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Relationship Between Menarch Age and Dysmenorrhea Pain in Female Students

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Abstract

Dysmenorrhea can cause disruption of several activities such as lower academic achievement, inhibit sleep performance and quality, have a negative impact on mood, and cause anxiety and depression. Several studies state that dysmenorrhea can interfere with daily activities. approximately 10-15% of women are absent from school and lost time at work caused by dysmenorrhea. This study aims to determine the relationship between menarche and the incidence of dysmenorrhea in female students at Al-Mabrur Islamic Boarding School. This research is quantitative research, using primary data (questionnaire). The research method uses a cross-sectional method with the aim of knowing the relationship between the independent variables and the dependent variable. Data was collected using a questionnaire and analyzed using the chi-square test. The number of samples was 91 female students who had experienced menstruation, the samples were obtained using the total sampling technique. The result of the calculation of the Pearson chi-square statistical test is 20.883 while the chi-square table is 5.991. This means that the calculated chi-squared value is greater than the table chi-squared value. The p-value is 0.000 while the significant level is 0.05. This means that the p-value is smaller than the significant level. The conclusion is that there is a relationship between the age of menarche and dysmenorrhea.

Keywords: menarche, dysmenorrhea, female students

Dismenore dapat menyebabkan terganggunya beberapa aktivitas seperti menurunkan prestasi akademik, menghambat kinerja dan kualitas tidur, berdampak negatif pada suasana hati, serta menimbulkan kecemasan dan depresi. Beberapa penelitian menyatakan bahwa dismenore dapat mengganggu aktivitas sehari-hari. sekitar 10-15% wanita tidak masuk sekolah dan kehilangan waktu kerja yang disebabkan oleh dismenore. Penelitian ini bertujuan untuk mengetahui hubungan antara menarche dengan kejadian dysmenorrhea pada santri putri di Pesantren Al-Mabrur. Penelitian ini merupakan penelitian kuantitatif, dengan menggunakan data primer (kuesioner). Metode penelitian menggunakan metode cross-sectional dengan tujuan untuk mengetahui hubungan antara variabel bebas dan variabel terikat. Data dikumpulkan dengan menggunakan kuesioner dan dianalisis dengan menggunakan uji chi-square. Jumlah sampel sebanyak 91 siswi yang telah mengalami menstruasi, sampel diperoleh dengan menggunakan teknik total sampling. Hasil perhitungan uji statistik chi square Pearson adalah 20,883 sedangkan chi square tabel adalah 5,991. Artinya nilai chi kuadrat hitung lebih besar dari nilai chi kuadrat tabel. Nilai p adalah 0,000 sedangkan tingkat signifikan adalah 0,05. Artinya p-value lebih kecil dari taraf signifikan. Kesimpulannya adalah ada hubungan antara usia menarche dengan dismenore.

Kata Kunci: menarche, dysmenorrhea, mahasiswi

Introduction

Adolescence is a transitional age from children to adults. This period is very important as a determinant of reproductive health. Dysmenorrhea is a health problem that can interfere with daily activities. Epidemiological data from the results of a study show that there are still many young women in Indonesia who experience dysmenorrhea, as indicated by the prevalence data for dysmenorrhea in Indonesia of 64.2%.

Dysmenorrhea has an adverse effect on the lives of adolescents, Bernardi et al., (2017) suggest "Dysmenorrhea can cause disruption to several activities such as lower academic achievement, inhibit sleep performance and quality, have a negative impact on mood, and cause anxiety and depression". Several studies state that dysmenorrhea can interfere with daily activities. approximately 10-15% of women are absent from school and lost time at work caused by dysmenorrhea.

World Health Organization (WHO) data for 2017 shows the incidence of dysmenorrhea of 1,769,425 people (90%) of women who experience dysmenorrhea with 10-16% experiencing severe dysmenorrhea. In Indonesia, the incidence of dysmenorrhea is estimated at 64.25% consisting of 54.89% primary dysmenorrhea (menstrual pain without any abnormalities in the reproductive organs, most often occurs in women who have never been pregnant) and 9.36% secondary dysmenorrhea (painful menstruation accompanied by anatomical abnormalities of the reproductive organs). Central Java Province in 2018 had a population of 34,490,835 people with a total of 2,719,115 young girls aged 10-19 years (BPS, 2018). A total of 1,518,867 people or 55% experienced dysmenorrhea in Central Java Province (Octaviani et al., 2019)

One study found that the highest proportion of dysmenorrhea was found in adolescents aged 14-16 years and the age range of menarche was 11-12 years. The earlier age of menarche <12 years causes the reproductive organs not to function optimally and are not ready to experience changes that cause pain during menstruation. In addition, a younger age is also related to the cervix which is still narrower in nature, resulting in pain during menstruation. Dysmenorrhea experienced by the majority of young women has a

considerable impact such as decreased concentration and motivation to learn in individuals. This causes adolescents to be unable to participate in learning activities to the fullest and often even causes absence from school (Silaen & Ani, 2019).

In addition, early menarche can also cause various problems, one of which is dysmenorrhea. Dysmenorrhea is a condition that is felt before or during menstruation and is characterized by pain or cramps in the lower abdomen that arise due to contractions in the myometrium in the form of pain and not due to a particular disease. The first menstruation or menarche experienced by women of childbearing age (WUS) is an early sign of a woman's entry into the reproductive period. The longest age to get menarche is 16 years. The age of getting menarche is uncertain or varies, however, there is a tendency that from year to year, teenage women get their first menstruation at a younger age. Early menarche is the first menstruation experienced by a fertile woman under the age of 12 years.

Method

This type of research is correlation analytic, namely research conducted to determine the relationship between two variables (Notoatmodjo, 2005). In this study was conducted to determine the relationship between menarche age and the incidence of dysmenorrhea. The design of this study used a cross-sectional survey, namely the data collection method carried out at the same time. The purpose of this method is to obtain complete data in a relatively short time (Arikunto, 2006). In this study, menarche age and dysmenorrhea pain were measured at the same time. The number of samples in this study was 91 female students who had experienced menstruation.

Result and Discussion

Table 1. Cross-tabulation of the relationship between menarche age and dysmenorrhea pain

Dysmenorrhea pain level	Menarche age				Total	%	ρ value
	<12 years		>12 years				
	F	%	F	%			
Mild pain	12	80	3	20	15	100	
Moderate pain	35	76,1	11	23,9	46	100	0,000
Severe pain	5	16,7	25	83,3	30	100	

Total	28	30,8	63	69,2	91	100

The result of the calculation of the Pearson chi-square statistical test is 20.883 while the chi-square table is 5.991. This means that the calculated chi-squared value is greater than the table chi-squared value. The p-value is 0.000 while the significant level is 0.05. This means that the p-value is smaller than the significant level. The conclusion is that there is a relationship between the age of menarche and dysmenorrhea.

Menstruation or menstruation is a natural process that occurs repeatedly every month in normal women from puberty to menopause which is accompanied by bleeding. The arrival of this period repeatedly is called the menstrual cycle. The normal menstrual cycle is 28 days. However, for some women, this cycle is irregular and varies between 22-25 days. Menstruation that must be experienced by young women can cause problems, one of which is dysmenorrhea. Dysmenorrhea is the most common gynecological problem experienced by women, both adult women and women in their teens. Menstrual pain/dysmenorrhea is an imbalance of the hormone progesterone in the blood, causing pain to arise.

Menarche is the first menstruation or blood that comes out of a woman's vagina when she is healthy, not caused by giving birth to a child or because of an injury, usually occurring in women aged 12-13 years. Under normal circumstances, menarche is preceded by a maturation period which can take up to 2 years. Menarche is a sign of the beginning of puberty in girls. During this period, a woman needs the attention of her parents, because, from the first menstrual period, it means that there is a possibility of becoming pregnant if she has sex with the opposite sex.

Based on the menarche age cross-tabulation table (table 1.1) it is known that 35 respondents who experienced moderate pain dysmenorrhea experienced menarche age at the age of <12 years. This shows that respondents who experience dysmenorrhea can be influenced by the age of menarche <12 years. This is in line with the results of research (Rosanti, 2017) on class VIII students of SMP Negeri 1 Ungaran with the result that there is a relationship between the age of menarche and dysmenorrhea (p=0.029). At the age of menarche 11-16 years, there were 65.6% and 56.3% experienced dysmenorrhea. This is due to different nutrition in adolescents. A child with good nutritional intake will have a faster

menarche and menopause will be slower, causing pain during menstruation.

Dysmenorrhea is one of the characteristics of endometriosis, which is a disease that can cause infertility in women. This condition needs to be considered because every teenager who experiences dysmenorrhea has a risk of later experiencing infertility (Janssen et al., 2013). The presence of abdominal pain in women during menstruation (dysmenorrhea), accompanied by pelvic pain, and infertility is a classic triad of symptoms used to diagnose endometriosis. Endometriosis occurs in almost 10% of women of reproductive age and more than 25-40% of infertile women (Andalas et al., 2019).

Conclusion

The result of the calculation of the Pearson chi-square statistical test is 20.883 while the chi-square table is 5.991. This means that the calculated chi-squared value is greater than the table chi-squared value. The p-value is 0.000 while the significant level is 0.05. This means that the p-value is smaller than the significant level. The conclusion is that there is a relationship between the age of menarche and dysmenorrhea. Of respondents who experienced moderate pain dysmenorrhea, as many as 35 people experienced menarche at the age of <12 years. This shows that respondents who experience dysmenorrhea can be influenced by the age of menarche <12 years.

