan untuk diadakannya program promosi kesehatan kepada setiap instansi mengenai kanker serviks khususnya vaksinasi HPV.*

## Introduction

Health problems initially caused by infectious diseases has been replaced by non-infectious diseases due to an epidemiological transition. Cancer caused by abnormal cells in the body is one of the non-infectious diseases which is considered as a significant health problem today. Due to the malignant spread of these abnormal cells, WHO or the world health organization mentions that cancer is one of

the death main causes globally. Cancer is one of the death main causes worldwide in 2020 by causing 10 million deaths or claiming 1 in 6 deaths. Infections which cause cancer such as Human Papillomavirus (HPV) and hepatitis contribute for 30% of cancer cases which occur in low- and middle-income countries (WHO, 2022). Based on Basic Health Research data in 2013 and 2018, the prevalence of cancer in Indonesia has increased from 1.4% to 1.49%. Cervical cancer is the second leading case of cancer of the 10 types of cancer that occur in Indonesia. Based on data derived from Globocan 2020, it was stated that there were 36,633 cervical cancer incidents in Indonesia or around 9.2% compared to all types of cancer and 9% of deaths due to cervical cancer (The Global Cancer Observatory, 2020). The second largest number of cervical cancer patients in Indonesia is in West Java region. Data derived from Hasan Sadikin Hospital (RSHS) reported that, on average, the number of cervical cancer patients who came every year were 400 people and 75% of them were at late stage (Hadisiwi & Arifin, 2018). Based on data obtained from Open Data Jabar (2019), in Sukabumi, there were 55 examinations with Positive IVA test results conducted on women aged 30-50 years in 2019.

Preventive behavior due to the incidence of cervical cancer can be performed through early detection and Human Papillomavirus (HPV) vaccination. According to dr. Venita as the Head of Social Services Division of the Indonesian Cancer Foundation, the scope of HPV vaccination conducted in Indonesia was still very low at 1.1%. The main cause of the low HPV vaccination scope is due to the relatively expensive vaccine, despite the cost of treatment if exposed to cervical cancer will be much more expensive (Kartinah, 2019). HPV vaccination is conducted not only for individual health, but also for the Indonesia society welfare. This is also in line with the statement of the Indonesian Health Minister, Budi Gunadi Sadikin, who said that HPV vaccination would be compelled as an effort to prevent cervical cancer. According to him, free HPV vaccination will only be given to the target of the national immunization program, namely girls in elementary school. Meanwhile, for adult women, to get the HPV vaccination, they have to spend quite a lot of money (CNN Indonesia, 2022). Based on a study conducted by Mulyati (2019), 68.8% of respondents did not take benefit of the HPV vaccination. On another occasion, a study conducted by Fitriani et al. (2018) also revealed that 50% of study subjects did not get HPV vaccination despite the majority of subjects had a good perception.

One of the health behavior domains in the form of closed reactions which determine decision making in behavior is influenced by perception or beliefs of individuals. The Health belief model theory explains the preventive behavior regarding health problems which is strongly influenced by the beliefs owned by the individual (Setiyaningsih et al., 2016). This theory explains individual behavior in preventing and responding to a disease. In this theory, it is emphasized that the individual's decision to perform health behavior is strongly influenced by the individual's perceived susceptibility and perceived benefits (Setiyaningsih et al., 2016). Thus, based on this health belief model, it can be concluded that the concept of using health services as an effort to prevent a disease (preventive behavior) is developed based on individual beliefs and convictions in maintaining their health. The existence of self-efficacy will foster an action plan which will be taken by the individual. These beliefs and convictions are also strongly influenced by perception. Good and bad perception possessed by individuals are influenced by



several things such as knowledge, experience, and information obtained which will later help the individual in viewing and assessing something. There are several components in the health belief model theory, including perceived susceptibility to a health condition, perceived severity of the consequences, perceived benefits, and perceived obstacles in implementing health behaviors. In addition, other variables consist of demographic, socio-psychological and structural variables, cues to action which triggers individuals to perform health behavior, and self-efficacy to successfully perform health behavior (Irwan, 2017).

Based on the Regulation of Minister of Health of the Republic of Indonesia Number 34 of 2015 concerning the Management of Breast Cancer and Cervical Cancer, it is explained that cancer primary prevention is conducted with the aim of reducing cancer exposure and risk factors, thus minimizing individual susceptibility to cancer. Primary prevention for cervical cancer can be implemented through HPV vaccination. The high rate of cervical cancer case confirms it as the second most common cancer in Indonesia which required specific management and primary prevention efforts for everyone. Otherwise, the implementation is still obstructed by various individual obstacles in getting such vaccination. Considering the importance of HPV vaccination and the government's effort regarding HPV vaccination which will be implemented in Indonesia as an effort to prevent cervical cancer and as a means of advocacy to the Sukabumi Regency Government regarding the HPV vaccination program to be conducted, this study is important to be conducted with the aim of determining HPV vaccination implementation and the effect of health belief model on the willingness to get HPV vaccination among female employees at Sukabumi Regency Government.

## **Methods**

This was a quantitative study with cross sectional approach which aims to analyze health belief model as the influential factor for the willingness to get HPV vaccination as an effort to prevent cervical cancer among female employees in Sukabumi Regency government in 2022. The population in this study involved female employees at government offices and non-governmental organizations. There were 479 health workers within the Sukabumi Regency Government with a total sample of 213 respondents with the inclusion criteria of female employees who had a maximum age of 55, had not got HPV vaccination, and did not have cervical cancer. The samples were selected using purposive sampling technique based on the respondents' affordability. Data were collected through a questionnaire containing respondent characteristics, perceptions and willingness to get HPV vaccination. The respondent's characteristic section consisted of name, age, education level, marital status, monthly income, cervical cancer status, and knowledge about HPV vaccination. Later, the perception section consisted of statements based on the concept of the Health Belief Model namely perceived susceptibility, severity, benefits, obstacles, cues to action, and self-efficacy with a total of 32 statements. Finally, the willingness section included 4 statements regarding the willingness to get HPV vaccination in preventing cervical cancer. Validity and reliability tests were conducted on questionnaires in a group with the same characteristics as the study samples with a total of 30 respondents. The validity test result showed that each statement used in the variable with a total of 36 statements was declared valid with an

r value that was higher than the r table. In addition, the reliability test result showed that all statements on the variables were reliable. Data processing was conducted through several stages, namely editing, coding, data entry, and data cleaning. Data analysis was performed using univariate analysis, bivariate analysis through chi-square test, and multivariate analysis through multiple logistic regression test. The study had obtained an ethical approval issued by the Health Research Ethics Commission (KEPK) of the Veteran National Development University of Jakarta with the Ethical Approval number: 151/V/2022/KEPK.

## Results

The current study was conducted in the second largest district on the Java island, namely Sukabumi Regency, West Java in 17 existing offices. The following table presents the distribution and frequency of 213 respondents. The dependent variable was willingness to get HPV vaccination to prevent cervical cancer which was divided into willing and unwilling. Meanwhile, the independent variables consisted of perceived susceptibility, severity, benefits, obstacles, cues to action, and self-efficacy. Furthermore, there was also a frequency distribution of respondents' characteristics including age, level of education, income, marital status and knowledge on HPV vaccination.

**Table 1.** Frequency Distribution of respondents' characteristics, willingness to get HPV vaccination, and the concept of Health Belief Model

Variable	Frequency (n=213)	Percentage (%)
<b>Age (years)</b>		
18-25	36	16.9
26-35	55	25.8
36-45	72	33.8
46-55	50	23.5
<b>Level of Education</b>		
High School	41	19.2
Diploma	16	7.5
Bachelor	136	63.8
Master	20	9.4
<b>Monthly Income</b>		
> Rp.3.125.000	128	60.1
≤ Rp.3.125.000	85	39.9
<b>Marital Status</b>		
Not Married Yet	50	23.5
Married	150	70.4
Widowed	6	2.8
Divorced	7	3.3
<b>Knowledge on HPV Vaccination</b>		
Good	100	46.9
Poor	113	53.1
<b>Willingness to get HPV Vaccination</b>		
Not Willing	105	49.3
Willing	108	50.7
<b>Perceived Susceptibility</b>		
Low	109	51.2
High	104	48.8
<b>Perceived Severity</b>		
Low	107	50.2
High	106	49.8
<b>Perceived Benefits</b>		
Low	142	66.7
High	71	33.3
<b>Perceived Obstacles</b>		

Variable	Frequency (n=213)	Percentage (%)
Low	137	64.3
High	76	35.7
<b>Cues to Action</b>		
Low	114	53.5
High	99	46.5
<b>Self-efficacy</b>		
Low	97	45.5
High	116	54.5

Source: Primary Data, 2022

Based on the table above, it was shown that most of respondents were in the 36-45 age group (33.8%). The majority of respondents had the level of education level of Bachelor (63.8%). Furthermore, the majority of respondents were married (70.4%). A total of 128 respondents (60.1%) had a monthly income exceeding the Regional Minimum Wage of Sukabumi Regency of IDR 3.125.000,-. Nevertheless, there were still many respondents who had poor knowledge on HPV vaccination (53.1%). Furthermore, 49.3% of respondents were not willing to get HPV vaccination. The majority of respondents (51.2%) had a low perceived susceptibility. Equivalently, the majority of respondents had a low level of perceived severity (50.2%) and perceived benefits (66.7%). 76 respondents (35.7%) had a high level of perceived obstacles in getting HPV vaccination. The majority of respondents (53.5%) had a low level of cues to action in conducting HPV vaccination. On the other hand, 97 respondents (45.5%) had low self-efficacy to be able to conduct HPV vaccination as self-protection from cervical cancer.

**Table 2.** Distribution of Questionnaire on Willingness to get HPV Vaccination

The Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I will set aside a portion of my income for HPV vaccination	6.6%	43.7%	40.8%	8%	0.9%
2. I will take my time to get HPV vaccination	10.8%	55.9%	28.2%	4.7%	0.5%
3. I will refuse the suggestion of healthcare worker offers for HPV vaccination	2.3%	7.5%	25.8%	47.4%	16.9%
4. I feel that HPV vaccination is not necessary	2.3%	7.5%	33.3%	40.4%	16.4%

Source: Primary Data, 2022

Based on table 2 on the statements included in the questionnaire regarding willingness to get HPV vaccination, it was revealed that willingness was influenced by the cost, time, attitude towards suggestion given by healthcare workers for HPV vaccination, as well as feelings related to whether or not the HPV vaccination is necessary. In the statement regarding the cost of HPV vaccination, 40.8% of respondents answered that they were hesitant to set aside some of their income as funds for HPV vaccination. Furthermore, 33.3% of respondents still had doubts regarding the importance of HPV vaccination.

**Table 3.** Results of Bivariate Analysis

Variable	Willingness to get HPV Vaccination						P value	POR
	Not Willing		Willing		Total			
	n	%	n	%	n	%		
<b>Perceived Susceptibility</b>								
Low	65	59,6	44	40.4	109	100	0.003	2.364
High	40	38,5	64	61.5	104	100		
<b>Perceived Severity</b>								
Low	55	51,4	52	48.6	107	100	0.631	1.185
High	50	47,2	56	52.8	106	100		
<b>Perceived Benefits</b>								
Low	79	55,6	63	44.4	142	100	0.013	2.170

Variable	Willingness to get HPV Vaccination						P value	POR
	Not Willing		Willing		Total			
	n	%	n	%	n	%		
High	26	36.6	45	63.4	71	100		
<b>Perceived Obstacles</b>								
Low	57	41.6	80	58.4	137	100	0.004	0.416
High	48	63.2	28	36.8	76	100		
<b>Cues to Action</b>								
Low	80	70.2	34	29.8	114	100	0.000	6.965
High	25	25.3	74	74.7	99	100		
<b>Self-efficacy</b>								
Low	71	73.2	26	26.8	97	100	0.000	6.586
High	34	29.3	82	70.7	116	100		

Source: Primary Data, 2022

Based on table 3, it was revealed that among respondents with a low level of perceived susceptibility 59.6% of them were not willing to get HPV vaccination. Meanwhile, 61.5% of respondents with a high level of perceived susceptibility were willing to get HPV vaccination. The chi-square test obtained a p-value of  $0.003 \leq 0.05$ , meaning that there was a relationship between the perceived susceptibility and willingness to get HPV vaccination. 51.4% of respondents with a low level of perceived severity were not willing to get HPV vaccination in preventing cervical cancer. Meanwhile, 52.8% of respondents with a high level of perceived severity were willing to get HPV vaccination. Based on data analysis, it was obtained a p-value of  $0.631 > 0.05$ , meaning that there was no relationship between perceived severity and willingness to get HPV vaccination. Furthermore, 55.6% of respondents with low level of perceived benefits were not willing to get HPV vaccination. Meanwhile, 63.4% of respondents with a high level of perceived benefits were willing to get HPV vaccination. Based on the analysis, it was obtained a p-value of  $0.013 \leq 0.05$ , which meant that there was a relationship between perceived benefits and willingness to get HPV vaccination. 41.6% of respondents with low level of perceived obstacles were not willing to get HPV vaccination. Meanwhile, 36.8% of respondents with a high level of perceived obstacles were willing to get HPV vaccination. The p value obtained was 0.004 which meant that there was a relationship between perceived obstacles and willingness to get HPV vaccination. Furthermore, 70.2% of respondents with low level of cues to action were not willing to get HPV vaccination. Meanwhile, 74.7% of respondents with high level of cues to action were willing to get HPV vaccination. Based on data analysis, it was obtained a p-value of  $0.000 \leq 0.05$ , which meant that there was a relationship between the cues to action variable and the willingness to get HPV vaccination. 73.2% of respondents with low level of self-efficacy were not willing to get HPV vaccination. Meanwhile, 70.7% of respondents with high level of self-efficacy were willing to get HPV vaccination. Based on data analysis, it was obtained a p-value of  $0.000 \leq 0.05$ , which meant that there was a relationship between self-efficacy and willingness to get HPV vaccination.