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Relationship of Mother Characteristics, Knowledge, Husband Support with Participation in Pregnant Women Classes

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Abstract

Pregnant Mother Class is a means to learn together about health for pregnant women, in the form of face-to-face groups which aims to increase the knowledge and skills of mothers regarding pregnancy, pregnancy care, childbirth, postnatal care, care for newborns, myths, infectious diseases. and birth certificates. This study aims to determine the participation of pregnant women in the class of pregnant women and the factors that influence it. This was a cross-sectional study conducted in the Catchment Area of Primary Health Center (PHC) Denpasar. A sample of 50 trimester III pregnant women, either primiparous or multiparous, who came and participated in the class of pregnant women mothers was obtained through multistage sampling. Data were gained via interviews using a structured questionnaire. Determinants were analyzed using chi-square. The results of the research found that most of them (68%) actively participated in the class of pregnant women. The results of bivariate analysis showed that there is a significant relationship between parity (p=0.03), knowledge (p=0.00), husband's support (p=0.01), with the participation of mothers in pregnant women classes.

Keywords: characteristics, knowledge, support, class of pregnant women

Kelas Ibu Hamil merupakan sarana untuk belajar bersama tentang kesehatan bagi ibu hamil, dalam bentuk tatap muka dalam kelompok yang bertujuan untuk meningkatkan pengetahuan dan keterampilan ibu-ibu mengenai kehamilan, perawatan kehamilan, persalinan, perawatan nifas, perawatan bayi baru lahir, mitos, penyakit menular dan akta kelahiran. Tujuan penelitian ini adalah mengetahui keikutsertaan ibu hamil mengikuti kelas ibu hamil dan faktor yang mempengaruhinya. Desain penelitian ini adalah cross-sectional analitik. Subjek penelitian menggunakan 50 ibu hamil trimester III baik primipara atau multipara yang datang dan ikut serta kelas ibu hamil di wilayah Puskesmas Kota Denpasar dengan analisis yang digunakan adalah chi-square. Hasil penelitian didapatkan sebagian besar (68,0%) responden aktif mengikuti kelas ibu hamil. Hasil bivariat menunjukkan terdapat hubungan yang signifikan antara paritas (p= 0,03), pengetahuan (p= 0,00), dukungan suami (p= 0,01) dengan keikutsertaan ibu mengikuti kelas ibu hamil.

Kata Kunci: karakteristik, pengetahuan, dukungan, kelas ibu hamil

Introduction

The Maternal Mortality Rate (MMR) is an important indicator of public health status. In 2015, based on data from the 2015 Inter-Census Population Survey (SUPAS) 2015, both MMR and IMR showed a decline where MMR became 305/100,000 KH and IMR 22.23/1000 KH. In Bali Province, the number of maternal deaths in 2017

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reached 45, reaching the set target of 95/100,000 KH.

Causes of maternal death include bleeding 12.24% in 2013, 25% in 2014, 20% in 2015, 18% in 2016 and 23.91% in 2017. Most causes of maternal death in Bali Province are due to non-obstetric causes, namely causes other than pregnancy and childbirth, including in 2013 it was 59.18%, in 2014 it was 47.92%, in 2015 it was 50.91%, in 2016 it was 60% and in 2017 it was 58% (Bali, 2017).

The regional government's commitment through related regional apparatuses has also made efforts such as the existence of the Movement to Love Mothers at the sub-district level. In order to be able to reduce the IMR significantly after reaching a very low number is indeed very difficult, because infant mortality is influenced by various factors, especially maternal factors before pregnancy as well as during pregnancy and childbirth. The efforts in the health sector that have been made to reduce infant mortality and under-five mortality rates include integrated Ante Natal Care, Organizing Mother Classes, Providing Supplemental Food (PMT) for pregnant women with Caloric Energy Deficiency (KEK), Provision of iron tablets (FE) for young women, Maternity Guarantee Program in Districts/Cities, Mother and Child Referral System, Family Planning Services.

One of the improvements in midwifery services to reduce maternal, infant, and toddler mortality is the class of pregnant women. The class program for pregnant women is a means to learn together about health for pregnant women, in the form of face-to-face meetings in groups with the aim of increasing the knowledge and skills of mothers regarding pregnancy, pregnancy care, childbirth, postpartum care, newborn care, myths, infectious diseases, and birth certificates (RI, 2011).

Factors that influence health behavior (participation of pregnant women to attend classes of pregnant women) include factors of maternal characteristics, namely age, education, employment, parity, predisposing factors including knowledge, attitudes, interests, social culture (customs), supporting factors including facilities health services, driving factors include family support, motivation, health workers and socio-economic (Notoatmodjo, 2018). Implementing classes for pregnant women at Health Centers throughout Denpasar City was carried out to reduce the maternal and infant mortality rates that occurred at that time.

Method

The design of this research is analytic with a cross-sectional approach. This research was conducted in Community Health Centers throughout Denpasar City. The sample in this study were pregnant women in their third trimester, both primiparas and multiparas, who came and took part in the class of pregnant women, totaling 50 people using a non-probability sampling technique. multistage sampling. Data were collected by interview method using a standardized questionnaire for the knowledge variable and for the support variable questionnaire made by the researcher. Data were analyzed descriptively and bivariate with the Chi-Square test.

Result and Discussion

The results of a descriptive analysis of the characteristics of respondents at the Denpasar City Health Center can be seen in the following table:

Table 1. Frequency distribution of Respondent Characteristics at Denpasar City Health Center

Characteristics	n	%
Education		
Low Education (Elementary/Junior High School)	0	0
Higher Education (SMA-PT)	50	100.0
Age		
<35 years	47	94.0
≥35 years old	3	6.0
Parity		
1 person	19	38.0
>1 person	31	62.0
Work		
Doesn't work	15	30.0
Work	35	70.0

Based on Table 1, it can be seen that all of them, namely 50 respondents (100%) have higher education, almost all of them, namely 47 respondents (94.0%) aged <35 years, the majority, namely 31 respondents (62.0%) have parity> 1 person, the majority of which is 35 respondents (70.0%) work.

Table 2. Frequency Distribution of Pregnant Women's Class Participation to Respondents at the Denpasar City Health Center

Pregnant Women Class Participation	N	%
Active	34	68.0
Not active	16	32.0

Based on table 2 shows that out of 50 respondents the majority, namely 34 respondents (68.0%), actively attended classes for pregnant women

Table 3. Bivariate Analysis of Pregnant Women's Participation in Pregnant Women's Classes at the Denpasar City Health Center

Variable	Pregnant Women Class Participation		95% CI	p value
	Active n(%)	Not active n(%)		
Age				
<35 years	32 (64.0)	15 (30.0)	0.07-11.1	0.69
≥35 years old	2 (4.0)	1 (2,0)		
Education				
Low	0 (0)	0 (0)	-	-
Tall	34 (68.0)	16 (32.0)		
Parity				
1 child	8 (16.0)	11 (22.0)	1.9-26.7	0.03
>1 child	26 (52.0)	5 (10.0)		
Work				
Doesn't work	9(18.0)	6(12.0)	0.4-5.9	0.31
Work	25(50,0)	10(20,0)		
Knowledge				
Not enough	3 (6,0)	12 (24.0)	6.0-159.5	0.00
Good	31 (62.0)	4 (8.0)		
Husband Support				
Not enough	2 (4.0)	8 (16.0)	2.8-90.4	0.01
Good	32 (64.0)	8 (16.0)		

Based on the table 3, it can be informed that the variables parity, knowledge, and husband's support are related to the participation of mothers in pregnant women classes. In the parity variable, most of the 26 respondents (52.0%) who had parity > 1 person attended the class of pregnant women, with a p value of 0.03 and 95% CI: 1.9-26.7, which means there is a relationship between parity with the participation of mothers in pregnant women classes. In the knowledge variable, most of the 31

respondents (62.0%) who had good knowledge attended classes for pregnant women with a p-value of 0.00 and 95% CI: 6.0-159.5, which means there is a relationship between knowledge and the participation of mothers attend classes for pregnant women. Regarding husband support, the majority of 32 respondents (64.0%) who received husband support attended classes for pregnant women, with a p-value of 0.01 and 95% CI:

1. **Mother's Participation in Pregnant Women Classes**

Based on the results of the study showed that the majority (68%) of mothers actively attended classes for pregnant women. The Pregnant Women Class is a study group for pregnant women with gestational ages between 20 weeks and 32 weeks with a maximum number of participants of 10 people. In this class, pregnant women will learn together, discuss, and exchange experiences about maternal and child health (MCH) in a comprehensive and systematic manner and can be carried out on a scheduled and continuous basis. Pregnant women's classes are facilitated by midwives/health workers using the Pregnant Women's Class package, namely the MCH Handbook, Flip chart (turn sheet) Guidelines for Pregnant Women's Classes, Handbook for Pregnant Women Class Facilitators and Pregnant Women's exercise book.

This research is in line with the results of Yuniastari, (2014), which shows that the majority (62.1%) attend classes for pregnant women. This is also in line with Desmariyenti & Hartati, (2019) research on Factors Associated with the Participation of Pregnant Women in Pregnant Women Classes (2019) which shows that the majority (70.7%) attend classes for pregnant women.

2. **The relationship between research variables and class participation of pregnant women**

Based on table 3, was obtained variable data that was significantly related to class participation for pregnant women, namely parity where the value of p = 0.03 (95% CI: 1.9-26.7). The results of this study are in line with research by Atiul Imartiana (2017), there is a significant relationship between parity and the participation of pregnant women in pregnancy exercise. This research is also in line with Impartina's (2017) title relationship between parity and participation in pregnancy exercise, the result is a p-value of 0.000, meaning that

there is a relationship between maternal parity and participation in pregnancy exercise. It can be concluded that pregnant women who have parity or a large number of children will affect the participation of pregnant women in attending pregnant women's classes or pregnancy exercises.

Knowledge is related to class participation of pregnant women with p = 0.00 (95% CI: 6.0-159.5). This research is in line with (Desmariyenti & Hartati, 2019) and Hidayah (2018) showing that there is a relationship between mothers' knowledge and class utilization of pregnant women (p-value = 0.00). This proves that the higher the level of knowledge of the mother, the better the understanding of the class of pregnant women. The researcher assumes that the participation of pregnant women in pregnant women's classes increases knowledge, so many pregnant women attend pregnant women's classes.