**Table 4.** Results of Multivariate Analysis on Final Modeling

Variable	B	P Value	Exp (B)	95% CI	
				Lower	Upper
Perceived Obstacles	-1.125	0.002	0.325	0.157	0.670
Cues to Action	1.701	0.000	5.477	2.657	11.290
Self-efficacy	1.139	0.001	3.125	1.575	6.199

Source: Primary Data, 2022

Furthermore, in the final modeling of the multivariate analysis, it was revealed that the dominant variable related to willingness to get HPV vaccination was the cued to action variable. The cues to action variable had the highest OR value of 5.477 (95% CI 2.657-11.290) which meant that respondents with high level of cues to action had a 5.4 times probability of being willing to get HPV vaccination compared to respondents with low level of cues to action.

## **Discussion**

Practically, HPV vaccination is influenced by various things, especially perception. According to Salito, a person will develop a perception when they are exposed to a stimulus which is then recorded by their organs and translated into meaning by their senses. Such perceiving process will determine the impression of something occurs in the surrounding environment (Listyana & Hartono, 2015). Perceived susceptibility is the perception of individuals regarding the risk factors they have for being exposed to a health condition (Irwan, 2017). A study conducted by Fitriani et al. (2018) found that there was a statistical relationship between perceived susceptibility and the HPV vaccination behavior. According to him, a strong perceived susceptibility will encourage the individual to adopt health behaviors, for example HPV vaccination. A high level of perceived susceptibility to cervical cancer will encourage the individual to get the HPV vaccination. Similarly, in the study conducted by Permatasari et al. (2020) found that when someone did not have any perception regarding the possibility of being exposed to Covid-19, then this would affect decision making in taking preventive actions related to a disease. In this case, when a person does not have a perception that she is at risk for cervical cancer, it will influence her decision to take preventive actions such as getting the HPV vaccination. This was also similar with the result of the current study based on the statements on the questionnaire submitted, that the majority of respondents had concerns if they had cervical cancer.

Based on this study, it was found that there was no relationship between perceived severity and willingness to get HPV vaccination. Regarding the study finding, although the majority of respondents agreed that cervical cancer was a deadly disease, they were afraid of getting cervical cancer, agreed that cervical cancer would change their lives which include finances, work, enthusiasm for life, but it had nothing to do with their willingness to get HPV vaccination. Similarly, in the study conducted by Krisnadewani et al. (2021), it was found that there was no relationship between perceived severity and willingness to get HPV vaccination. Similarly, Zuliyanti (2018) in her study also proposed that there was no relationship between perceived severity and health behavior in the form of a pap smear examination. According to her, perceived severity of a disease would not affect health behavior, and vice versa. According to the health belief model theory, perceived severity is a concept which refers to individual perception towards severity of a disease, whether the disease is infectious or leaves the disease untreated. A person views the disease severity by considering the medical consequences that he will get if she suffers from the disease, as well as the changes experienced regarding the social life (Irwan, 2017).

Based on the study, it was also known that there was a relationship between perceived benefits and willingness to get HPV vaccination. The majority of respondents agreed that HPV vaccination can

prevent them from cervical cancer. Furthermore, respondents also agreed that HPV vaccination was effective in preventing cervical cancer, the sooner they got the HPV vaccination, the more effective the vaccine's performance in preventing cervical cancer would be. Moreover, respondents also agreed that HPV vaccination would maintain their own health. A study conducted by Fitriani et al. (2018) also found that there was a relationship between perceived benefits and HPV vaccination behavior. The high level of belief towards a method designed to minimize the threat of a disease will increase the person's preventive behavior to avoid a disease, which in this case was described by HPV vaccination as a strategy or effort taken to avoid cervical cancer. Similarly, a study conducted by Krisnadewani et al. (2021) stated that perceived benefits was related to willingness to get vaccination ( $p\ 0.040 < 0.05$ ). Based on the health belief model theory, it is explained that the perceived benefits can help encourage perceived susceptibility and severity to encourage people in taking health action (Irwan, 2017).

According to this study, perceived obstacles were related to willingness to get HPV vaccination. According to a study conducted by Fitriani et al. (2018), it was found a relationship between perceived obstacles and behavior towards HPV vaccination. The higher the level of perceived obstacles, the higher the HPV vaccination behavior. Nevertheless, such finding is not in accordance with a study conducted by Putri et al. (2020) regarding relationship between perceived obstacles and the practice of using contraceptive methods which obtained a p-value of  $0.834 > 0.05$ , which meant that perceived obstacles had no relationship with the practice of using contraceptive methods. Obstacles to HPV vaccination are generally caused by the high cost of HPV vaccination, the lack of information obtained regarding HPV vaccination, and the fear of side effects that will arise. It can be said if the perceived obstacles is a concept related to how big the obstacles faced by individuals in conducting health behavior. An obstacle which is considered not too significant will cause good perceived obstacles in the individual. Thus, even though the perceived obstacles are quite significant, which means that there are quite a number of obstacles faced in conducting these health behaviors, it will not prevent the individual from performing a behavior which in this case is indicated by the willingness to get HPV vaccination as an effort to prevent cervical cancer (Chusna et al., 2021). In this study, obstacles arose from various factors including costs, information, and available programs. The majority of respondents agreed that it was difficult for them to get HPV vaccination because the price of the HPV vaccine was quite expensive and there were no programs which provided free HPV vaccination around them. Moreover, obstacles also arose due to the lack of information obtained by respondents regarding HPV vaccination. This is also supported by the discussion results with employees at one of the office who stated that there was no health promotion program held at the office related to cervical cancer.

Based on the analysis, it was found that the cues to action were related to the willingness to get HPV vaccination among female employees in Sukabumi Regency Government. Similarly, a study conducted by Nugrahani et al. (2017) presented the finding that the perceived cues to action had an effect on HPV vaccine utilization. Women with high cues to action would get HPV vaccine to avoid cervical cancer, and vice versa. Similar finding was found in a study conducted by Wong et al. (2021) related to the belief theory in the acceptance of Covid-19 vaccination that was conducted among society

in Hong Kong. According to the study, there was a positive correlation between cues to action and acceptance of the Covid-19 vaccine. Cues to action are a very important element in providing impetus to the acceptance of the Covid-19 vaccine. The cue to act is a stimulus needed to perform health behavior. The cues appearing are divided into two, namely internal which can be in the form of feelings within the individual, and external which can be in the form of advice from other people, family, and information obtained from existing articles (LaMorte, 2019). Similarly, according to the belief theory, cues to action will trigger individuals to perform health behavior (Irwan, 2017). In preventing a disease, everyone has their own way. Generally, the actions taken or chosen by the individual receive help from others in the form of an assessment of what choices they will take later (Notoatmodjo, 2007). The occurrence of cervical cancer which occurs in close relative of individuals raises an assessment of the existing disorders caused by cervical cancer (Rosyida, 2019). The existence of these assessments or perceiving experienced by cervical cancer patients and informed to others, resulted in a sense of anxiety for the person concerned and for the individuals around him. Thus, with this threat which causes the individual to conduct health behavior in the form of prevention efforts to avoid a disease which in this case is cervical cancer. This study also found that the majority of respondents agreed that they would vaccinate because there were close relatives who suffered from cervical cancer. Furthermore, the issue of HPV vaccination was starting to spread, as well as the emergence of recommendation to get HPV vaccination.

According to the data analysis, it was revealed that there was a relationship between self-confidence and the willingness to get HPV vaccination as an effort to prevent cervical cancer among employees in Sukabumi Regency government. Most of the respondents agreed that they were able to conduct the HPV vaccination at the following health services with complete and timely doses. Furthermore, the majority of respondents also agreed and believed that they could avoid cervical cancer if they got the HPV vaccination and it had benefits for their lives. This is in accordance with a study conducted by Warsini and Septiawan (2021) which found self-confidence as the dominant influential factor for the decision to get HPV vaccination among women of child-bearing age. Compared with women who had an active sexual relationship status, had performed early detection of cervical cancer and women of child-bearing age who had never had sexual contact, women of child-bearing age who had never had sexual intercourse had better primary prevention of cervical cancer. Self-efficacy is a factor in the health belief model which refers to the beliefs that exist in each individual regarding success in conducting a health behavior (LaMorte, 2019). Knowledge related to cervical cancer and HPV vaccination will also certainly increase the efficacy which exists in individuals in deciding whether to get HPV vaccination or not. The high level of knowledge possessed by a woman will affect the high level of decisions to be taken because indirectly they already know the risks when making such decisions (Warsini & Septiawan, 2021).

## **Conclusions**

There was a relationship between perceived susceptibility, benefit, obstacle, cues to action, and self-efficacy with the willingness to get HPV vaccination. Meanwhile, the perceived severity was not

related to the willingness to get HPV vaccination as an effort to prevent cervical cancer among employees of Sukabumi Regency government in 2022. In the multivariate analysis, it was found that cues to action had the most significant effect on willingness to get HPV vaccination.

It is expected that female employees in the Sukabumi Regency Government increase the cues to action both internally and externally to get HPV vaccination in order to prevent the incidence of cervical cancer. Furthermore, the Sukabumi Regency Government can also conduct an HPV vaccination introduction program for female employees within the Sukabumi Regency Government as advised by the Health Minister regarding HPV vaccination for women.

## References

- Chusna, F. F., Sulistiawati, & Irwanto. (2021). Hubungan Persepsi Hambatan dan Kemampuan Diri dengan Intensitas Konsumsi Tablet Fe Pada remaja Putri. *Jurnal Kebidanan*, 10(2), 81–88.
- CNN Indonesia. (2022). *Vaksin Kanker Serviks Gratis Buat Kelompok Sasaran, Dewasa Berbayar*. CNN Indonesia.
- Fitriani, Y., Mudigdo, A., & Andriani, R. B. (2018). Health Belief Model on the Determinants of Human Papilloma Virus Vaccination in Women of Reproductive Age in Surakarta, Central Java. *Journal of Health Promotion and Behavior*, 3(1), 16–26. <https://doi.org/10.26911/thejhp.2018.03.01.02>
- Hadisiwi, P., & Arifin, H. S. (2018). Pengalaman Komunikasi Penyandang Kanker Serviks dalam Pencarian Informasi Pengobatan di Jawa Barat. *Jurnal Kajian Komunikasi*, 6(1), 51–63. <https://doi.org/10.24198/jkk.v6i1.15388>
- Irwan. (2017). *Etika dan Perilaku Kesehatan*. Absolute Media.
- Kartinah, E. (2019). *Lawan Kanker Serviks dengan Vaksin dan Screening*. Media Indonesia.
- Peraturan Menteri Kesehatan RI Nomor 34 Tahun 2015 tentang Penanggulangan Kanker Payudara dan Kanker Leher Rahim, (2015).
- Krisnadewani, I. G. A. A., Yuliyatni, P. C. D., Putri, W. C. W. S., & Sari, K. A. K. (2021). Hubungan Pengatahuan dan Persepsi terhadap Kesediaan Melakukan Vaksinasi Human Papillomavirus pada Mahasiswi Fakultas Kedokteran Universitas Udayana. *Jurnal Medika Udayana*, 10(12), 63–68.
- LaMorte, W. W. (2019). *The Health Belief Model*. Boston University School of Public Health.
- Listyana, R., & Hartono, Y. (2015). Persepsi dan Sikap Masyarakat Terhadap Penanggalan Jawa dalam Penentuan Waktu Pernikahan (Studi Kasus Desa Jonggrang Kecamatan Barat Kabupaten Magetan Tahun 2013). *Jurnal Agastya*, 5(1), 118–138.
- Mulyati, S. (2019). Hubungan Pengetahuan, Status Ekonomi, Peran Petugas Kesehatan dan Peran Keluarga terhadap Vaksinasi HPV (Human Papilloma Virus) di Klinik Dara Jingga Kota Jambi Tahun 2018. *Scientia Journal*, 8(1), 256–262.
- Nugrahani, R. R., Budihastuti, U. R., & Pamungkasari, E. P. (2017). Health Belief Model on the Factors Associated With the Use of Hpv Vaccine for the Prevention of Cervical Cancer Among Women in Kediri, East Java. *Journal of Epidemiology and Public Health*, 2(1), 70–81. <https://doi.org/10.26911/theicph.2017.009>
- Open Data Jabar. (2019). *Jumlah Perempuan Usia 30-50 Tahun Yang Memiliki Hasil Tes Iva Positif Berdasarkan Kabupaten/Kota di Jawa Barat*. Open Data Jabar.
- Permatasari, P., Herbawani, C. K., Karima, U. Q., Oktafiyanti, A., & Ramadhanty, N. (2020). A Descriptive Study of Covid-19: Risk Perception and Preventive Behavior in West Java, Banten and Jakarta. *Advances in Health Sciences Research*, 30, 478–483. <https://doi.org/10.2991/ahsr.k.201125.080>
- Putri, R. R. C., Zulvayanti, Z., Hadisoemarto, P. F., Sunjaya, D. K., Setiawati, E. P., Mariani, H., &