Husband's support is related to class participation of pregnant women, p = 0.01 (95% CI: 2.8-90.4). The results of this study are in line with Septiani's research (2013) which has a significant relationship with pregnant women's participation in pregnant women's classes (p <0.05). This is also in line with the research of Risneni, (2007) which obtained a p-value of 0.006 so that it is said that there is a significant relationship between husband's support and participation in pregnant women's classes. This research is also in line with research conducted by Nugraheny, (2016) the relationship between husband's support and pregnant women's participation in attending pregnant women's classes in 2015, showing data that there is a significant relationship between husband's support and mother's participation in attending pregnant women's classes.

Conclusion

The results of this study indicate that the factors that influence the participation of mothers in classes for pregnant women are parity, knowledge, and husband support.

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The Relationship of Knowledge and Family Planning Unmet Need Incidence in Couple of Reproductive Age

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Abstract

The Family Planning Program has a very strategic, comprehensive, and fundamental meaning in realizing healthy and prosperous Indonesian people and can significantly reduce fertility rates, although the Fertility Rate (TFR) is still increasing. This is due to the high unmet need for family planning (BKKBN, 2015). Unmet Need is a Fertile Age Couple who wants to delay having children for two years or more and does not want to have more children but is not an active family planning participant (BKKBN, 2016). This study aims to determine the relationship between knowledge and the incidence of family planning (KB) Unmet need in fertile-age couples (PUS) in Denpasar. The research design used was analytic observational with a cross-sectional approach. The research subjects used 96 fertile age couples in Denpasar City. The sampling technique used the proportional stratified random sampling method to determine the number of samples in each district. The analysis used was the Chi-Square test with 95% Confidence Interval (CI). The results showed that the value of p = 0.000 ≤ 0.05, so it can be concluded that knowledge has a significant relationship with the incidence of unmet need family planning in fertile age couples.

Keywords: knowledge, fertile age couples, unmet need KB

Program Keluarga Berencana merupakan memiliki makna yang sangat strategis, komprehensif dan fundamental dalam mewujudkan manusia Indonesia yang sehat dan sejahtera serta secara nyata dapat menurunkan angka fertilitas, walaupaun Tingkat *Fertility Rate* (TFR) masih mengalami peningkatan. Hal ini disebakan oleh karena tinginya kebutuhan ber KB yang tidak terpenuhi (BKKBN, 2015). *Unmet Need* adalah Pasangan Usia Subur (PUS) yang ingin menunda untuk memiliki anak selama dua tahun atau lebih dan tidak ingin memiliki anak lagi, namun tidak menjadi peserta KB aktif (BKKBN, 2016). Penelitian ini bertujuan untuk mengetahui hubungan pengetahuan dengan kejadian *Unmet need* Keluarga Berencana (KB) pada Pasangan Usia Subur (PUS) di Kota Denpasar. Rancangan penelitian yang digunakan yaitu *observasional analitik* dengan pendekatan *cross sectional.* Subjek penelitian menggunakan 96 wanita Pasangan Usia Subur di Kota Denpasar. Teknik pengambilan sampel menggunakan metode *proportional stratified random sampling* untuk menentukan jumlah sampel di masing-masing kecamatan. Analisis yang digunakan adalah uji *Chi- Square dengan Confidence Interval (CI) 95%*. Hasil penelitian menunjukkan bahwa nilai p=0,000 ≤0,05, sehingga dapat disimpulkan bahwa pengetahuan memiliki hubungan yang signifikan dengan kejadian *unmet need* KB pada PUS.

Kata Kunci : pengetahuan; Pasangan Usia Subur (PUS); unmet need KB

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Introduction

Indonesia is a developing country with a large population. This can be seen from the census data every year which is increasing. An increase in population in developing countries can have an impact on the economy and public health (Ambarwati, 2012). The population of Indonesia based on data from the Central Statistics Agency (BPS) in 2010 reached 238,518,800 people with a population growth rate of 1.49 percent. In 2015, the population was 255,461,700 people with a population growth rate of 1.40 percent (Keluarga & Pertama, 2015).

The Family Planning Program in Indonesia has been recognized nationally and internationally as one of the programs that have significantly reduced fertility rates, however, the Fertility Rate (TFR) is still increasing (Rismawai, 2011). This is due to the high need for family planning that is not met (Keluarga & Pertama, 2015). The 2019 KKBK Program Performance and Accountability Survey (SKAP).define*unmet need for family* planning is a woman of childbearing age aged 15-49 who is not using family planning at the time of the survey, wants a child later (delayed > 24 months), does not want any more children, or is in a state of pregnancy where the pregnancy is unwanted or desired later (within the 2 years or more) (SKAP, 2019).

The Contraceptive Prevalence Rate (CPR) in Bali Province has decreased from 65.4% in 2007 to 59.6% in 2012 (DHS, 2008). Denpasar City has the lowest Contraceptive Prevelance Rate (CPR), which is 49.9% (Susenas, 2012). Based on data from the Bali Province National Population and Family Planning Agency (BKKBN) in 2018, of the nine regencies in the Bali Province, the highest number of unmet needs for family planning was in Denpasar City (15.4%) and the lowest was Jembrana Regency (7,4%).

The increase in unmet need for family planning is influenced by several factors one of them is knowledge. Selection and use of contraception are inseparable from the knowledge possessed by a person. Knowledge is the result of knowing someone by seeing or listening to a certain object. Without knowledge, a person has no basis for making decisions and determining actions or solutions to the problems faced (Dwijayanti, 2008). Based on research conducted by Ulsafitri & Nabila in 2015, the results showed that there was a significant

relationship between respondents' knowledge of the incidence of unmet need for family planning (p=0.0 (p<0.05); OR=0.079). by Suseno 2011 also shows that the knowledge variable has a significant effect between knowledge and the incidence of unmet need for family planning (p=0.049 (p<0, 05); 95% CI = 1.004, so can be concluded that knowledge or cognitive is a very important domain in shaping one's actions

Various efforts have been made by the National Family Planning Coordinating Board (BKKBN) in reducing the number of unmet needs, one of which is conducting counseling on the importance of using family planning and distributing free contraception, but not all of these efforts have been successful because there are still groups of unmet need, therefore researchers are interested in further researching the relationship between knowledge and the incidence of unmet need for family planning (KB) in couples of childbearing age (PUS) in Denpasar City

Method

The design of this research is analytically observational with a cross-sectional approach. This research was conducted in Denpasar City with a total sample of 96 people. The sampling technique used the proportional stratified random sampling method to determine the number of samples in each district. The inclusion criteria in the study were that the respondents were couples of childbearing age, domiciled in Denpasar City, and willing to be the research sample. Data collection was carried out by distributing online questionnaires (google form), due to the Covid-19 pandemic that hit Indonesia, including the Province of Bali. Data were analyzed descriptively and bivariate with Chi-square which is a non-parametric statistical test.

Result and Discussion

The results of this study showed that most of the unmet needs for family planning occurred in respondents with sufficient knowledge, namely 26 people (27%) compared to PUS with good knowledge of 22 people (22.9%). The results of the Chi-Square test showed significant results with a value of p = 0.000 (p ≤ 0.05), so it can be concluded that knowledge is related to the incidence of unmet needs for family planning in PUS. Knowledge is the result of curiosity through sensory processes, especially in the eyes and ears for certain objects, and becomes an important domain in the formation of open behavior or open behavior (Donsu, 2017).

The results of this study are in line with research conducted by Patel et al., (2015) which revealed that the main reason for the occurrence

of unmet needs in Vadodara was the lack of knowledge of PUS about the importance of using contraceptives, so efforts were needed from the government to increase awareness of PUS to participate in family planning. Knowledge of family planning is an important aspect of understanding the importance of the role of husband and wife in family planning programs and can influence the behavior of husbands and wives to participate in family planning programs (Notoatmodjo, 2014). Research conducted by Nyauchi, (2011) in Kenya, shows that knowledge about family planning is related to the incidence of unmet need for family planning with a value of p = 0.001. Likewise, research conducted by Assefa and Haddis (2011) in Ethiopia,

This study also showed that 39 people (40.6%) who had good knowledge tended to choose to use contraception to prevent pregnancy either for reasons of delaying, managing, or terminating pregnancies which were categorized as the met need group. According to Wahab, (2014), knowledge plays a role in making decisions to use contraceptives. The higher the knowledge, the higher the role in contraceptive use.

This is in line with research conducted by Farahan, (2016) in Bebandem Karangasem Village showing that respondents with low knowledge used family planning (39.6%) while respondents with high knowledge used family planning (78.4%), so it can be concluded that the higher the knowledge PUS regarding family planning, the awareness to use contraceptives is increasing and vice versa.

Table 1. Frequency Distribution of Characteristics of Couples of Reproductive Age in Denpasar City Based on Education Level in 2020

Level of education	**n**	**%**
S2	6	6,3
S1/D4	35	36,4
D3	18	18,8
SMA/SMK	33	34,4
JUNIOR HIGH SCHOOL	3	3,1
SD	1	1.04
TOTAL	96	100

Table 2. Relationship between Knowledge and Unmet Need for Family Planning in Couples of Reproductive Age in 2020

Knowledge	Unmet need KB				Total		*P-values*
	Yes		No				
	n	%	n	%	n	%	
Enough	26	27	9	9,4	35	36,4	
Good	22	22,9	39	40,6	61	63.5	0.000
Total	48	50	48	50	96	100	

Conclusion

Incidents of unmet needs for family planning are mostly experienced by PUS with sufficient knowledge. The results of the study show that knowledge is significantly related to the incidence of unmet needs. Health workers are expected to increase socialization regarding family planning and increase PUS's understanding of the importance of using contraceptives, so as to reduce the incidence of unmet need for family planning.