- Amelia, I. (2020). Hubungan Persepsi tentang Penularan HIV/AIDS dari Ibu ke Anak terhadap Praktik Penggunaan Kontrasepsi pada Wanita Usia Subur Penerima Obat Antiretroviral di Kota Bandung. *Media Penelitian Dan Pengembangan Kesehatan*, 29(4), 341–352. <https://doi.org/10.22435/mpk.v29i4.2179>
- Rosyida, D. A. C. (2019). Pengaruh Edukasi Metode Wish and Care Program Terhadap Perilaku Deteksi Dini Kanker Serviks. *Embrio*, 11(1), 8–16. <https://doi.org/10.36456/embrio.v11i1.1843>
- Setiyaningsih, R., Tamtomo, D., & Suryani, N. (2016). Health Belief Model: Determinantsof Hypertension Prevention BehaviorinAdults at Community Health Center, Sukoharjo, Central Java. *Journal of Health Promotion and Behavior*, 01(03), 160–170. <https://doi.org/10.26911/thejhp.2016.01.03.03>
- The Global Cancer Observatory. (2020). Cancer Incident in Indonesia. *International Agency for Research on Cancer*, 858, 1–2.
- Warsini, & Septiawan, C. (2021). Faktor – Faktor yang Berpengaruh terhadap Pengambilan Keputusan Vaksinasi HPV. *Jurnal Ilmiah Kebidanan Indonesia*, 11(2), 97–107.
- WHO. (2022). *Cancer*. World Health Organization.
- Wong, M. C. S., Wong, E. L. Y., Huang, J., Cheung, A. W. L., Law, K., Chong, M. K. C., Ng, R. W. Y., Lai, C. K. C., Boon, S. S., Lau, J. T. F., Chen, Z., & Chan, P. K. S. (2021). Acceptance of the COVID-19 vaccine based on the health belief model: A population-based survey in Hong Kong. *Vaccine*, 39(7), 1148–1156. <https://doi.org/10.1016/j.vaccine.2020.12.083>
- Zuliyanti, E. (2018). *Analisis Faktor yang Berhubungan dengan Pemeriksaan Pap Smear pada Tenaga Kesehatan Berdasarkan Health Belief Model (HBM) di Surabaya*. Universitas Airlangga.

## Analysis of Factors Related to Stunting Among Children Aged 6-24 Months in Central Jakarta

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### ABSTRACT

Stunting is a condition in which children aged 0-5 years have height-for-age with a z-score of below -2SD based on growth standards according to WHO, which occurs at the age of 0-5 years. Stunting condition may result in the inhibition of cognitive and motor development so as to create a generation that is less competitive and have disrupted metabolic system and they are at risk of various diseases. The causes of stunting are multi-dimensional factors such as birth length and genetics, maternal height, economic status, level of education and child care patterns. This study aims to analyze factors related to the incidence of stunting among children aged 6-24 months in Central Jakarta with a cross sectional study using a questionnaire. Data were analyzed using Chi-square and multiple logistic regression tests. The results showed that there was no relationship between education, age, family income, gestational age, BMI, newborn length and exclusive breastfeeding with stunting ( $P > 0.05$ ). In contrast, there was a relationship between maternal height and stunting ( $p < 0.05$ ). Furthermore, the results of regression test showed that the most dominant influential factor on the incidence of stunting was maternal height.

*Stunting merupakan kondisi dimana balita menurut usianya (0 – 5 tahun) memiliki panjang atau tinggi badan dengan hasil nilai z-score dibawah -2SD berdasarkan standar pertumbuhan menurut WHO. Kondisi stunting mengakibatkan terhambatnya perkembangan kognitif dan motorik sehingga menciptakan generasi yang kurang berdaya saing serta mengganggu sistem metabolik yang beresiko terjadinya berbagai penyakit. Stunting disebabkan oleh faktor multi dimensi, diantaranya yaitu panjang badan lahir yang dipengaruhi nutrisi saat hamil dan genetik, tinggi badan orang tua yang dapat diturunkan kepada anaknya, status ekonomi yang berhubungan dengan kemampuan pemenuhan gizi, pendidikan yang mempengaruhi pengetahuan terkait gizi dan pola asuh anak. Penelitian ini bertujuan menganalisis faktor yang berhubungan dengan kejadian stunting pada anak usia 6-24 bulan di Jakarta Pusat dengan metode cross sectional menggunakan kuesioner. Analisis menggunakan Chi-square untuk mengetahui hubungan antara faktor penyebab stunting dan menggunakan uji regresi logistik ganda untuk mengetahui faktor yang paling berpengaruh terhadap kejadian stunting. Hasil penelitian menunjukkan tidak ada hubungan antara pendidikan, usia pendapatan keluarga, jarak kehamilan, IMT, panjang badan lahir dan pemberian ASI eksklusif dengan kejadian stunting ( $P > 0,05$ ) serta ada hubungan antara tinggi badan ibu dengan kejadian stunting ( $p < 0,05$ ). Sedangkan, hasil uji regresi menunjukkan faktor yang paling berpengaruh terhadap kejadian stunting adalah tinggi badan ibu.*

## Introduction

Stunting is a condition of under-five children with chronic malnutrition (since pregnancy and in the early life stages after birth), who experience growth failure that does not appear until the age of 2 years (Ministry of Health, 2019). Stunting can be caused by chronic child malnutrition, so it takes a long time to restore the length/height-for-age condition (Richardson & Dutton, 2016; United Nations-World Health Organization-The World Bank Group, 2019). WHO data (2018) showed that the incidence of stunting ranks first in Southeast Asia (57.9%). Indonesia is one of the countries in the list of countries in the Southeast Asian continent. Among several countries in Southeast Asia, Indonesia has the second

highest prevalence of stunting after Cambodia. Basic Health Research (2018) recorded a decrease in the incidence of stunting by 47.2% in 2013 to 30.8% in 2018 or around 9 million infants and 29.9% occurred in children under 2 years old (Ministry of Human Development and Culture Coordinator, 2018; Ministry of Health of the Republic of Indonesia, 2019; Unicef/WHO/The World Bank, 2019).

Stunting conditions can impair brain development regarding the inhibition of cognitive and motor development so as to create a generation that is less competitive and have disrupted metabolic system and they are at risk of various diseases. such as obesity, stroke, diabetes and heart disease. In Indonesia, stunting is a major problem as it affects the country's economy and increases poverty, resulting in losses of up to 3% per year.

The second goal of one of the SDG'S programs focuses on reducing hunger and poverty. It is expected that by 2030, the problem of malnutrition can be solved and the nutritional needs of pregnant and breastfeeding women can be met to reduce the incidence of stunting. Nutrition-related interventions have been shown to be up to 70% effective in terms of success in improving community nutrition, particularly in reducing the incidence of stunting (Ministry of Health of the Republic of Indonesia, 2019).

The critical intervention to reduce the prevalence of stunting occurs in the first 1000 days of life in under-five children, especially before the age of 2 (TNP2K, 2017). A study conducted by Kusuma (2013) concluded that children's growth slowed down at the age of 2-3 years, so the process of growth at this age had less chance than at the age of 6-24 months. Causes of stunting are multidimensional factors such as birth length affected by maternal diet during pregnancy, genetics, parents of short stature, economic status which is related to ability to fulfill diet during pregnancy through infancy, and level of education which affectt parents knowledge about nutrition and child care. Inappropriate parenting carries a greater risk of inhibiting children (Kusuma, 2013).

The impact of stunting in Indonesia is very wide and the success of interventions performed on children under 2 years old is very high. Based on the beackground, researchers are interested in understanding factors related to stunting among children aged 6 to 24 months in Central Jakarta in 2019.

## **Methods**

This was an observational analytical study with a cross-sectional method performed on all children aged 6 to 24 months in Johar Baru Village, Central Jakarta, with a total number of 35 children. The samples were selected using total sampling technique. The study was conducted in February-August 2019 using a questionnaire that included informed consent as a means of approval and data collection. The results obtained were then analyzed with SPSS. Bivariate analysis applied chi-square to determine the relationship between stunting variables and multivariate analysis applied multiple logistic regression to determine the most dominant factor in the incidence of stunting. Before implementing multivariate analysis, bivariate analysis was performed which obtained a p-value of < 0.25. There was a requirement for multivariate analysis, and the dependent variable was categorical. According to the results of the bivariate analysis, the independent variables appropriate for further analysis by multiple logistic

regression were maternal age, maternal height, breastfeeding and the dependent variable was growth retardation.

**Results**

**Table 1.** Distribution of stunting frequency, maternal level of education, age, BMI, height, family income, pregnancy spacing, newborn length, gestational age and exclusive breastfeeding

Variable	N	Percentage (%)
<b>Stunting</b>		
Yes	9	25,7%
No	26	74,3%
<b>Maternal Level of Education</b>		
Primary Level	16	45.7%
Further level	19	54.3%
<b>Maternal Age</b>		
<20 or >35 years	9	25.7%
20-35 years	26	74.3%
<b>Maternal BMI</b>		
< 18.5 or > 24.9	7	20%
18.5 – 24.9	28	80%
<b>Maternal Height</b>		
≤150 cm	6	17.1%
>150 cm	29	82.9%
<b>Family Income</b>		
< Rp. 2.500.000	13	37.1%
≥ Rp 2.500.000	22	62.9%
<b>Pregnancy Spacing</b>		
≤ 2 years	4	11.4%
>2 years	31	88.6%
<b>Newborn Length</b>		
< 48 cm	23	65.7%
≥ 48 cm	12	34.3%
<b>Gestational Age</b>		
Preterm or Postterm	0	0%
Aterm	35	100%
<b>Exclusive Breastfeeding</b>		
No	5	14.3%
Yes	30	85.7%

Table 1 revealed that a small proportion (25.7%) of the respondents had underdeveloped children or shorter height-for-age, most of respondents (54.3%) had a further level of education, most of respondents (74.3%) had an age range between 20 and 35 years old, almost all respondents (80%) had a BMI (Body Mass Index) in the normal category, namely 18.5 to 24.9, almost all of respondents (82.9%) had body height of > 150cm, most of respondents earned almost Rp 2,500,000 per month. Furthermore, almost all respondents (88.6%) had pregnancy spacing of >2 years or had just had their first child, all respondents (100%) had children with term pregnancies, most of respondents (65.7%) gave birth to children in the newborn length category of <48 cm and almost all respondents (85.7%) reported to do exclusive breastfeeding.