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Increase Natural Serotonin Hormone with Pranayama Ante-Natal Yoga Method to Control Anxiety in Pregnant Women

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Abstract

The anxiety of pregnant women can be caused because the fear and fear that most pregnant women feel is anxiety and fear in facing childbirth. Anxiety will have a negative impact on pregnant women from pregnancy to delivery. The hormone serotonin as a mental health hormone that can prevent anxiety, mood, or depression can be produced by the body naturally. Some ways that you can increase the release of the hormone serotonin naturally are by exercising, massage, sunbathing in the sun, and meditation or yoga. Analyzing the increase in natural serotonin hormones with the pranayama antenatal yoga method to control anxiety in pregnant women. This research is quasi-experimental research, with a nonrandomized pretest-post-test control group design. The population in this study were pregnant women in the PMB "C" area. The number of samples was 20 pregnant women who were given yoga exercise treatment and 20 pregnant women as the control group. Statistical test using paired t-test. The results showed that yoga was significantly effective in overcoming maternal anxiety, the p-value showed 0.019 (p <0.05), and the positive t-value indicated that yoga had a good impact on overcoming the anxiety of pregnant women. Yoga practice during pregnancy helps reduce anxiety, increase self-confidence in coping with childbirth and reduce physical complaints and prevent the increase in symptomatological symptoms, and has a statistically significant effect on anxiety levels. The results showed that yoga was significantly effective in overcoming maternal anxiety, the p-value showed 0.019 (p <0.05), and the positive t-value indicated that yoga had a good impact on overcoming the anxiety of pregnant women. Yoga practice during pregnancy helps reduce anxiety, increase self-confidence in coping with childbirth and reduce physical complaints and prevent the increase in symptomatological symptoms, and has a statistically significant effect on anxiety levels. The results showed that yoga was significantly effective in overcoming maternal anxiety, the p-value showed 0.019 (p <0.05), and the positive t-value indicated that yoga had a good impact on overcoming anxiety of pregnant women. Yoga practice during pregnancy helps reduce anxiety, increase self-confidence in coping with childbirth and reduce physical complaints and prevent the increase in symptomatological symptoms and has a statistically significant effect on anxiety levels.

Keywords: antenatal yoga, pranayama method, anxiety

Kecemasan ibu hamil dapat disebabkan karena rasa takut dan rasa takut yang paling banyak dirasakan oleh ibu hamil adalah rasa cemas serta takut dalam menghadapi persalinan. Kecemasan akan berdampak negatif pada ibu hamil sejak masa kehamilan hingga persalinan, seperti janin yang gelisah sehingga menghambat pertumbuhannya, melemahkan kontraksi otot rahim, dan lain-lain. Hormon serotonin sebagai hormon kesehatan mental yang dapat mencegah kecemasan, mood ataupun depresi dapat di-produksi oleh tubuh secara alami. Beberapa cara yang dapat meningkatkan pengeluaran hormon serotonin secara alami adalah dengan olah raga, pijat, berjemur di bawah matahari, serta meditasi atau yoga. Tujuan penelitian ini menganalisis peningkatan hormon serotonin alami dengan metode pranayama antenatal yoga untuk mengendalikan anxiety pada ibu hamil. Penelitian ini adalah penelitian eksperimen semu (quasi experimental), dengan rancangan nonrandomized pretest-posttest control group design. Populasi dalam

penelitian ini adalah ibu hamil di wilayah PMB "C". Pengukuran besar sample dalam penelitian ini menggunakan software Power Analysis Sample Size (PASS). Jumlah sample yaitu 20 ibu hamil yang diberikan perlakuan senam yoga dan 20 ibu hamil sebagai kelompok control. Uji statistik yang digunakan paired t-test. Hasil penelitian menunjukkan yoga efektif secara signifikan dalam mengatasi kecemasan ibu karena nilai p value menunjukkan 0,019 (p< 0,05) dan nilai selisih rerata berada didalam batas normal CI, serta nilai t hitung positif menandakan bahwa yoga membawa dampak baik dalam mengatasi kecemasan ibu hamil. Latihan yoga saat kehamilan membantu menurunkan kecemasan, menambah keyakinan diri dalam menghadapi persalinan dan mengurangi keluhan fisik dan mencegah peningkatan gejala simtomatologi dan memiliki efek yang signifikan secara statistik pada tingkat kecemasan.

Kata Kunci: kehamilan; yoga; metode pranayama; kecemasan

Introduction

Anxiety is a response to an unpleasant experience marked by a feeling of anxiety, or fear of facing a threat that will be experienced by someone accompanied by physiological stimulation. Anxiety is a normal thing that occurs in various circumstances, such as growth, changes, and new experiences (Mandagi, 2013). Anxiety can be a feeling of fear that has no clear cause and is not supported by the existing situation (Usman, F., Kundre, R., & Onibala, 2016). Anxiety is unavoidable in everyday life (Saseno, Pramono, G.K., 2013). Anxiety can be felt by everyone if they experience deep pressure and feelings that cause psychiatric problems and can develop over a long period of time(Shodiqoh, E., & Syahrul, 2014). Anxiety disorders are also more common in women (30.5%) than men (19.2%) (Sadock., 2015).

One study showed that 350,000,000 pregnant women have anxiety and psychological disorders that can reduce the quality of pregnancy outcomes.*6.*Indonesia has an incidence of pregnant women with anxiety of 56.5% and depression of 14.8%. Anxiety in pregnancy can cause psychiatric disorders, reduce fetal quality, preeclampsia, spontaneous abortion, premature birth, low birth weight, postpartum depression, increase the risk of heart rhythm disturbances, and developmental delays and even personality disorders into adulthood (Gong, 2015).

Stunted growth and weakened uterine muscle contractions are some of the results of anxiety experienced by mothers from pregnancy to delivery which can harm the mother and fetus (Novitasari, 2013). High levels of anxiety in pregnant women have a risk of premature delivery (premature) and even miscarriage.

Anxiety in pregnant women besides having an impact on the birth process, can also affect the growth and development of the child. This anxiety occurs in the third trimester which can result in decreased birth weight and increased HHA (hypothalamic-pituitary-adrenal) activity, causing changes in steroid hormone production, impaired social behavior, and fertility rates as adults. Feelings of anxiety during pregnancy are closely related to emotional problems, hyperactivity disorder, decentralization, and cognitive development disorders in children (Shahhosseini, Z., Pourasghar, M., Khalilian, A., & Salehi, 2015)

Treatment with antidepressants is still debated about the benefits and risks for pregnant women and their fetuses (Field, 2016). The available antidepressants are as follows: First, selective serotonin reuptake inhibitors (SSRIs), which include SSRIs, Citalopram (Celexa), fluoxetine (Prozac), and sertraline (Zoloft), both serotonin and norepinephrine reuptake inhibitors (SNRIs), which include SNRIs, namely duloxetine (Cymbalta), and venlafaxine (Effexor XR), and the third Buproprion (Wellbutrin) and the fourth Tricyclic (Al., n.d.). Previous studies reported that more than 50% of pregnant women who received antidepressants still had relapses (Muzik, 2012).

Serotonin hormone as a mental health hormone that can prevent anxiety, mood or depression can be produced by the body naturally. Some ways that can increase the production of the hormone serotonin naturally are by exercising, massage, basking in the sun, and meditation or yoga (Field, 2016). Sports Prenatal Yoga or psychotherapy including (interpersonal psychotherapy, cognitive psychotherapy and personality psychotherapy) (Jiang, Q., Wu, Z., Zhou, L., Dunlop, J. & Chen, 2015). Practicing yoga during pregnancy is useful as a self-help medium that will reduce anxiety (Battle, 2015).

Method

This research is quasi-experimental research, with a nonrandomized pretest-posttest control group design. This research was conducted at PMB "C" Malang City, East Java Province. Time for collecting research data will be carried out from May to June 2020. The population in this study is pregnant women in the PMB area "C". The measurement of the sample size in this study used the Power Analysis Sample Size (PASS) software. The number of samples is 20 pregnant women who were given the yoga exercise treatment and 20 pregnant women as the control group.

When the researcher conducted the research, the researcher gave an explanation about the purpose of the research, and the treatment of respondents that interviews and filling out questionnaires would be carried out, as well as providing an explanation about the right to withdraw and about the confidentiality of this research. After the respondents understood and agreed, the researchers conducted interviews and asked respondents to fill out a questionnaire via the Google form. Then the intervention given was antenatal yoga for 2 meetings within 4 weeks. Furthermore, interviews or filling out the questionnaire will be carried out again to determine the effect of the treatment given.

Using the HRS-A questionnaire measuring tool which consists of 14 items, with a scale of each item 0-4, with a total overall score of 0-56. Researchers conducted interviews and asked respondents to fill out questionnaires via the Google form. Data that has been collected through a questionnaire, edited and coded and then processed using the Stata program version 9.2. Then the data is analyzed to link the independent variable with the dependent variable. Data analysis used in this study was carried out in stages, including univariate and bivariate analysis. The statistical test used to determine the difference in anxiety of pregnant

women between before and after treatment, the method used is paired t-test.

After obtaining informed consent, research respondents were interviewed and filled out a Google form before and after treatment. This activity was carried out at the research location, namely at PMB "C" during the Yoga class. All procedures were carried out following the standards of the national research ethics committee and with the 1964 Helsinki Declaration, but this study did not require ethical approval.

Result and Discussion

The results of the univariable analysis aim to describe the characteristics of the research subjects so that the data set turns into useful information. Based on the age of the mother in the yoga group, half (50%) were pregnant and 8 pregnant women (40%) in the control group were <20 years old. Maternal education was classified as high or at the high school level and above in the same two groups, namely 18 people in the treatment group and 18 people in the control group (90%). Based on the work of the mothers in the yoga and non-yoga groups, the majority of mothers did not work, namely 15 people (75%) in the treatment group and 14 people (70%) in the control group. Based on family income in the yoga and non-yoga groups, the majority of income ≥ Rp. 2,781,564, namely 13 people (65%) in the treatment group and 11 people (55%) in the control group.