**Table 2.** Relationship between maternal level of education, age, pregnancy spacing, BMI, height, family income, newborn length, and breastfeeding with the incidence of stunting

Variable	Stunting		N	OR (95% CI)
	Yes (n = 9)	No (n= 26)		
<b>Maternal Level of Education</b>				
Primary Level	3 (33.3%)	13 (50%)	0.460	0.842 (0.573 – 1.238)
Further Level	6 (66.7%)	13 (50%)		

Variable	Stunting		N P value	OR (95% CI)
	Yes (n = 9)	No (n= 26)		
<b>Maternal Age</b>				
<20 or >35 years	4 (44.4%)	5 (19%)	0.192	1.454 (0.787 – 2.686)
20-35 years	5 (55.6%)	21 (81%)		
<b>Maternal BMI</b>				
< 18.5 or > 24.9	3 (33.3%)	4 (15.4%)	0.340	1.375 (0.704 – 2.687)
18.5 – 24.9	6 (66.7%)	22 (84.6%)		
<b>Maternal Height</b>				
<150 cm	4 (44.4%)	2 (7.7%)	0.027	2.483 (0.791-7.792)
≥150 cm	5 (55.6%)	24 (92.3%)		
<b>Family Income</b>				
≤ Rp. 2.500.000	2 (22.2%)	11 (42.3%)	0.431	0.806 (0.558 – 1.164)
>Rp 2.500.000	7 (77.8%)	15 (57.7%)		
<b>Pregnancy spacing</b>				
≤ 2 years	1 (11.1%)	3 (11,5%)	1.000	0.989 (0.541-1.807)
>2 years or first child	8 (88.9%)	23 (88.5%)		
<b>Newborn Length</b>				
≤ 48 cm	5 (55.6%)	18 (69.2%)	0.685	0.852 (0.541 – 1.342)
> 48 cm	4 (44.4%)	8 (30,8%)		
<b>Exclusive Breastfeeding</b>				
No	3 (33.3%)	2 (7.7%)	0.095	2.000 (0.674 – 5.939)
Yes	6 (66.7%)	24 (92.3%)		

Table 2 shows the factors related to stunting, including maternal height. The results of the chi-square analysis of maternal height obtained a p-value = 0.027 or < 0.05. Such finding indicated that there was a significant relationship between maternal height and stunting. Most of respondents (44.4%) who had stunting children were women with body height of <150 cm. Accordingly, the results of the analysis with a 95% confidence level showed that women with body height of <150 cm 2.4 times more likely to have stunted children than women with body height of >150 cm.

**Table 3.** Logistic regression analysis of maternal age, height, exclusive breastfeeding with stunting

Variable	Koef (β)	SE (β)	Wald	P value	Exp.B (95% CI)
Martenal Age (< 20 years and > 35 years)	1.111	0.975	1.301	0.254	3.039 (0.450 – 20.525)
Maternal Height (<150 cm)	2.444	1.084	5.083	0.024	11.522 (1.376 – 96.467)
Non-Exclusive Breastfeeding	1.914	1.144	2.801	0.094	6.781 (0.721 – 63.814)
Constant	2.343	0.721	10.560	0.01	

*Hosmer and Lemeshow Test*= 0.892

Table 3 provides information on the variables that put children at risk of stunted growth. In the variable of maternal age (< 20 years and > 35 years), there was a 3.039-fold (22.48%) probability of having a stunted child. Furthermore, the maternal height lead to 11.522-fold (52.38%) and that exclusive breastfeeding lead to 6,781 fold (39.39%) probability of having a stunted child. And if the maternal age was <20 years old or >35 years old with height of <150 cm and no exclusively breastfeeding, then the probability that the infant was at risk for stunting was 95.80%.

## **Discussion**

The results of this study indicated that there was a significant relationship between maternal height and the incidence of stunting (p-value of  $<0.05$ ). This showed that women with height of  $<150$  cm were at risk of having underdeveloped children. This is consistent with a study conducted by Husna (2017), which found that women with height of  $<150$  cm were 6.35 times more likely to have children with stunting (Husna, 2013). Likewise in the study by Toliu et al., it was found that genetic factors (height) had an impact on the incidence of stunting among under-five children. Having one or both parents short due to pathological conditions (such as growth hormone deficiency) means that they have genes on their chromosomes that carry short traits, making children more likely to inherit those genes and grow into the stunting generation. However, if the parents are small due to nutritional deficiencies or disease, it is likely that the child can grow to a normal size as long as the child is not exposed to other risk factors during growth (Nasikhah & Margawati, 2012; Toliu, Malonda, & Kapantow, 2018).

According to Rahayu and Khairiyati (2014), children of young mothers are at risk of being underdeveloped due to physical conditions. They have gene structure that can carry short traits, giving children the opportunity to inherit genes as they grow into stunting. Mothers of short stature are 7 times more likely to have underdeveloped children compared to mothers with high stature (150 cm) because genetic/hereditary factors can influence fetal growth and the function of the formed organs (Manggala, Kenwa, Kenwa, Sakti & Sawitri, 2018; Soetjningsih, 2016). Maternal height was significantly related to the incidence of stunting and has a three times higher risk of having a child with stunting, as short mothers inherently have limited organ capacity and function (Nur Hadibah Hanum, 2019).

High level of knowledge can influence parents in determining compliance with family dietary and parenting patterns. Inappropriate parenting may increase the risk of stunting (Adriani and Wirjatmadi, 2012). In this study, more than half the incidence of stunting (66.7%) occurred in mothers with higher education. Basically, higher education tends to have better employment opportunities and the level of ability to obtain information (Atmarita, Trihono; Tjandrarini, Dwi Hapsari; Irawati, Anies; Utami, Nur Handayani; Tejayanti, Teti; Nurlinawati, 2015). However, higher education does not guarantee either that someone has better knowledge, especially in relation to nutrition. From direct observations, mothers with low levels of education tend not to work so that they have time to come to the posyandu for extra food and to take part in nutritional and health counseling (Wanimbo & Wartningsih, 2020). This shows that higher education does not guarantee that children are free from malnutrition, because higher education does not mean that one has a good knowledge on nutrition (Iswati et al., 2019). Highly educated mothers are more likely to work as professionals than as housewives, so childcare is often left to caregivers who may not have adequate training and knowledge of nutritional issues. This is the possible reason why maternal low educational level is not a risk factor for stunting in children aged 1-2 years (Pramesti, SA, Fitriahadi, E, Candra, 2019).

In this study, it was shown that almost half (44.5%) of respondents with underdeveloped children were aged  $<20$  years and  $>35$  years, which age was taken into account as the age at risk for stunted children. This is consistent with a study conducted by Yu, et al. (2016) that relatively young maternal

age was closely related to growth failure in infants aged 0-11 months. Besides, women with gestational age of <20 years do not have enough experience and knowledge to take care of their pregnancy. Wanimbo and Wartiningsih (2020) also found that under-fives with stunting were more likely to be from the group of mothers aged <20 years. Maternal age was found to be significantly related to the incidence of stunting. Women aged <20 years were at higher risk of stunting during pregnancy compared to women of childbearing age (20-34 years). Teenage mothers are 8 times more likely to have stunting than mothers in the optimal reproductive age. Likewise, it was known that mothers who are older than 35 years tend not to take care of their pregnancy, so this can also lead to stunted fetal growth during pregnancy. In addition, at this age, the absorption of nutrients also decreases, leading to imbalanced food intake and malabsorption that reduces nutritional fulfillment in infants (Hasandi, 2018). At too young (<20 years) and too old (> 35 years) age, women have 4 times greater risk of having stunted growth compared to women in the optimal reproductive age (Manggala et al., 2018; Yu, Mason, Crum, Cappa & Hotchkiss, 2016).

This study shows that there was a significant relationship between maternal age and the onset of stunting. This is consistent with Wemakor's (2018) statement that maternal age is significantly related to the incidence of stunting. (Wemakor, Garti, Azongo, Garti & Atosona, 2018). This may be due to the ongoing physical growth in adolescent women, resulting in competition for nutrients between mother and fetus (Stephenson, Tammy, and Schiff, 2019). As a result, women are at risk of intrauterine growth restriction (IUGR) and give birth to low birth weight (LBW) and small children. If there is no catch-up growth in the first 2 years, the toddler will grow into a small child. In addition, young mothers are psychologically immature in terms of mindset, so child rearing in adolescent mothers is not as good as in older mothers (Wanimbo & Wartiningsih, 2020).

BMI is one of the indicators in determining a person's nutritional status through anthropometric measurements. Nutritional problems are the most important direct factor in causing growth retardation. The results of this study indicated that there was no significant relationship between BMI during pregnancy and the incidence of growth retardation ( $p$ -value >0.05). This study is consistent with a study conducted by Astuti et al. (2020) which revealed that BMI had no significant relationship with the incidence of stunting. Such finding might happens because mothers and families already have good nutritional status, so they can prevent the onset of low birth weight and stunting (Astuti, Susanti, Nurparidah & Mandiri, 2017).

The level of family income was known to affect the incidence of stunting, as low-income families impair families' purchasing power, while high-income families allow families to meet their nutritional food needs (Adriani and Wirjatmadi, 2012). High-income families will be able to meet all of the children's primary and secondary needs, thereby reducing the incidence of stunting, and they will also have better access to health services than low-income families.

This study found that family income was not significantly related to stunting. Low income is not the only cause of stunting and it can be explained by the fact that families with high economic abilities sometimes spend their income not entirely on basic foodstuffs but on other needs, so this certainly does

not guarantee good nutritional status for young children. Low-income families can actually maximize their income by managing nutritious foods with simple and inexpensive ingredients to keep the baby growing well (Mawaddah, 2019; Susilaningrum, Nursalam, & Utami, 2013). Good parenting by providing information on nutrition, parenting patterns, and parenting courses can increase parental engagement and awareness of what influences children's growth and development (Coordinating Ministry of Human Development and Culture Midwives, 2018). Children in families of low economic status tend to consume less food in terms of quantity, quality, and variety. High economic status drives a person to select and purchase nutritious and varied foods (Agustin & Rahmawati, 2021). However, the ability to buy groceries does not necessarily guarantee that a child will grow up better than a low-educated family. When administering complementary food, the strategy must be timely, appropriate, safe, hygienic, and responsive to administration. Sometimes the ability of the parents to buy expensive foods is considered good, sometimes the nutrition is insufficient to meet the needs of the body to grow and develop (Illahi & Zki, 2017; Roesli, 2012).

However, this study found that family income had no significant relationship with the incidence of stunting in children aged 6 to 24 months. This result is consistent with Ambarwati (2019) who found that there was no significant relationship between family income and the incidence of stunting among under-five children. The similar finding was also presented in a study conducted by Putri (2012), which finds that there was no relationship between family income and the incidence of stunting in young children. This could be because the income received was not entirely spent on basic food needs, but on other needs. A high income level does not necessarily guarantee good nutritional status for children under the age of five, as the income level is not necessarily adequately provided for nutritional purposes. If low-income families can manage nutritious food with simple and inexpensive ingredients, the baby's growth will also be good. Poor economic status can also mean low purchasing power, thus affecting the ability to buy good and cheap food (Indonesia, 2018; Susilaningrum et al., 2013).

It is well known that short pregnancy spacing indicates that parents tend not to provide optimal care for their children. The older children are not yet independent and still need a lot of attention. The results of this study indicated that there was no significant relationship between pregnancy spacing and the incidence of stunting ( $p\text{-value} > 0.05$ ). This is likely because almost all respondents in this study were their first children, so they did not experience iron deficiency during pregnancy, which causes anemia and affects the mother's nutritional status. BAPPENAS explained that by providing information about nutrition, parenting patterns, and parenting classes. Good parenting can increase parental engagement and awareness, which impacts children's growth and development (BAPPENAS, 2018).

The results of this study showed that more than half (55.6%) of infants with stunted growth had a birth length of 48 cm. The body length of an infant at birth describes linear growth in the uterus. If the mother suffers from a lack of energy and protein during pregnancy, there is a risk that the baby will be 48 cm long. Andini, 2019 added that babies born with a short body length were 75.5 times more likely to suffer from stunted growth (Andini, Maryanto, & Mulyasari, 2020; Supariasa, Bakri, & Fajar, 2012, 2016).



The results showed that the infant's birth length was not significantly related to the incidence of stunting ( $p$ -value  $>0.05$ ). This study is consistent with a study conducted by Indrianti (2019) and Pramesti (2019) which concluded that there was no relationship between birth length and the incidence of growth retardation (Indrianti, 2019; Pramesti, SA, Fitriahadi, E, Candra, 2019). The lack of this relationship is because birth length is not the main factor causing stunting. It is known that there are many other causes that cause a child to retard growth. Adequate parental upbringing and nutrition from birth can catch up (catch up) in body length. It is known that heightening can be carried out until infants are 2 years old. In addition, regular monitoring of children's growth and development by healthcare workers can identify growth disorders early for further evaluation and treatment by physicians (BAPPENAS, 2018; Rahmawati, 2018). If infants are born short but get adequate stimulation and nutrition, their height will approach normal children's height even though they cannot match non-stunting criteria (Dr. Nurlailis Saadah, S.Kp., 2020).