Table 1. Characteristics of Research Subjects

Characteristics	Group			
	Yoga (n=20)		No Yoga (n=20)	
	n	%	n	%
Mother's age				
< 20 years	10	50	8	40
20 – 35 years	8	40	7	35
> 35 years	2	10	5	25
Mother's Education				
Tall	18	90	18	90
Low	2	10	2	10
Mother's job				
Work	5	25	6	30
Doesn't work	15	75	14	70
Family Income				
< Rp. 2,781,564	7	35	9	45
≥ Rp. 2,781,564	13	65	11	55
Disease History				
There is	1	5	0	0
There isn't any	19	95	20	100

Anxiety can occur due to the high and low level of education that a person has. Pregnant women who have high knowledge with a higher level of education can handle their pregnancy well when compared to those who do not have a low level of education. The higher a person's education level, the greater the opportunity to seek treatment at health services. Conversely, low education will cause a person to experience stress, where the stress and anxiety that occurs is due to the lack of information that person gets. However, this is not in line with the results of the study, that almost all levels of education in the two groups were highly educated (90%) experiencing severe anxiety. Pregnancy is the happiest event in her life (Rokhmah, R, 2010).

The anxiety felt by pregnant women is related to the mother's age. Mothers who are young will experience a higher level of anxiety when compared to mothers who are old enough. The results showed that the age of the mother in the yoga group was half (50%) of pregnant women and 8 pregnant women (40%) in the control group were <20 years old. This is because young mothers have many factors that can cause them to experience anxiety, starting from their immature reproductive system and psychological readiness of mothers in facing childbirth. The anxiety that is felt is in the form of questions about her condition and what she will go through during labor later. Mothers are afraid of pain, vaginal tearing and possible complications that occur when facing labor. Neighbors' stories about the birth process made the mother feel even more anxious. The more mature the mother is, the lower the level of anxiety she will feel because a mother of sufficient/mature age will be better prepared both mentally and physically. Women aged 20-35 years are physically ready to get pregnant, because their reproductive organs are fully formed, compared to women aged <20 years their reproductive organs are still in the developmental stage, so the level of anxiety is more severe (panic), while women aged >35 are partly classified as in pregnancies at high risk for congenital abnormalities and complications during labour The more mature the mother is, the lower the level of anxiety she will feel because a mother of sufficient/mature age will be better prepared both mentally and physically. Women aged 20-35 years are physically ready to get pregnant, because their reproductive organs are fully formed, compared to women aged <20 years their reproductive organs are still in the developmental stage, so the level of anxiety is more severe (panic), while women aged >35 are partly classified as in pregnancies at high risk for congenital abnormalities and complications during labour. The more mature the mother is, the lower the level of anxiety she will feel because a mother of sufficient/mature age will be better prepared both mentally and physically. Women aged 20-35 years are physically ready to get pregnant, because their reproductive organs are fully formed, compared to women aged <20 years their reproductive organs are still in the developmental stage, so the level of anxiety is more severe (panic), while women aged >35 are partly classified as in pregnancies at high risk for congenital abnormalities and complications during labour (Badudu, 2012).

Mother's work related to activities carried out by pregnant women. Strenuous activity makes the risk of miscarriage and premature birth higher because of less oxygen intake to the placenta and early contractions may occur. Light activity or exercise that pregnant women do will help maintain pregnancy. Pregnant women who do light activities have been shown to reduce the risk of babies born prematurely. The results showed that most of the pregnant women in both the control and treatment groups did not work. Work does not affect anxiety in the face of labor. This is probably because pregnant women who work and who do not work both have a good adaptation to the changes that occur during pregnancy. so that these changes do not greatly affect the physical and psychological conditions of the mother in facing childbirth. In addition, it is possible that the family is supported by socio-economic factors that are quite good so that the mother's health status is guaranteed. This can be seen from the results of the study that the majority of family income (55-65%) is above the minimum wage. Adequate family income makes pregnant women ready for pregnancy because pregnancy requires a special budget such as ANC costs, nutritious food for the mother and fetus, maternity clothes, labor costs and the needs of the baby after birth This can be seen from the results of the study that the majority of family income (55-65%) is above the minimum wage. Adequate family income makes pregnant women ready for pregnancy because pregnancy requires a special budget such as ANC costs, nutritious food for the mother and fetus, maternity clothes, labor costs and the needs of the baby after birth (Ingewati, 2014).

From the results of the study, the health status (history of disease) of pregnant women obtained data that only 1 (5%) of pregnant women in the treatment group had a history of asthma. For a mother who experiences health problems during pregnancy, of course she will experience anxiety in facing childbirth. For pregnant women who have a fetus with a high risk for congenital abnormalities, anxiety is even greater, while pregnant women with pregnancy complications are twice as likely to have fear of their baby's weakness or to become depressed.

Table 2. Frequency Distribution of Anxiety Levels Before Yoga

Anxiety Level	Yoga group		Control Group	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
No worries	0	0	0	0
Mild anxiety	0	0	0	0
Moderate anxiety	2	10	4	20
heavy anxiety	13	65	13	65
Anxiety is very heavy	5	25	3	15
Total	20	100	20	100

The anxiety level of most of the 13 (65%) pregnant women before yoga in both the yoga group and the control group experienced severe anxiety (Table 2). The anxiety level of most of the 12 (60%) pregnant women in the treatment group experienced mild anxiety, while in the control group most of the 12 (60%) pregnant women experienced moderate anxiety (Table 3).

Table 3. Frequency Distribution of Anxiety Levels After Yoga

Anxiety Level	Yoga group		Control Group	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
No worries	3	15	0	0
Mild anxiety	12	60	6	30
Moderate anxiety	5	25	12	60
heavy anxiety	0	0	2	10
Anxiety is very heavy	0	0	0	0
Total	20	100	20	100

The results showed that the anxiety level of most of the 12 (60%) pregnant women in the treatment group after doing yoga for 4 weeks experienced mild anxiety, while in the control group most of the 12 (60%) pregnant women experienced moderate anxiety. It can be seen from these results that there has been a significant reduction in anxiety levels after doing yoga, and severe anxiety is gone. Whereas in the control group, 2 (10%) pregnant women experienced severe anxiety.

Prenatal yoga is a science that explains the relationship between human physical, mental and spiritual to achieve overall health (Sindhu, 2014). Doing yoga exercises during pregnancy will prepare the body and mind to be ready and strong for childbirth. In the opinion of researchers, a person's anxiety is influenced by many things, apart from antenatal yoga, an important factor that can help reduce anxiety is family support, which can be in the form of support from husbands, parents or other relatives. Based on

this, efforts that can be made so that pregnant women do not easily experience anxiety, namely the need to do prenatal yoga activities so that during the process of getting pregnant and giving birth, pregnant women do not experience difficulties.

The benefits of yoga activities for the health of the body include lowering blood pressure, heart rate, increasing blood circulation in the process of removing food residues that contain toxins from the body. Then, some of the benefits of pregnancy yoga exercise for pregnant women are that it can increase blood flow and adequate nutrition of the fetus, as well as play a role in the health of the reproductive organs and pelvis such as strengthening the perineal muscles in preparing for the birth of a baby naturally.

Table 4. Analysis of Paired T Test

Treatment Group	Average difference (SD)	Average Difference Difference (CI)	t	*p.s*
No Yoga	22,150 (4,081)	3,600 (0.669 – 6.530)	2,571	0.019
yoga	18,550 (4,019)			

The results showed that yoga was significantly effective in overcoming maternal anxiety because the p value showed 0.019 (p <0.05) and the mean difference value was within the normal CI limits, and a positive t-count value indicated that yoga had a good impact on overcoming the anxiety of pregnant women. Anxiety or anxiety is a state of tension. A tension can arise from feelings of worry, fear, pressure, irritation, nervousness, anxiety and confusion experienced by the mother. These feelings can disturb or cause discomfort for the mother in dealing with pregnancy and if it continues until delivery, it will affect the progress of labour. When a mother is afraid or anxious, the body will activate the flight response. This causes an increase in adrenaline production. Heart begins to beat faster, breathing becomes faster, muscles tense, blood pressure increases. During labour there are several signs indicating that the mother is not coping well with labour, namely anxiety, panic, high-pitched vocalizations, increased pain perception due to decreased endorphins production, slowed contractions due to decreased oxytocin production and fetal distress.

One alternative method that can be used to increase comfort and reduce anxiety is prenatal yoga. Prenatal yoga (yoga for pregnancy) is a modification of classic yoga that has been adapted to the physical condition of pregnant women, which is performed at a gentler and slower intensity (Michelle Haring, Jules E. Smith, Doris Bodnar, Shaila Misri, n.d.). Prenatal yoga has three important principles, namely breathing with full awareness, gentle and slow movements as well as relaxation and meditation (Nimah Said, 2015). Deep, regular breathing is healing

and calming. Through correct breathing techniques, the mother will be more able to control her mind, body and with relaxation and meditation, the mother's whole body and mind will be relaxed, calm and peaceful. Research has shown that pranayama and relaxation have a significant positive effect on reducing anxiety.

Prenatal yoga is an activity for pregnant women that not only trains physically but alsopsychological conditioning so that mothers are healthy and comfortable. The use of aromatherapy during prenatal yoga can help pregnant women relax, thereby reducing anxiety levels. This is because aromatherapy contains the chemical linalyl ester which is efficacious for calming and provides an anti-neuro depressive effect which is able to relax and relax the work system of tense nerves and muscles (Leonard, 2018). The progressive relaxation technique is a series of prenatal yoga movements, it is intended that pregnant women can relax themselves, especially when facing conditions that cause stress or anxiety for mothers, such as when facing birth. The effect of progressive relaxation techniques can make a person more relaxed and this technique is also used to control anxiety (Mariyana, 2019).