Breast milk is the first and most important food for babies. Breast milk is the ideal food for babies as it contains all the nutrients babies need. It should be exclusively breastfed. Proper breastfeeding for babies has many positive effects on health and the growth and development process. Breast milk is an ideal nutritional source with a balanced composition and in line with the baby's growth needs (Hairunis, Rohmawati, & Ratnawati, 2016; Manungkalit, Nyoman, Arthina, & Kartiko, 2018; Mawadda, 2019; Walyani, 2015).

This study concluded that there was no relationship between exclusive breastfeeding and growth retardation. This study is consistent with a study conducted by Winny in 2014, which found that exclusive breastfeeding was not related to growth retardation. However, another study concluded that babies who were not breastfed were at risk 2 times more likely to be underdeveloped (Rambitan et al., 2014). The results of a study conducted by Marlan et al., 2013 also agreed that exclusive breastfeeding was not related to growth retardation. It is possible that non-breastfed babies are also fed by the mother in a balanced way, so that their growth does not differ significantly from that of breastfed children. Moreover, there are many factors that cause growth retardation, not only those without exclusively breastfeeding. Many other factors that influence the incidence of growth retardation (Pang Kong). Rattu & Malonda, 2013). In contrast, breastfeeding  $>6$  months also increases the risk of stunting by 1.36 times compared to children breastfed  $<6$  months. This may be because breastfeeding  $>6$  months runs the risk of delaying complementary feeding such inadequate nutritional intake. It is known that breast milk in children  $>6$  months of age is unable to meet the nutritional needs for child growth and development (Khasanah, Hadi, & Paramashanti, 2016). Paramashanti, 2020, also concluded that exclusive breastfeeding was not the only factor affecting the incidence of stunting, but there were other factors such as diet during pregnancy and preconception (Khasanah et al., 2016; Wardani et al., 2018).

The results of this study indicated that the most influential factor in the incidence of stunting was maternal height ( $p$ -value  $<0.05$ ). The study revealed that stunted children were born from mothers with height of  $<150$  cm which increased the incidence of stunting. In addition, Husna (2017) found that there was a relationship between maternal height of  $<150$  cm with the incidence of stunting and women

with height  $od < 150$  are 6.35 times more likely to have stunting children than women with normal height (Husna, 2013). 40% of a child's height is influenced by growth hormones, genetics and a healthy lifestyle and happiness, so although genetics have an influence, the percentage is not large as it is influenced by other factors (Lissauer & Clyden, 2012). A study conducted by Latif and Istiqomah in 2017 found that stunting was related to genetics, the role of genetics was about 25% and the other 75% was influenced by environmental factor (Latif & Istiqomah, 2017). One or both parents who are short due to pathological conditions (such as growth hormone deficiency) have genes on their chromosomes that carry short traits, making their children more likely to inherit these genes and grow up with stunted growth (Iswati et al., 2020). However, if the parents are small due to malnutrition or illness, it is possible for the child to grow to a normal size as long as the child is not exposed to other risk factors (Nasikhah & Margawati, 2012). Short women have limited organ capacities and functions, so whatever enters the mother's body is adapted to the capacity of the mother's organs (Nur Hadibah Hanum, 2019).

## Conclusions

The causes of growth retardation are very diverse. The results of this study identified factors that cause growth retardation in children aged 6 to 24 months, including maternal level of education, age, BMI during pregnancy, height, family income, pregnancy spacing and gestational age upon delivery, the length of the baby at birth and exclusive breastfeeding. Of all the factors examined, only maternal height had a significant relationship. Furthermore, it was known that the most dominant influential factor for the incidence of stunting was maternal height.

## References

- Adriani and Wirjatmadi. (2012). *Peranan Gizi dalam Siklus Kehidupan*. Jakarta: Kencana.
- Agustin, L., & Rahmawati, D. (2021). Hubungan Pendapatan Keluarga dengan Kejadian Stunting. *Indonesian Journal of Midwifery (IJM)*, 4(1), 30. <https://doi.org/10.35473/ijm.v4i1.715>
- Andini, V., Maryanto, S., & Mulyasari, I. (2020). Hubungan Panjang Badan Lahir, Berat Badan Lahir Dan Pemberian Asi Eksklusif Terhadap Kejadian Stunting Pada Baduta Usia 7-24 Bulan Di Desa Wonorejo Kecamatan Pringapus Kabupaten Semarang, *12(27)*, 1–6.
- Astuti, S., Susanti, A. I., Nurparidah, R., & Mandiri, A. (2017). *Asuhan Ibu dalam Masa Kehamilan Buku Ajar Kebidanan-Antenatal Care (ANC)*. Erlangga.
- Atmarita, Trihono; Tjandrarini, Dwi Hapsari; Irawati, Anies; Utami, Nur Handayani; Tejayanti, Teti; Nurlinawati, I. (2015). Pendek (Stunting) di Indonesia, masalah dan solusinya. *Lembaga Penerbit Balitbangkes*.
- BAPPENAS. (2018). Rencana Aksi Pangan dan Gizi 2018. *Journal of Materials Processing Technology*, 1(1), 1–8. Retrieved from <http://dx.doi.org/10.1016/j.cirp.2016.06.001><http://dx.doi.org/10.1016/j.powtec.2016.12.055><https://doi.org/10.1016/j.ijfatigue.2019.02.006><https://doi.org/10.1016/j.matlet.2019.04.024><https://doi.org/10.1016/j.matlet.2019.127252><http://dx.doi.org>
- Dr. Nurlailis Saadah, S.Kp., M. K. (2020). *Modul Deteksi dini dan Penanganan Stunting*. (M. K. Dr. Budi Yulianto, Ed.). Scopindo Media Pustaka. Retrieved from <https://books.google.com/books?hl=en&lr=&id=MvYIEAAAQBAJ&oi=fnd&pg=PA6&dq=nutrisi+memperbaiki+stunting&ots=I-dKsrxmMS&sig=bu1qsQ8cIFDvUA790KvHV4vda0Q#v=onepage&q=nutrisi+memperbaiki>

stunting&f=false

- Hairunis, M. N., Rohmawati, N., & Ratnawati, L. Y. (2016). Determinan Kejadian Stunting pada Anak Balita di Wilayah Kerja Puskesmas Soromandi Kabupaten Bima Nusa Tenggara Barat ( Determinan Incidence of Stunting in Children Under Five Year at Puskesmas Soromandi Bima district of West Nusa Tenggara ), 4(2), 323–329.
- Hasandi, L. A. (2018). *Hubungan Usia Ibu Saat Hamil Dan Pemberian Asi Eksklusif Dengan Kejadian Stunting Pada Balita Di Dusun Cemanggal, Desa Munding Kabupaten Semarang*. Universitas Ngudi Waluyo.
- Husna, M. (2013). Hubungan Tinggi Badan Ibu Dengan Kejadian Stunting pada Anak Usia 24 –59 Bulan. *Journal of Chemical Information and Modeling*, 53(9), 1689–1699.
- Illahi, K. R., & Zki. (2017). Hubungan\_Pendapatan\_Keluarga\_Berat\_Lahir\_Dan\_Panja. *Manajemen Kesehatan*, 3(1), 1–14.
- Indonesia, I. D. A. (2018). *Pemberian Makanan Pendamping Air Susu Ibu (MPASI)*. Retrieved from <https://www.idai.or.id/artikel/klinik/asi/pemberian-makanan-pendamping-air-susu-ibu-mpasi>
- Indrianti, A. F. (2019). Berat Badan Lahir Dan Pemberian Asi Berhubungan Dengan Stunting Balita Di Jakarta. *Jurnal Gizi Dan Kesehatan Masyarakat*, 1(2), 86–92.
- Iswati, R. S., Ayu, D., & Rosyida, C. (2019). Relationship between Nutritional Status and the Incidence of Anemia among Children Aged 6 Months - 3 Years. *1st International Conference of Health, Science & Technology (ICOHETECH)*, 56–58.
- Iswati, R. S., Ayu, D., & Rosyida, C. (2020). Optimalisasi Peran Keluarga Dalam Pencegahan Stunting Melalui Pelatihan Senam Bayi. *Jurnal Pengabdian Masyarakat*, 3(1), 102–107.
- Ministry of Human Health Development and Culture Coordinator. (2018). *Strategi Nasional Percepatan Pencegahan Anak Kerdil (Stunting)*. Central Jakarta. Retrieved from [www.wapresri.go.id](http://www.wapresri.go.id)
- Ministry of Health of the Republic of Indonesia, R. (2019). *Warta-Kesmas-Edisi-1-2019\_1357.pdf*.
- Ministry of Health of the Republic of Indonesia. (2019). *Wartakesmas; Gizi seimbang, Prestasi Gemilang*.
- Khasanah, D. P., Hadi, H., & Paramashanti, B. A. (2016). Waktu pemberian makanan pendamping ASI (MP-ASI) berhubungan dengan kejadian stunting anak usia 6-23 bulan di Kecamatan Sedayu. *Jurnal Gizi Dan Dietetik Indonesia (Indonesian Journal of Nutrition and Dietetics)*, 4(2), 105. [https://doi.org/10.21927/ijnd.2016.4\(2\).105-111](https://doi.org/10.21927/ijnd.2016.4(2).105-111)
- Kusuma, K. eka and N. (2013). Faktor Risiko Kejadian Stunting Pada Anak Usia 2-3 Tahun (Studi Di Kecamatan Semarang Timur). *Journal Of Nutrition College*, 2(4), 523–530. <https://doi.org/10.1111/1467-9868.00143>
- Latif, R. V. N., & Istiqomah, N. (2017). Determinan Stunting Pada Siswa Sd Di Kabupaten Pekalongan. *Unnes Journal of Public Health*, 6(1), 68. <https://doi.org/10.15294/ujph.v6i1.14108>
- Lissauer, T., & Clyden, G. (2012). *Illustrated Textbook of Paediatrics*. Elsevier. Retrieved from [https://books.google.co.id/books?id=-ZrGAAAQBAJ&pg=PA182&lpg=PA182&dq=FIGURE+11.1+Male+and+female+height+velocity+charts+\(50th+percentile\)+showing+the+determinants+of+childhood+growth.+The+fetal+and+infantile+phases+are+mainly+dependent+on+adequate+nutrition,+whereas+the+childhood+and+pubertal+phases+are+dependent+on+growth+hormone+and+other+hormones.+Adult+m ales+are+taller+than+females+as+they+have+a+longer+childhood+growth+phase,+their+peak +height+velocity+is+higher+and+their+growth+ceases+later.&source=bl&ots=GZO9aH0X-&sig=ACfU3U2edXoULisxQ7Qdt-1lrQJRFfp1Kg&hl=en&sa=X&sqi=2&ved=2ahUKEwiFmefPg\\_H6AhWmR2wGHSYLBoIQ6AF6BAgrEAI#v=onepage&q=FIGURE 11.1 Male and female height velocity charts \(50th percentile\) showing the determinants of childhood growth. The fetal and infantile phases are mainly dependent on adequate nutrition%2C whereas the childhood and pubertal phases are dependent on growth hormone and other hormones. Adult males are taller than females as they have a longer childhood growth phase%2C their peak height velocity is higher and their growth](https://books.google.co.id/books?id=-ZrGAAAQBAJ&pg=PA182&lpg=PA182&dq=FIGURE+11.1+Male+and+female+height+velocity+charts+(50th+percentile)+showing+the+determinants+of+childhood+growth.+The+fetal+and+infantile+phases+are+mainly+dependent+on+adequate+nutrition,+whereas+the+childhood+and+pubertal+phases+are+dependent+on+growth+hormone+and+other+hormones.+Adult+m ales+are+taller+than+females+as+they+have+a+longer+childhood+growth+phase,+their+peak +height+velocity+is+higher+and+their+growth+ceases+later.&source=bl&ots=GZO9aH0X-&sig=ACfU3U2edXoULisxQ7Qdt-1lrQJRFfp1Kg&hl=en&sa=X&sqi=2&ved=2ahUKEwiFmefPg_H6AhWmR2wGHSYLBoIQ6AF6BAgrEAI#v=onepage&q=FIGURE 11.1 Male and female height velocity charts (50th percentile) showing the determinants of childhood growth. The fetal and infantile phases are mainly dependent on adequate nutrition%2C whereas the childhood and pubertal phases are dependent on growth hormone and other hormones. Adult males are taller than females as they have a longer childhood growth phase%2C their peak height velocity is higher and their growth)

ceases later.&f=false

- Manggala, A. K., Kenwa, K. W. M., Kenwa, M. M. L., Sakti, A. A. G. D. P. J., & Sawitri, A. A. S. (2018). Risk factors of stunting in children aged 24-59 months. *Paediatrica Indonesiana*, 58(5), 205–212. <https://doi.org/10.14238/pi58.5.2018.205-12>
- Manungkalit, E. M., Nyoman, N., Arthina, S., & Kartiko, D. W. (2018). Hubungan Antara Karakteristik Ibu Dengan Pemberian Asi Desa Pananjung Kecamatan Cangkuang Kabupaten Bandung Tahun 2018, 2(4), 260–271.
- Mawaddah, S. (2019). Hubungan Pemberian ASI Eksklusif dengan Kejadian Stunting pada Balita Usia 24-36 Bulan. *Jurnal Berkala Kesehatan*, 5(2), 60. <https://doi.org/10.20527/jbk.v5i2.7340>
- Nasikhah, R., & Margawati, A. (2012). Prevalensi stunting di Jawa Tengah kejadian tertinggi di Kecamatan Semarang Timur. *Journal of Nutrition College*, 1(1), 176–184. Retrieved from [ejournal-s1.undip.ac.id](http://ejournal-s1.undip.ac.id)
- Nur Hadibah Hanum. (2019). Hubungan Tinggi Badan Ibu dan Riwayat Pemberian MP-ASI dengan Kejadian Stunting pada Balita Usia 24-59 Bulan. *Amerta Nutrition*, 3(2), 78–84. <https://doi.org/10.2473/amnt.v3i2.2019.78-84>
- Pangkong, M., Rattu, A. J. ., & Malonda, N. S. H. (2013). *Hubungan Antara Pemberian Asi Eksklusif Dengan Kejadian Stunting Pada Anak Usia 13-36 Bulan Di Wilayah Kerja Puskesmas Sonder. Sam Ratulangi*.
- Pramesti, SA, Fitriahadi, E, Candra, D. (2019). Faktor-Faktor yang Berhubungan dengan Stunting pada Balita Usia 12-36 Bulan di Posyandu Widosari 8 Yogyakarta. Skripsi. Repository Universitas Aisyiyah Yogyakarta.
- Rahmawati, V. E. (2018). Hubungan Panjang Badan Lahir dengan Kejadian Stunting pada Anak Balita Usia 0-59 Bulan di Kabupaten Jombang. *STIKES William Booth*. Retrieved from <https://jurnal.stikeswilliambooth.ac.id/index.php/Keb/article/view/250/289>
- Rambitan, W., Purba, R. B., Kapantow, N. H., Kesehatan, F., Universitas, M., Ratulangi, S., ... Batita, A. (2014). Hubungan antara Riwayat Pemberian ASI Eksklusif dengan kejadian Stunting Pada Anak Batita Diwilayah Kerja Puskesmas Kawangkoan Kabupaten Minahasa. *Universitas Sam Ratulangi Manado*, 167.
- Richardson, L., & Dutton, P. (2016). *Nutrition-WASH Toolkit: Guide for Practical Joint Actions Nutrition-Water, Sanitation and Hygiene (WASH)*. Retrieved from <https://www.unicef.org/eap/reports/nutrition-wash-toolkit-guide-practical-joint-actions>
- Roesli, U. (2012). *Inisiasi Menyusu Dini Plus ASI Eksklusif*. Jakarta: Pustaka Bunda.
- Soetjiningsih. (2016). *Tumbuh Kembang Anak*. Jakarta: EGC.
- Stephenson, tammy and Schiff, W. (2019). *Human Nutrition: Science for Healthy Living* (2nd ed.). new york: McGraw-Hill Higher Education.
- Supariasa, I. D. N., Bakri, B., & Fajar, I. (2012). *Penilaian Status Gizi Revisi*. Jakarta: Buku Kedokteran EGC.
- Supariasa, I. D. N., Bakri, B., & Fajar, I. (2016). *Penilaian Status Gizi* (2nd ed.). Jakarta: Kedokteran EGC.
- Susilaningrum, R., Nursalam, & Utami, S. (2013). *Asuhan Keperawatan Bayi dan Anak*. Jakarta: Salemba Medika.
- TNP2K. (2017). *100 Kabupaten/Kota Prioritas untuk Intervensi Anak Kerdil (stunting)*. Jakarta.
- Toliu, S. N. K., Malonda, N. S. ., & Kapantow, N. H. (2018). Hubungan Antara Tinggi Badan Orang Tua Dengan Kejadian Stunting Pada Anak Usia 24-59 Bulan Di Kecamatan Pasan Kabupaten Minahasa Tenggara. *Jurnal KESMAS*, 7(5), 5–9.
- Unicef/ WHO/The World Bank. (2019). Levels and Trends in Child malnutrition - Unicef WHO The World Bank Joint Child Malnutrition Estimates, key findings pf the 2019 edition. *Unicef*, 4. [https://doi.org/10.1016/S0266-6138\(96\)90067-4](https://doi.org/10.1016/S0266-6138(96)90067-4)

- United Nations-World Health Organization-The World Bank Group. (2019). UNICEF-WHO-The World Bank: Joint child malnutrition estimates - Levels and trends, p.1-15. Retrieved from <https://www.who.int/nutgrowthdb/estimates/en/>
- Walyani, E. S. (2015). *Perawatan Kehamilan dan Menyusui Anak Pertama agar Bayi Lahir dan Tumbuh Sehat*. Yogyakarta: Pustaka baru Press.
- Wanimbo, E., & Wartiningsih, M. (2020). Hubungan Karakteristik Ibu Dengan Kejadian Stunting Baduta (7-24 Bulan) Di Karubaga. *Jurnal Manajemen Kesehatan Yayasan RS.Dr. Soetomo*, 6(1), 83. <https://doi.org/10.29241/jmk.v6i1.300>
- Wardani, D. W. K. K., Ali, M., Khotimah, H., Nurdiana, Riawan, W., Primihastuti, D., ... Zakiah. (2018). The effect of *Centella asiatica* to the vascular endothelial growth factor and vascular endothelial growth factor receptor-2 on the rotenone induced zebrafish larvae (*Danio rerio*) stunting model. *GSC Biological and Pharmaceutical Sciences*, 5(2), 088–095. <https://doi.org/10.30574/gscbps.2018.5.2.0117>
- Wemakor, A., Garti, H., Azongo, T., Garti, H., & Atozona, A. (2018). Young maternal age is a risk factor for child undernutrition in Tamale Metropolis , Ghana. *BMC Research Notes*, 1–5. <https://doi.org/10.1186/s13104-018-3980-7>
- Yu, S. H., Mason, J., Crum, J., Cappa, C., & Hotchkiss, D. R. (2016). Differential effects of young maternal age on child growth. *Global Health Action*, 9(1), 1–13. <https://doi.org/10.3402/gha.v9.31171>

## Effectiveness of Papaya (*Carica papaya*) Leaf Extract Pills to Increase Breast Milk Production among Breastfeeding Women at Private Practice Midwife M Palangka Raya

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### ABSTRACT

Breast milk contains substances that are important and sufficient for the growth and development of infants. One of the efforts that can be performed to increase the rate of secretion and production of breast milk is through various types of (processed) food made from papaya leaves (*Carica papaya*). Papaya plants are widely grown throughout the tropics which contain the quercetin compound as a breast milk stimulant. This study aims to determine the effectiveness of papaya (*Carica papaya*) leaf extract pills to increase breast milk production among breastfeeding women. This was a pre-experimental study with One Group Pre-Test and Post-Test design. The population involved all women who exclusively breastfed infants aged 0-6 months at Private Practice Midwife Made, Palangka Raya City. The study samples consisted of 33 respondents who were selected using purposive sampling technique. Data were analyzed using the Paired sample T Test. The study results obtained z-statistics value of -5.011 with a probability of 0.000. Such findings showed that the probability value was < level of significance ( $\alpha=5\%$ ). Thus, it can be concluded that there was a significant difference in infant weight before and after administration of papaya (*Carica papaya*) leaf extract pills among breastfeeding women.

*ASI mengandung zat yang penting untuk tumbuh kembang bayi dan sesuai dengan kebutuhannya. Salah satu upaya yang dapat dilakukan untuk meningkatkan laju sekresi dan produksi ASI adalah melalui berbagai jenis makanan (olahan) asal daun pepaya (*Carica papaya*). Daun pepaya adalah tumbuhan yang banyak ditanam diseluruh daerah tropis yang mempunyai kandungan senyawa quercetin sebagai pelancar ASI. Tujuan dari penelitian ini adalah untuk mengetahui efektivitas Pil ekstrak daun pepaya (*carica papaya*) terhadap peningkatan produksi ASI ibu menyusui. Penelitian ini merupakan penelitian Pre eksperimental, dengan menggunakan desain One Group Pre-Test and Post – Test. Populasi seluruh ibu yang menyusui bayi usia 0-6 bulan secara eksklusif di Praktik Mandiri Bidan Made Kota Palangka Raya. Jumlah sampel 33 reponden dengan teknik pengambilan sampel Purposive Sampling. Uji analisis data menggunakan Uji Paired sample T Test. Hasil: Didapatkan hasil z - statistics yang dihasilkan sebesar -5.011 dengan probabilitas sebesar 0.000 Hal ini berarti probabilitas < level of significance ( $\alpha=5\%$ ). Hasil penelitian menyatakan terdapat perbedaan yang signifikan berat badan bayi sebelum dan sesudah pemberian pil daun pepaya (*carica papaya* bahwa) pada ibu menyusui.*

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### Introduction

Based on Government Regulation Number 33 of 2012 concerning Exclusive Breastfeeding, exclusive breastfeeding refers to breastfeeding infants for the first six months without any

additional/complementary food or other liquids except minerals, vitamins and drugs (Ministry of Health of the Republic of Indonesia, 2018).

Previous study found that infants who were breastfed for a duration of 6 months or more had a survival of 33.3 times better than infants who were breastfed for less than 4 months (Nurmiati and Besral, 2008). Longer duration of breastfeeding will avoid the risk of infectious diseases, such as gastrointestinal infections (diarrhea), respiratory tract infections, ear infections, as well as non-infectious diseases, such as allergies, obesity, and malnutrition (Yuliarti, 2015). Exclusive breastfed infants have a 1.62 times chance of experiencing normal growth than that of non-exclusive breastfed babies. On the other hand, infants who do not receive exclusive breastfeeding have a 21.0 times chance of experiencing growth disorders compared to infants who receive exclusive breastfeeding (Al Rahmad, 2017).

Breast milk contains substances that are important and sufficient for infant's growth and development. Many factors can affect breast milk production. Two hormones, prolactin and oxytocin, have an impact on the secretion and production of breast milk. Oxytocin has an effect on the process of producing breast milk, while prolactin has an effect on the amount of milk produced. Prolactin is related to maternal nutrition, the better the nutritional intake, the more production of breast milk (Zakaria, 2017). One of the efforts that can be performed to increase the rate of secretion and production of breast milk is through various types of (processed) food made from papaya (*Carica papaya*) leaves. Papaya plants are widely grown throughout the tropics and the leaf is one of the galactagogues that contains quercetin, which can help increase breast milk production by activating the hormone prolactin.. 100 grams of papaya (*Carica papaya*) leaves contain 18250 SI of Vitamin A, 0.15 milligrams of Vitamin B1, 140 milligrams of Vitamin C, 79 calories, 8.0 grams of protein, 2.0 grams of fat 11.9 grams of carbohydrates, 353 milligrams of calcium and 75.4 grams of water (Khasanah. et al, 2021). Therefore, researchers are interested in observing and conducting a study on the Effectiveness of Papaya (*Carica papaya*) Leaf Extract Pills to Increase Breast Milk Production among Breastfeeding Women.

## Methods

This was a pre-experimental study with one group pre-test and post-test design (Hidayat,2010). This study was conducted at Private Practice Midwife M in Palangka Raya in March-June 2021. The population in this study involved all women who exclusively breastfed infants aged 0-6 month at Private Practice Midwife Made in Palangka Raya City, totaling 65 respondents. The number of samples was 33 respondents who were selected through purposive sampling technique. Researcher provided intervention to the treatment group by giving papaya leaf extract in capsule form with a dose per 1 capsule contained 500 mg, which was taken 2 times a day in the morning and night for 7 days. Before giving the treatment, the researcher first weighed the infant using a baby scale. Then on day 8 the researcher weighed the baby for the second time. The indicator of the increase in breast milk production in this study was the infant weight. Data were analyzed using the Paired sample T Test.