Research involving 46 pregnant women with symptoms of depressionand anxiety indicate that prenatal yoga is a feasible and acceptable intervention for pregnant women who have symptoms of anxiety and depression. Participants also expressed high satisfaction and no adverse results (Kyle Davis, Sherryl H. Goodman, Jenn Leiferman, 2015). The results of this study are in line with the research of Satyapriya, et al which stated that yoga is more influential than pregnancy exercise to reduce anxiety experienced by pregnant women in the second and third trimesters (M. Satyapriya, R. Nagarathna, V. Padmalatha, 2013). Practicing yoga during pregnancy helps reduce anxiety related to labor, increases self-confidence in facing labor and reduces physical complaints (Fauziah, 2016). The results of this study are also in line with the theory put forward by Sindhu that yoga in pregnancy can reduce the anxiety felt by pregnant women. Yoga in pregnancy can be used to reduce women's anxiety about childbirth and prevent an increase in symptomatology (James J Newham, Anja Wittkowski Clin, Janine Hurley, 2014). Prenatal yoga had a statistically significant effect on anxiety levels (Hamdiah, Ari Suwondo, Triana Sri Hardjanti, Ariawan, 2017)

A person's anxiety is influenced by many things, besides antenatal yoga, the most important thing in reducing anxiety is family support, especially husbands. Factors that can reduce anxiety that occurs in women who are about to give birth are family support which can be in the form of husbands, family or other relatives, parents, and in-laws.

Conclusion

Prenatal yoga is an activity for pregnant women that not only trains physically but also conditions psychologically so that mothers are healthy and comfortable. Yoga practice during

pregnancy helps reduce anxiety, increase confidence in facing labor and reduce physical complaints and prevent an increase in symptomatology and has a statistically significant effect on anxiety levels. A person's anxiety is influenced by many things, apart from antenatal yoga, the most important in reducing anxiety

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The Relationship between Anemia Status and Newborn Weight Outcomes

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Abstract

Background: Anemia has been a crucial contributor to adverse pregnancy outcomes such as premature birth, low birth weight (BBLR), small for gestational age (IUGR), as well as delivery by cesarean section. Methodology: The method used is an analytical survey method with a cross-sectional approach. The population in this study is all mothers who gave birth in the working area of the Bangetayu Health Center in Semarang City from September 2021 to September 2022. The sampling technique uses Consecutive Sampling. Results: Chi-Square test results, there is a relationship between Anemia Status and Newborn Weight Outcomes at Bangetayu Health Center Semarang City (p-value = 0.001). Conclusion: Hemoglobin levels in pregnant women should be observed even from the first trimester of pregnancy to avoid a higher risk of adverse pregnancy outcomes.

Keywords: Low birth Weight (LBW), Anemia, pregnancy, newborn

Abstrak

Latar belakang :Anemia telah menjadi kontributor krusial untuk hasil kehamilan yang merugikanseperti kelahiran prematur, berat badan lahir rendah (BBLR), kecil untuk usia kehamilan (IUGR), serta persalinan dengan operasi Caesar. Metodologi: Metode yang digunakan adalah metode survei analitik dengan pendekatan cross sectional . Populasi dalam penelitian ini adalah seluruh ibu yang melahirkan di wilayah kerja Puskesmas Bangetayu Kota Semarang pada bulan September 2021 sampai dengan September 2022. Teknik pengambilan sampel menggunakan Consecutive Sampling. Hasil: Hasil uji Chi-Square, ada hubungan Status Anemia dengan Luaran Berat Badan Bayi Baru Lahir di Puskesmas Bangetayu Kota Semarang (p-value = 0,001). Kesimpulan: Kadar hemoglobin pada ibu hamil harus di perhatikan bahkan sejak trimester pertama kehamilan untuk menghindari risiko yang lebih tinggi dari hasil kehamilan yang merugikan.

Kata Kunci: BBLR, Anemia, kehamilan, bayi baru lahir

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Introduction

Anemia during pregnancy is a case of nutritional disorders in developing and developed countries. According to the World Health Organization (WHO), the proportion of the population suffering from anemia during pregnancy is 14% in developed countries and

51% in developing countries, and most cases are found in Africa and Southeast Asia (Lumbanraja et al., 2019). Anemia cases of pregnant women in Indonesia according to data from RISKESDAS, namely 48.9% of pregnant women have anemia and as many as 84.6% of anemia in pregnant women occurs in the age group of 15-24 years (Ministry of Health RI, 2022). Cases of pregnant women with anemia amounted to 15.4% in Semarang City in 2021 (Semarang City Health Office, 2021).

Anemia is one of the most common medical disorders during pregnancy and can cause serious adverse effects on the mother and fetus with a high risk of maternal death (Youssry et al., 2018). Anemia is a crucial contributor to adverse pregnancy outcomes such as premature birth, low birth weight (BBLR), small for gestational age (IUGR), as well as delivery by Caesarean section (Kant et al., 2018). During pregnancy, the fetus's need for iron increases the mother's daily iron needs about 10-fold, increasing from 6 mg/day to 22 mg/day in the first and third trimesters of pregnancy. This increased demand for iron is largely taken from maternal iron stores, which puts pregnant women at a higher risk of iron deficiency (Srour et al., 2018). The government's efforts in overcoming anemia in pregnant women are by giving blood-added tablets (TTD) of at least 90 tablets during pregnancy (Ministry of Health RI, 2022).

Research from Youssry et al., (2018) states that there is an increased risk of premature birth, low birth, low birth, and postpartum hemorrhage in mothers who experience anemia in their pregnancy. This study also states that the incidence of low birth weight babies is 9 times more common in pregnant women who are anemic compared to pregnant women who are not anemic. Higher hemoglobin levels can lower the risk of pregnancy complications. Good iron supply and normal Hemoglobin values have been shown to prevent perinatal and neonatal death (Iqbal et al., 2019). The results of research conducted by Widiyanto & Lismawati (2019) prove that there is a significant relationship between the amount of hemoglobin (Hb) and the incidence of low birth weight. Mothers who are anemic have a risk of their babies experiencing low birth weight events when compared to mothers who are not anemic. Lack of hemoglobin (Hb) will result in the growth of the baby because the blood cannot provide enough oxygen to all tissues. So that metabolic processes and the exchange of important nutrients in tissues are disturbed. This situation will affect

pregnant women and the fetus they contain. The state of anemia will affect the baby to be born.

Method

The method used is an analytical survey method with a cross-sectional approach. The population in this study is all mothers who gave birth in the working area of the Bangetayu Health Center in Semarang City from September 2021 to September 2022. The sampling technique uses Consecutive Sampling. In this study, the sample was a portion of the population taken by consecutive sampling. Sampling i.e. where each subject meeting the inclusion criteria is selected with the required sample size achieved. The inclusion criteria in this study are all pregnant women who gave birth to babies in the working area of the Bangetayu health center in Semarang City. The exclusion criteria in this study were incomplete patient medical records, multiple pregnancies, and stillbirths. Secondary data is obtained from the patient's medical record, then collected by midwives appointed by researchers as enumerators. Data collection using questionnaires and checklists provided by researchers. Data analysis using Chi-Square.

Result and Discussion

Anemia Status in Pregnant Women

Table 1. Frequency Distribution Based on Anemia Status of Pregnant Women at Bangetayu Health Center Semarang City

No	Status Anemia	Distribution	
		F	%
1.	Anemia	31	30.4
2.	not anemic	71	69.6
Total		102	100.0

Based on Table 1, it can be concluded that respondents who experience anemia as many as 31 respondents (30.4%), and those who do not experience anemia as many as 71 respondents (69.6%). Anemia in pregnancy is a hemoglobin level of <11 g / dL which can be classified into two, namely mild anemia (7-10.9 g / dL) and severe anemia (<7 g / dL). Anemia in pregnancy can be a risk factor for giving birth to a Low Birth Weight (BBLR) baby. BBLR can increase perinatal and neonatal mortality which affects impairment and development and decreased intellectual function (Mendrofa et al., 2020).

Research from Ningrum (2017) shows anemic pregnant women have a 9.3 times chance of having low birth weight compared to mothers without CI anemia 95% (2,180-39,962) Anemia in pregnant women can result in reduced oxygen supply to the tissues and will interfere with fetal growth, thus strengthening the risk of preterm labor and low birthweight. This is also by research conducted by Figueiredo et al. (2018) that

maternal anemia is associated with low birth weight with adjusted OR: 1.23 (95% CI: 1.06-1.43) and I2: 58%. In conclusion, maternal anemia is considered a risk factor for low birth weight. Anemia is a major public health problem worldwide, affecting more than 1.6 billion people. Anemia has been associated with an increased risk of maternal and infant mortality, neurodevelopmental disorders in the child, and decreased cognitive function and physical work capacity later in life (Finkelstein et al., 2020).

Pregnant women who had enough iron in the 1st trimester experienced a decrease in iron concentration but still maintained a higher iron status in the 2nd trimester compared to pregnant women who were iron deficient in the 1st trimester. However, in the 3rd trimester, early pregnancy expectant mothers with iron deficiency as well as in early pregnancy with enough iron have comparable iron status. This reflects the physiology of pregnancy in the 3rd trimester where maternal iron is rapidly mobilized to meet fetal transfer needs, and the administration of iron supplements during the 1st trimester for women diagnosed with anemia but not given until the 2nd trimester of pregnancy (Pobee et al., 2021).

Newborn Weight Outcomes

Table 2. Frequency Distribution Based on Newborn Weight Bangetayu Health Center Semarang City.