## Results

**Tabel 1.** Maternal Eating Pattern

Maternal Eating Pattern	Frequency	Percentage
> 3 times	11	33.3%
3 times	22	66.7%
Total	33	100.0%

Based on the table 1, that 11 out of 33 (33.3%) infants involved in this study had mothers with eating pattern of more than 3 times a day. Meanwhile, the remaining 66.7% had mothers with eating pattern of 3 times a day. Thus, it can be said that most of women involved in this study had an eating pattern of 3 times a day.

**Tabel 2.** Breastfeeding Frequency

Breastfeeding Frequency	Frequency	Percentage
> 2 hours	10	30.3%
2 hours	23	69.7%
Total	33	100.0%

Based on the table 2, that 10 out of 33 (30.3%) infants involved in this study had mothers with breastfeeding frequency of more than 2 hours. Meanwhile, the remaining 69.7% had mothers with a breastfeeding frequency of 2 hours. Thus, it can be said that most of women involved in this study had a breastfeeding frequency of 2 hours.

**Tabel 3.** Infant Weight

	Min	Max	Mean	Std. Deviation
Day -0	2400.00	3500.00	2869.697	308.712
Day -8	2550.00	3680.00	3048.182	287.480

Based on the table 3, that the infant weight on the 3rd day was the lowest of 2400.00 grams and the highest was 3500.00 grams. Mean infant weight on the third day was 2869,697 grams with a standard deviation of 308,712 grams. The study findings indicated that the infant weight on the 3rd day was centered at  $2869.697 \pm 3048.712$  grams.

**Tabel 4.** Differences in Infant Weight Before and After administration of Papaya (*Carica Papaya*) Leaf Extract Pills among Breastfeeding Women

	Mean	Z statistics	Probability
Weight before intervention	2869.697		
Weight after intervention	3048.182	-5.011	0.000

Based on the test results listed in the table above, it can be seen that the resulting t statistics was -5.011 with a probability of 0.000. Such findings showed that the probability value was < level of significance ( $\alpha=5\%$ ). Thus, it can be concluded that there was a significant difference in infant weight before and after administration of papaya (*Carica papaya*) leaf extract pills among breastfeeding women. The mean body weight after administration of papaya (*Carica papaya*) leaf extract pills among breastfeeding mothers was higher than the mean weight before administration of papaya (*Carica papaya*) leaf extract pills among breastfeeding women.

## Discussion

The study results showed that there was a significant difference in infant weight before and after



administration of papaya (*Carica papaya*) leaf extract pills among breastfeeding women. The mean body weight after administration of papaya (*Carica papaya*) leaf extract pills among breastfeeding mothers was higher than the mean weight before administration of papaya (*Carica papaya*) leaf extract pills among breastfeeding women.

Phytochemical analysis of papaya leaves showed that papaya leaves contain alkaloids, phenols, flavonoids, saponins. In previous studies, it was found that administration of papaya leaf extract with a dose of 800 mg, for 7 days had an effect on the production of breast milk. This is due to the polyphenols and flavonoids contained in papaya leaf capsules which have a role in stimulate the oxytocin hormone to stimulate breast milk production and releasing prolactin to produce breast milk (Astutik, 2017). The calcium content in papaya leaves also affects the production of breast milk. The higher the calcium level, the more the prolactin secretion. Calcium is required by women for increasing breast milk secretion and production. (Pratiwi, 2017).

According to Entin (2016), a woman after childbirth is willing to consume a lot of papaya leaves is due an intention to increase milk production. Papaya leaves are very good for consumption for breastfeeding women because of the content of various substances including vitamins A, B1, calories, carbohydrate, fat, calcium, protein, phosphorus, water and iron. Vitamin B1 or thiamine is known as food hormone and plays a crucial role in the oxidation of carbohydrates for energy conversion. The body will have trouble breaking down carbohydrates if it does not have B1. Pregnant and lactating women need adequate intake of vitamin B1 and more than normal women because of the vitamin content B1 in breast milk is very dependent on the presence or absence of this vitamin in the food consumed (Amin, 2017).

The results of this study are in line with a study conducted by Endah Tri Wahyuni (2015), who observed the effectiveness of *Carica papaya* L on breast milk production at Private Practice Midwife Utami, in Ngagalik, Sleman, Yogyakarta. It was found that the mean breast milk production before consuming *Carica papaya* L was 56.50 with a standard deviation of 5.07020 and the mean production after consuming *Carica papaya* L was 59.43 with a standard deviation of 4.01440 with a significance of  $0.000 < 0.05$ . Thus, it was concluded that there was a significant difference in the mean breast milk production before and after consuming *Carica papaya* L. Thus, *Carica papaya* L could increase the secretion and production of breast milk. The additional food consumed by the mother also has a significant effect on the amount of breast milk produced. Additional food can be obtained from katuk leaves, Moringa leaves and also papaya leaves (Nuning, 2015). Women can get additional nutrition in the form of an extra drink of papaya leaves. Such drink contains compounds that can increase breast milk production. It should be given for 4 days from the 4th to 7th day postpartum, with the recommended consumption of 2x of 1 capsule which contains 550 mg (Suharti, 2017). Furthermore, supporting factors for the increase in the volume of breast milk is the good content of papaya leaves. One of the nutrients found in papaya leaves is protein. Protein is required by women during breastfeeding and can increase the secretion of milk because the nutritional content, especially the protein containing amino acids so as to stimulate the secretion of breast milk (Tory, 2016).

## Conclusions

There was a significant difference in infant weight before and after administration of papaya (*Carica papaya*) leaf extract pills among breastfeeding women. Based in the study results, the mean body weight after administration of papaya (*Carica papaya*) leaf extract pills to breastfeeding women was higher than the mean weight before administration of papaya (*Carica papaya*) leaf extract pills to breastfeeding women.

## References

- Al Rahmad, A. H. 2017. Breastfeeding and complementary feeding on the growth of infants aged 6–24 months. *Syiah Kuala Medical Journal*, 17(1), 4-14.
- Amin, M., Rehana., Jaya, H. 2017. *The Effectiveness of Rolling (Back) Massage on Breast Milk Production in Mothers PostSurgery Sectio Caesarea at Muhammadiyah Hospital Palembang*. IJEMC. Volume 2. Number 1:1-8.
- Astutik., RY 2014. *Breast and Lactation*. Jakarta: Salemba Medika.
- Ministry of Health of the Republic of Indonesia, 2016. *Indonesia Health Profile 2015*. Available in <http://www.depkes.co.id> accessed on 18 September 2019.
- Entin, W. 2016. Kinetics of Fermeability of Katuk Leaves (*Sauropusandrogynus L, Merr.*) Pare Leaves (*Masiordicacharantia L.*) and Papaya Leaves (*Caricia papaya L.*) in Cow Rumen.
- Hidayat. 2010. *Research Methods: Quantitative, Qualitative, and Combined Research. Edition First*. Jakarta : Prenamedia Group.
- Khasanah, U., & Anwar, M. C. (2021). The Effectiveness Of Suplementation Of Papaya Leaf Nanoparticles (*Carica Papaya L*) As An Alternative To Midwife Services In Increasing The Production Of Breast Milk (ASI).
- Nuning. 2015. *Economic Level and Mother's Motivation in Exclusive Breastfeeding for Infants Age 0-6 Months at Private Practice Midwife (BPS) Ummi Latifah Argomulyo, Sedayu Yogyakarta*. *Journal of Indonesian Nurses and Midwifery*. Volume 3. Number 2:116-122.
- Nurmiati, B. (2008). Duration of Breastfeeding on Infant Survival in Indonesia. *Makara Health*, 12(2).
- Pratiwi, R. 2017. The Relationship Between Parity With Correct Breastfeeding Skills In Postpartum Mothers. *Journal of Midwifery*. Volume 6. Number 2:5.
- Suharti JF Mamagkey. 2017. *Relationship between Family Support and Exclusive Breastfeeding for babies at Ranotana Weru Health Center*. *e-Journal of Nursing (eKp)*. Volume 6. Number 1:1-6.
- Tory, Mulyatim Koeswo, and Sujianto. 2016. Factors Affecting Waiting Time for Health Services in Relation to Outpatient Satisfaction of Internal Medicine Clinic Dr. Isaac Tulungagung. Volume 29. Number 3:252-257.
- Wahyuni, E. T., & Noviyanti, R. (2022, September). The Effectiveness of *Carica Papaya L* on Breast Milk Production in Pmb Utami's Wife and PMB Tutik Purwani Ngaglik Sleman Yogyakarta. In *Proceedings of The Conference on Multidisciplinary Research in Health Science and Technology (Vol. 1, No. 1)*.
- Yuliarti, 2015. *The Effect of Giving Green Bean Extract to Postpartum Mothers with Smooth Breast Milk Production at Bpm Yuni Widaryanti, Amd. Keb Sumbermulyo Jogoroto Jombang*. *Edu Health Journal*. Volume 5. Number 2:148-153.
- Zakaria, Z., Hadju, V., As'ad, S., & Bahar, B. 2017. 2017. *The Effect of Giving Moringa Leaf Extract on the Quantity and Quality of Mother's Milk (ASI) in Breastfeeding Mothers of Infants 0-6 Months*. *Indonesian Public Health Media*. Volume 12. Number 3:161-169.

## Effect of Ethanol Extract of Red Beetroot (*Beta vulgaris L.*) on the Follicle Stimulating Hormone Levels among Wistar Rats (*Rattus norvegicus*) Exposed to Cigarette Smoke

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### ABSTRACT

Ethanol extract of red beetroot (*Beta vulgaris L.*) contains chemical compounds of ascorbic acid, carotenoid, phenolic acid, betalain, and flavonoids. Red beetroot supplements can prevent oxidative damage to the structure of DNA, lipids and proteins in vitro. This study aims to prove that the ethanol extract of red beetroot (*Beta vulgaris L.*) has an effect on increasing FSH levels among female white rats (*Rattus norvegicus*) exposed to cigarette smoke. This was an experimental study with the post-test only control group design. The current study involved 25 female rats which were assigned into 5 groups: negative control, positive control, treatment I, II and III. The doses of red beetroot extract used were PI (125 mg/kgBW/day), PII (250 mg/kgBW/day), and PIII (500 mg/kgBW/day). Data were analyzed using One Way ANOVA with p-value of FSH ( $p = 0.000$ ). The results of the study proved that administration of red beetroot ethanol extract at a dose of 500 mg/kgBW/day could increase the ovarian FSH levels among female rats exposed to cigarette smoke.

Ekstrak etanol bit merah (*Beta vulgaris L.*) memiliki kandungan senyawa kimia: asam askorbat, karotenoid, asam fenolik, betalain, serta flavonoid. Suplemen bit merah dapat menghindari terjadinya kerusakan oksidatif pada lipid, struktur DNA, dan protein secara in vitro. Tujuan riset ini untuk membuktikan bahwa ekstrak etanol bit merah (*Beta vulgaris L.*) memiliki pengaruh terhadap kenaikan kadar FSH pada tikus putih (*Rattus norvegicus*) betina yang dipapar dengan asap rokok. Desain penelitian eksperimen dengan rancangan post-test only control group design. Riset ini menggunakan 25 ekor tikus betina yang dipisah menjadi 5 kelompok: kelompok kontrol negatif, kontrol positif, perlakuan I, II serta III. Dosis ekstrak bit yang digunakan masing-masing ialah PI (125 mg/kgBB/hari), PII (250 mg/kgBB/hari), PIII (500 mg/kgBB/hari). Analisa data menggunakan One-Way ANOVA dengan p-value FSH ( $p = 0.000$ ). Hasil riset membuktikan jika pemberian ekstrak etanol bit merah dengan dosis 500 mg/kgBB/hari dapat menambah kadar FSH pada ovarium tikus yang dipapar asap rokok.

### Introduction

One of the bioactives that can be used as an antioxidant to counteract free radicals is betacyanin. Betacyanin is a water-soluble pigment, which gives vegetables, fruits and flowers their purple, blue and red colors. Betacyanin is also a type of polyphenol and is included in a group of flavonoids that contain antioxidants (Ramadhan, 2015). A study conducted by Husna (2013) reported that the higher the betacyanin content, the higher the antioxidant effect. Zhao (2013) also revealed that the antioxidant effect on betacyanin from beetroots could increase the expression of antioxidant enzymes (Indu *et al.*, 2017). Betacyanin contained in red beetroots is known to have anti-radical effects and high antioxidant activity (Mastuti, *et al.*, 2010).