No	Incidence of Low birth weight	Distribution	
		F	%
1.	LBW	30	29,4
2.	Normal	72	70,6
	Total	102	100.0

Based on Table 2, it can be concluded that as many as 30 respondents have low birth weight babies (29.4%) and 72 respondents are not low birth weight (70.6%). Research from Srour et al., (2018) states that newborns born to mothers with low Hb levels tend to have lower body weight and birth height, head circumference, and lower gestational age. Anemia in pregnancy can adversely affect both the mother and the fetus. Anemia in pregnancy will disrupt oxygenation and nutritional supply from the mother to the fetus. As a result, the fetus will experience weight gain disorders resulting in low weight (Novianti et al., 2018). The fetus is at risk of premature labor and low birth weight due to impaired oxygen delivery to the placenta and fetus. (Kavya.N et al., 2022).

The Relationship between Anemia Status and Newborn Weight Outcomes at Bangetayu Health Center Semarang City

Table 3. Relationship between Anemia Status and Newborn Weight Outcomes at Bangetayu Health Center Semarang City

Anemia Status	LBW				Total		P Value
	LBW		Normal		F	%	
	F	%	F	%			
Anemia	16	51.6%	15	48.4%	31	100%	0.001
No Anemic	14	19.7%	57	80.3%	67	100%	
Total	30	29,4%	72	70,6%	102	100%	

Based on Table 3, it can be concluded that respondents who experience anemia mostly have babies who are low birthweight, namely as many as 16 respondents (51.6%), and respondents who do not experience SEZ mostly do not give birth to BBLR babies, which is as many as 57 respondents (80.3%). Based on the results of the *Chi-Square test*, there is a relationship between Anemia Status and Newborn Weight Outcomes at Bangetayu Health Center Semarang City (p-value = 0.001).

This is in line with research conducted by Asaf et al., (2022) which states that pregnant women with low Hb levels tend to give birth to babies with a birth weight of less than 2500 grams. The study concluded that there was a strong association between birth weight and Hb levels (p-value = 0.038). Hemoglobin levels were positively correlated with fetal birth weight (r= 0.631, p-value=0.0001). Research from Liu et al., (2022) found that maternal hemoglobin concentration in the third trimester is associated with low and low pregnancy risk (KMK). Pregnant women with severe anemia or hemoglobin > 130 g / L in the third trimester can significantly lose neonatal birth weight and increase the risk of low birth weight and small gestation (KMK). Low and high hemoglobin concentrations in the third trimester can have adverse effects on fetal weight growth (Liu et al., 2022a).

Research from Sah et al., (2022) shows that mothers who have low hemoglobin concentrations have a higher chance of having low hemoglobin babies compared to mothers who have normal hemoglobin levels. Pregnant women who experience anemia during pregnancy have a

3.42 higher chance of giving birth to BBLR babies compared to mothers who do not have anemia (Azizah et al, 2022). A low hemoglobin level inhibits the delivery of oxygen and nutrients to the fetus by the mother, as well as the body's oxygen supply and placental growth. This unfavorable impact occurs in persistent fetal hypoxia and inadequate nutrient intake, leading to poor fetal weight gain and birth outcomes such as low birth weight (Randall et al., 2019).

Anemia during pregnancy increases the occurrence of maternal health disorders and birth outcomes. A strategy that can be done to reduce anemia is the provision of iron supplementation during pregnancy and in women of childbearing age (Kabir et al., 2022). The speed of fetal weight growth reaches its peak in the third trimester (around 35 weeks gestation) accompanied by a sharp increase in fetal nutritional needs. Severe anemia or relatively high hemoglobin concentration in this period can lead to a very inadequate supply of maternal nutrients to the fetus, which seriously affects fetal weight growth and increases the risk of low weight (Liu et al., 2022)

Conclusion

Hemoglobin levels in pregnant women should be observed even from the first trimester of pregnancy to avoid a higher risk of adverse pregnancy outcomes. For this reason, the need for anemia screening in couples who will plan a pregnancy.

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Differences in Gross Motor Development for Infants 6-12 Months Based on Exclusive Breastfeeding

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Abstract

Gross motor and large muscle which are basic movement skills. The golden age of motor development is 6-12 months. The impact of basic motoric stages is not passed, namely not having basic motoric conceptions, the long-term effect will affect children's emotional and mental intelligence. One of the factors that influence the process of growth and development is offering breastfeeding exclusively. Breast milk contains taurine which functions as a neurotransmitter and the maturation process of brain cells.. This study aims to observe gross motoric development in infants 6-12 months between those who were exclusively breastfeeding and non-exclusively breast milk at the Sawah Besar Health Center in 2020. The method of this research is an analytic observational study with a cross-sectional approach. The study population was mothers and infants aged 6-12 months at the Sawah Besar Public Health Center in Jakarta. The number of samples was 39 respondents with purposive sampling technique. Data collection used KPSP, KMS and questioner. Statistical analysis using Chi Square test and Logistic Regression. The results of this study are maternal age (p = 0.015), maternal education (p = 0.023), exclusive breastfeeding (p = 0.001) and infant growth (p = 0.003) had an impact on gross motor development of infants aged 6-12 months. It indicates that exclusive breastfeeding is the main factor determining the gross motor development of infants aged 6-12 months. The difference in gross motor development of babies who are given exclusive breastfeeding will be 25,002 times earlier than babies who are non-exclusive breast milk.

Keywords: exclusive breastfeeding; gross motor development; non-exclusive breast milk

Motorik kasar melibatkan keterampilan otot-otot besar yang merupakan kemampuan gerak dasar. Usia emas perkembangan motorik adalah 6-12 bulan. Dampak apabila tahapan motorik dasar tidak terlalui yaitu tidak mempunyai konsepsi motorik dasar, efek jangka panjangnya akan mempengaruhi kecerdasan emosi dan mental anak. Kemampuan motorik halus berkembang setelah kemampuan motorik kasar berkembang secara optimal. Salah satu faktor yang mempengaruhi proses tumbuh kembang adalah pemberian ASI secara eksklusif. ASI mengandung taurin yang berfungsi sebagai neurotransmitter dan proses maturasi sel otak. Penelitian ini bertujuan untuk mengetahui perbedaan perkembangan motorik kasar pada bayi 6 – 12 bulan antara yang diberikan ASI eksklusif dengan non ASI eksklusif di Puskesmas Sawah Besar Tahun 2020. Metode penelitian ini bersifat observasional analitik dengan pendekatan *cross sectional.* Sampel penelitian berjumlah 39 responden dengan teknik *purposive sampling*. Pengumpulan data menggunakan KPSP, KMS dan kuesioner. Analisis statistik menggunakan uji *Chi Square* dan Regresi Logistik. Hasil uji *Chi Square* dengan nilai α 0,05 diperoleh bahwa umur ibu (p=0,015), pendidikan ibu (p=0,023), pemberian ASI Eksklusif (p=0,001) dan pertumbuhan bayi (p=0,003) memberikan dampak terhadap perkembangan motorik kasar bayi umur 6-12 bulan. Oleh karena itu, dapat disimpulkan bahwa pemberian ASI Eksklusif menjadi faktor utama yang menentukan perkembangan motorik kasar bayi

umur 6-12 bulan. Perbedaan perkembangan motorik kasar bayi yang diberikan ASI Eksklusif akan lebih awal 25,002 kali dibandingkan bayi yang tidak diberikan ASI Eksklusif.

Kata Kunci: ASI Eksklusif, Motorik Kasar, Non-ASI Eksklusif.

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Introduction

Growth and development are two events that are different but interrelated and difficult to separate(Soetjiningsih, 2015).Monitoring the growth and development of the baby is an important phase, because it determines the quality of health, welfare, learning and behavior in the future.The number of targets for infant and toddler health in 2018 in Indonesia is very large, namely around 19,270,715 or 7.5% of the entire population of Indonesia(RI Ministry of Health, 2018). So the quality of growth and development of infants and toddlers in Indonesia needs serious attention, namely getting good nutrition, adequate stimulation and affordable by quality health services including early detection and intervention of developmental deviations.(Soetjiningsih, 2015).

Development is an increase in ability in the structure and function of the body which involves the process of differentiation of body cells, body tissues, organs and organ systems that develop so that each can fulfill its function. This includes emotional, intellectual and behavioral development as a result of interaction with the environment(Soetjiningsih, 2015).

Motor development is the process of growth and development of a child's movement abilities which are coordinated by nerves, nerve centers and muscles. In general, motor development is divided into two, namely gross motor and fine motor. Gross motor is part of motor activity that involves large or gross muscle skills(Soetjiningsih, 2015). while fine motor skills are activities involving small muscle movements, such as drawing, writing, beading, embroidering, eating. Fine motor skills develop after gross motor skills develop optimally(Santrock, 2007).

Gross motor skills (gross motor skills) are all children's skills in moving and balancing their bodies. It can also be interpreted as the movements of a child who are still simple, such as jumping and running(Rahma, 2018).

Gross motor movements begin to form when children begin to have coordination and balance. Gross motor movements involve the whole body of the child, such as the activity of the muscles of the hands and feet.(Sujiono et al., 2014).

One of the factors that influence the process of growth and development is providing adequate nutrition, especially when babies are born with exclusive breastfeeding. WHO recommends that children be given exclusive breastfeeding until the age of six months without any liquids or solid food(Lissauer TF, 2009) (Wieland & Santesso, 2016), whereas in Indonesia, the average mother who gives exclusive breastfeeding is only 2 months, even at the same time, giving formula milk increases 3 times(Lestari et al., 2013).

Breast milk has ingredients that are useful for the process of myelination or the formation of membranes in the nerves of the brain which can speed up the work of the nerves, namely AA and DHA(Khamzah, 2012). In addition, breast milk contains taurine which functions as a neurotransmitter and plays an important role in the maturation process of brain cells. The ability of mental and motor development, especially children's gross motor skills, correlates with taurine concentrations in infancy(Hartono, NP, Wilujeng, CS and Andarini, 2016). Breast milk also contains LPUFAs that babies need because they can improve mental function, vision and psychomotor development of babies. This indicates that increasing cognitive reflex abilities is the role of LPUFAs during the baby's neurodevelopment.(Wieland & Santesso, 2016).