Ethanol extract of red beetroot (*Beta vulgaris L.*) contains chemical compounds including ascorbic acid, phenolic acids, carotenoids, betalains, and flavonoids, which also function as antioxidants, anti-cancer, antimicrobial, anti-anaemic, anti-malarial and anti-inflammatory, which have high levels of antioxidant and anti-inflammation both in in vivo and in vitro performed on several animal models. Red beetroot supplements can prevent oxidative damage to the structure of DNA, lipids and proteins in vitro (Clifford *et al.*, 2015). Such damage can result in inhibition of GnRH pulses which further cause disturbances in the synthesis and secretion of Luteinizing Hormone (LH) and Follicle Stimulating Hormone (FSH) (Armstrong, 2010). Both of these hormones are necessary for the development of male and female gonads and are important for the processes of spermatogenesis and oogenesis. Disruption of the function of the hypothalamus may interfere with endocrine functions, including reproductive hormones, thereby affecting the process of folliculogenesis (Camihort, 2004). In this case, infertility is a reproductive health problem that affects 8-10% of reproductive couples in the world. Based on Basic Health Research data (2014), smoking behavior of the population aged  $\geq 15$  years increased from 2007 to 2013, from 34.2% (2007), 34.7% (2010) to 36.3% (2013). Data derived from the National Socioeconomic Survey (Susenas) and the Household Health Survey (SKRT) also showed an increase in the prevalence of smokers aged  $\geq 15$  years by 27% (1995), 31.5% (2001), and 34.4% (2004). Based on WHO records, known causes of infertility in women include fallopian tube factor by 36%, ovulation disorders by 33%, endometriosis by 6%, and other unknown factors by 40%. Thus, most infertility problems in women are caused by disorders of the reproductive organs or disturbances in the ovulation process (Kumalasari, 2012). This study aims to prove whether the antioxidants found in beetroot can increase FSH levels in the ovaries of female white rats.

## Methods

This was an experimental study with the post-test only control group design. This study was conducted in 3 sites, namely in the Biomedical, Anatomical Pathology and Pharmacology Laboratories, Faculty of Medicine, Brawijaya University. The Pharmacology Laboratory was a site for *Rattus norvegicus* maintenance and treatments of experimental animals namely administration of ethanol extract of red beetroot (*Beta vulgaris L.*), exposure to cigarette smoke, surgery and sampling. Biomedical Laboratory of the Faculty of Medicine was a laboratory for measuring ovarian FSH levels in *Rattus norvegicus* using the Enzyme Linked Immunosorbent Assay (ELISA) of FSH ELISA Kit brand cusabio catalog number CSB-E06869r produced by the United States. This study involved the samples of 30 female white rats (*Rattus norvegicus* wistar strain) with a weight of 150 grams, respectively. The cigarettes used were unfiltered clove cigarettes. The tools used were a smoking pump, gastric tube and FSH antibodies. Twenty-five white rats were acclimatized for 7 days to adapt to the new environment, then the rats were examined and assigned into 5 groups, namely the negative control group (no treatment), positive control group (exposed to cigarette smoke of 2 cigarettes/day without red beetroot extract), treatment I (exposed to cigarette smoke of 2 cigarettes/day along with red beetroot ethanol extract at a dose of 125 mg/kgBW/day), treatment II (exposed to cigarette smoke of 2 cigarettes/day

along with red beetroot ethanol extract at a dose of 250 mg/kgBW/day), treatment III (exposed to cigarette smoke of 2 cigarettes/day along with red beetroot ethanol extract at a dose of 500 mg/kgBW/day). After being treated for 56 days, the rats were killed and blood serum was taken from the heart and ovarian organs. Data analyzed using the One-Way ANOVA test, and if the difference was significant, data were then proceed with the Least Significant Difference (LSD) test.

**Table 1.** Experimental animal chart

Observational Group	n
Negative control	5
Positive control	5
P1 (Beetroot extract of 125 mg/KgBW/day)	5
P2 (Beetroot extract of 250 mg/KgBW/day)	5
P3 (Beetroot extract of 500 mg/KgBW/day)	5

## Results

**Table 2.** Effects of exposure to cigarette smoke on FSH levels in rat ovaries

Observational group	n	Mean $\pm$ SD	P-value
negative control	5	55.23 $\pm$ 8.42 <sup>a</sup> ng/mL	
positive control	5	11.07 $\pm$ 2.26 <sup>b</sup> ng/mL	
P1 (Beetroot extract of 125 mg/KgBW/day)	5	20.80 $\pm$ 7.46 <sup>c</sup> ng/mL	0.000 $<$ $\alpha$
P2 (Beetroot extract of 250 mg/KgBW/day)	5	26.85 $\pm$ 4.30 <sup>c</sup> ng/mL	
P3 (Beetroot extract of 500 mg/KgBW/day)	5	37.82 $\pm$ 9.14 <sup>d</sup> ng/mL	

Table 2 was shown that there was a significant difference in the mean FSH levels between the negative control group (55.23 $\pm$ 8.42a ng/mL) and the positive control group with rats exposed to cigarette smoke (11.07 $\pm$ 2.26b ng/mL). It could be observed that the mean FSH levels in the positive control group was lower than the mean FSH levels in the negative control group. Such finding indicated that rats exposed to cigarette smoke had lower FSH levels when compared to healthy rats. In other words, exposure to cigarette smoke in *Rattus norvegicus* rats could decrease FSH levels. Likewise, the mean FSH levels of the negative control group (55.23 $\pm$ 8.42a ng/mL) was significantly different from the P1 group (20.80 $\pm$ 7.46c ng/mL), the P2 group (26.85 $\pm$ 4.30 c ng/mL) and the P3 group (37.82 $\pm$ 9.14d ng/mL). It could be observed that the mean FSH levels in the negative control group was much higher than that of the other groups.

## Discussion

Based on the results of this study, it was found that the positive control group (which was exposed to cigarette smoke of 2 cigarettes per day and without red beetroot (*Beta vulgaris L.*)) showed a significant decrease in the serum FSH levels compared to the negative control group. Armstrong (2010) states that inhibition of FSH hormone production can be due to oxidative stress from cigarette smoke through inhibition of GnRH pulsation through GABA, a receptor system that interferes with the synthesis and secretion of Follicle Stimulating Hormone (FSH). Cigarette smoke is involved in free radical. Unpaired electrons in reactive oxygen compounds make up free radicals. By forming new radicals, these compounds or atoms attempt to reach a stable state by attracting additional electrons. This free radical reaction takes place in a cascade (cascade reaction) so that it can cause an increase in oxidative stress either directly or indirectly (Kelly, 2002; Ratnawati, 2014). As a result of increased

oxidative stress, lipid peroxide will occur which further cause damage to the arcuate nucleus and ventromedial nucleus in the hypothalamus and impaired hypothalamic GnRH synthesis and secretion (Kardi, 2015). Administration of red beetroot (*Beta vulgaris L.*) with several dose levels in this study revealed that the increase in FSH levels in the positive control group at a dose of red beetroot (*Beta vulgaris L.*) of 500 mg/kgBW led to the highest mean FSH levels than the other doses. Based on the results of this study, it was found that the dose of red beetroot (*Beta vulgaris L.*) which increased serum FSH levels more quickly in female white rats exposed to cigarette smoke was 500 mg/kg BW (treatment P3) compared to 125 mg/kgBW and 250 mg/kgBW. The study finding is in accordance with a study conducted by AL-Olayan (2014) concerning the effect of pomegranate juice containing flavonoids including red beetroot (*Beta vulgaris L.*) which could significantly increase the serum FSH levels in male rats exposed to carbon tetrachloride free radicals. The study finding is also in accordance with a study conducted by Sa'adeya (2014) concerning the effect of green tea polyphenols as bioactive similar to red beetroot (*Beta vulgaris L.*) among female rats with oxidative stress which found that there was an increase in FSH levels among white rats with oxidative stress.

## Conclusions

It can be concluded that exposure to cigarette smoke of 2 cigarettes/day without the administration of red beetroot ethanol extract (positive control group) could decrease FSH levels in rat ovaries. Furthermore, there was an increase in FSH levels in treatment I (exposed to cigarette smoke of 2 cigarettes/day along with red beetroot ethanol extract at a dose of 125 mg/kgBW/day), treatment II (exposed to cigarette smoke of 2 cigarettes/day along with red beetroot ethanol extract at a dose of 250 mg/kgBW/day), treatment III (exposed to cigarette smoke of 2 cigarettes/day along with red beetroot ethanol extract at a dose of 500 mg/kgBW/day).

## References

- Al-Olayan, E.M., El-Khadragy, MF., Aref, A.M., Othman, MS., Kassab, RB., and Moneim, A.E.A. (2014). The potential Protective Effect of *Physalis peruviana L.* Against Carbon Tetrachlorine-induced Hepatotoxicity in Rats Is Mediated by Suppression of Oxidative Stress and Downregulation of MMP-9 Expression, *Oxidative Medicine and Cellular Longevity J.*, 1-2.
- Amstrong, S.P., Caunt, C.J., Craig, A.M. (2010). Pulsatile And Sustained Gonadotropin-releasing Hormone (GnRH) Receptor Signaling. *Journal Biological Chemistry.* 285(32) : 24360-24371
- Basic Health Research. Report on the Results of Indonesian Basic Health Research in 2014. Jakarta: Research and Development Agency of the Ministry of Health of the Republic of Indonesia; 2014.
- Camihort, G., Dumm, CG., Luna, G., Ferese C., Jurad S., Moreno G. 2004. Relationship Between Pituitary and Adipose Tissue After Hypthalamic Denervatin in Female Rat. *Cell Tissue Organs.* 179: 192-201.
- Clifford, T., Howatson, G., West, J.D., and Stevenson, J.E. (2015). The Potential Benefits of Red Beetroot Supplementation in Health and Disease. *Nutrient.* 7(4), pp: 2801-2822. doi: 10.3390/nu7042801.
- Husna, N. El, Novita, M., & Rohaya, S. (2013). Anthocyanins Content and Antioxidant Activity of Fresh Purple Fleshed Sweet Potato and Selected Products. *Agritech,* 33(3), 296–302.

- Indu, R., Adhikari, A., Ray, M, Alok K. Hazra, A.K., Tapas, K. Sur, T.K., and Das, A.K. (2017). Antioxidant properties of polyphenolic rich HPLC standardized extract of Beta vulgaris L. roots. *International Journal of Research and Development in Pharmacy & Life Science*. 6(3): 2619-2624.
- Kardi. (2015). Pemberian Glutathion Pada Mencit Jantan Dewasa Yang Terpapar Asap Rokok Dapat Meningkatkan Motilitas Progresif Spermatozoa. Program Magister Ilmu Biomedik Universitas Udayana Denpasar.
- Kelly G.N.D. 2002. The Interaction of Cigarette Smoking and Antioxidants Part II. Alpha-Tocopherol. *Altern Med Rev*. 6 : 500-511.
- Kumalasari, Intan and Andhyantoro, Iwan. 2012. Kesehatan Reproduksi untuk Mahasiswa Kebidanan dan Keperawatan. Jakarta: Salemba Medika.
- Mastuti, R. 2010. Identifikasi Pigmen Betasianin Pada Beberapa Jenis Inflorescence Celosia. *Jurnal Biologi UGM*. 10(4): 224-236
- Ratnawati, R.S.N., Saputri, I.N., Ratnawati, R., Soeharto, S., dan Wiyasa, I.W.A. (2014). The effect of Alpha tocopherol on oxidative stres and ovarian function in Rats exposed to tobacco smoke. *Cukorova medical journal*. Vol 39 (2) : 203-312
- Ramadhan. (2015). Mengenal Antioksidan. Yogyakarta: Graha Ilmu.
- Sadeu J.C., Foster W.G. (2011). Cigarette Smoke Condensat Exposure Delays Follicular Development and Function in a Stage Dependent Manner. *Fertility and Sterility*. **95**:7.
- Sa'adeya, A.A., Al-Lebawi, Z. (2014), Use of Green Tea Polyphenois In Ameliorates Cadmiumsulfate Toxic Effectson Wisterrat's Female Reproductive System. *Journal of Agricultura and Veterinary Science* **7**(8): 72-8
- Zhou, Y., Jorgensen, E.M., Gan, Y., and Taylor, H.S. (2013). Cigarette Smoke Increases Progesterone Receptor and Homebox A10 Exprssion in Human Endometrium and Endometrial Cells : A Potential Role in Decreased Prevalence of Endometrial Pathology in Smokers. *Journal Biology of Reproduction* **84**: 1242-1247