The golden age for motor development is middle childhood, which is 6-12 months old. At this age, the child's physical health has begun to stabilize. Children do not experience pain like the previous age (< 6 months). This causes physical development to be more optimal than the previous age(Santrock, 2007).

Based on the results of Larasati's research (2019) stated that there were 26 children (56.5%) with malnutrition status in toddlers based on weight / age at the Sawah Besar District Health Center.(Larasati, 2019). Furthermore, the authors conducted a preliminary survey in early January 2020 of 12 mothers who had babies aged 6-12 months, four of whom experienced developmental deviations and did not exclusively breastfeed. Therefore, there is a link between exclusive and non-exclusive breastfeeding with children's gross motor development, so researchers need to conduct a study entitled "Differences in gross motor development in infants aged 6-12 months at the Sawah Besar District Health Center".

Method

This research is an analytic observational study which was carried out in cross-sectional ways to determine differences in the gross motor development of infants who were given exclusive breastfeeding at the age of 6-12 months in the working area of the Sawah Besar District Health Center. The research was conducted from January to March 2020. The sample for this research was mothers with babies aged 6-12 months who had their babies checked at the KIA Polyclinic at the Community Health Center in Sawah Besar District, a total of 39 people using a purposive sampling technique.

Data collection methods used the Pre-Developmental Screening Questionnaire (KPSP), Healthy Menju Card (KMS) and a questionnaire to record the characteristics of the baby's age, sex, age and education of the mother, while specific data included gross motor development and infant growth and exclusive breastfeeding. Data on the infant's psychomotor development was carried out by observation using the Developmental Pre Screening Questionnaire (KPSP) with 10 questions(MOH, 2016). Exclusive breastfeeding data was obtained based on interviews and observations on the Towards Health Card (KMS) and Maternal and Child Health (MCH) books. The additional variable, namely the growth of the baby, was carried out by observation of the baby's weight gain chart using the KMS. Data analysis using SPSS software version 21 includes univariate, bivariate and multivariate analysis. Normality and homogeneity tests were carried out prior to the analysis process to determine the statistical test used. Bivariate analysis uses the Chi Square test because variables include categorical data. The process is continued with multivariate analysis to determine two independent variables (exclusive breastfeeding and infant growth) with one dependent variable (gross motor development) at the same time.(Sabri, L., & Sutanto, 2006)

Results and Discussion

Based on Table 1, it is known that the characteristics of the respondents based on age, most were 6 and 8 months old, each of which was 8 babies (20.5%), female sex as many as 22 babies (56.4%), most mothers were between 20- 35 years as many as 21 respondents (53.8%). The education level of mothers was almost evenly distributed between high school/university graduates and elementary/junior high school graduates, respectively 19 respondents (48.7%) and 20 respondents (51.3%). It is known that the largest proportion of gross motor

development is in the normal category as many as 26 babies (66.7%) and 18 babies (46.2%) who are exclusively breastfed. According to KMS, the biggest proportion of infant growth is in the green line, namely 28 babies (71.8%)

Table 1. Frequency distribution based on the characteristics of the respondents, gross motor development, growth and exclusive breastfeeding

Baby Age (months)	Frequency (f)	Percentage (%)
6	8	20.5
7	6	15,4
8	8	20.5
9	5	12,8
10	4	10,3
11	2	5,1
12	6	15,4
Gender	Frequency (f)	Percentage (%)
Man	17	43,6
Woman	22	56,4
Mother's Age (years)	Frequency (f)	Percentage (%)
<20	1	2,6
20 – 35	21	53,8
> 35	17	43,6
Mother's Education	Frequency (f)	Percentage (%)
Height (SMA, PT)	19	48,7
Low (SD, SMP)	20	51,3
Gross Motor Development	Frequency (f)	Percentage (%)
Normal	26	66,7
Abnormal	13	33,3
Exclusive breastfeeding	Frequency (f)	Percentage (%)
Yes	18	46,2
No	21	53,8
Baby Growth	Frequency (f)	Percentage (%)
Green line	28	71.8
Yellow line	9	23,1
Red line	2	5,1
Amount	39	100

Source: Processed primary data.

Based on Table 2, information was obtained that the motor development in the normal category was relatively almost the same between male and female babies respectively, namely 12 babies (46.2%) and 14 babies (53.8%) obtained a p value of 0.648 > 0. 05. According to(Aulia & Batubara, 2019)every healthy baby has the same development, starting from lying on his stomach, crawling, walking and so on, but hereditary factors such as gender have a different influence. As in adolescents, changes in the endocrine system. The growth and development of children with male sex

after birth will tend to be faster than girls and will last for a certain time. This is influenced by the hormone testosterone which is higher in baby boys compared to baby girls. Babies or boys are more interested in organized activities, being more aggressive and impulsive when compared to baby girls who prefer quiet and comfortable activities.(Aulia & Batubara, 2019).

Table 2. Cross-tabulation of gross motor development by sex

Gender	Gross Motor Development				Total		*P-values*	OR
	Normal		Abnormal					
	F	%	F	%	f	%		
Man	12	46,2	5	38.5	17	100	0.909	1,371
Woman	14	53,8	8	61.5	22	100		
Total	26	100	13	100	39	100		

Source: Processed primary data.

Table 3. Cross-tabulation of gross motor development based on maternal age

Mother's age (years)	Gross Motor Development				Total		*P-values*	OR
	Normal		Abnormal					
	F	%	F	%	f	%		
<20	0	0	1	7,7	1	100	0.015	3,046
20-35	18	69,2	3	23,1	21	100		
> 35	8	30,8	9	69,2	17			
Total	26	100	13	100	39	100		

Source: Processed primary data.

Based on table 3, it was found that there were 18 mothers (69.2%) aged 20-35 years whose baby's motoric development was in the normal category, while there were 8 persons (30.8%) mothers aged > 35 years who had babies with abnormal development.(Megawati, 2012)Mother's age is one of the characteristics that influence parenting patterns and child growth. According to this theory,(Arini, 2012)stated that the age of the mother greatly determines maternal health because it is related to the conditions of pregnancy, childbirth and postpartum, as well as how to care for and breastfeed her baby. The results of this study indicate that there is an effect of maternal age on the gross motor development of infants 6-12 months (p value 0.015 <0.05). The existence of this influence is due to the older the mother, the more emotionally mature, the more knowledge and experience, and the higher the awareness and responsibility so that it affects the gross motor development of the baby.

Table 4. Cross-tabulation of gross motor development based on mother's education

Mother's Education	Gross Motor Development				Total		*P-values*	OR
	Normal		Abnormal					
	F	%	F	%	f	%		
Height (SMA, PT)	16	61.5	3	23,1	19	100	0.023	5,333
Low (SD, SMP)	10	38.5	10	76.9	20	100		
	26	100	13	100	39	100		

Source: Processed primary data.

Based on Table 4, it is known that the gross motor development category is normal in 16 mothers with high education (61.5%) while those with low education are 10 people (38.5%). This study shows that there is an effect of mother's education on gross motor development of infants aged 6-12 months (p value 0.023 <0.05). This means that the higher the education, the better the mother's understanding of the importance of carrying out a stimulus so that it can support the normal motoric development of the baby according to the stages of its development.

The gross motor development of infants based on their growth using KMS can be seen in table 5. The results of this study stated that there was a difference between the gross motoric development of infants and growth (p value 0.003 <0.05) meaning that babies whose weight gain was not according to age according to the KMS graph then 10.248 times the risk of experiencing gross motor development disorders compared to babies whose growth is appropriate.

Based on Table 6, it shows that there were 17 babies (65.4%) whose gross motor development was normal according to age and 1 baby (7.7%) whose development was not normal, while there were 12 babies (92.3%) whose gross motor skills were not normal and not given exclusive breastfeeding. According to(Proverawati, A. & Rahmawati, 2012)Babies who get exclusive breastfeeding for 6 months without any additional food will stimulate normal baby development because they get more nutrients according to the baby's needs, and as a stimulus for motor development with communication between mother and baby as well as emotional bonding.(Proverawati, A. & Rahmawati, 2012).

Table 5. Cross-tabulation of gross motor development based on growth charts on KMS

Growth (KMS)	Gross Motor Development				Total		*P-values*	OR
	Normal		Abnormal					
	F	%	F	%	f	%		
Green line	23	88.5	5	38.5	28	100	0.003	10.248
Yellow line	3	11.5	6	46,2	9	100		
Red line	0	0	2	15,4	2	100		
	26	100	13	100	39	100		

Source: Processed primary data.

Table 6. Cross tabulation of gross motor development based on exclusive breastfeeding

Exclusive breastfeeding	Gross Motor Development				Total		*P-values*	OR
	Normal		Abnormal					
	F	%	F	%	f	%		
Yes	17		1		18	100	0.002	22,667
No	9		12		21	100		
Total	26		13		39	100		

Source: Processed primary data.

The results of research conducted by(Anisha, 2016)that babies who are exclusively breastfed experience normal growth and development. The results of this study agree with(Aisha, 2017)that babies who get exclusive breastfeeding experience faster growth and development. Babies who are exclusively breastfed have good nutritional status so that babies are able to perform gross and fine motor skills well(Aisha, 2017). Theory(Bahrudin, 2016), babies who get breast milk will have normal gross motor skills, while babies who do not get breast milk will have more potential to experience gross motor development disorders.

Researchers argue that exclusive breastfeeding is very influential on the baby's gross motor skills. Exclusive breastfeeding for 6 months will ensure better motor development, then breastfeeding is continued for up to 2 years, because the duration of breastfeeding also affects the baby's gross motor skills. There are several factors that influence gross motor development. The main factor is nutrition, where babies who are exclusively breastfed will have better development. Babies who get exclusive breastfeeding will get good nutritional status so that in carrying out motor development activities the baby can do well.

In addition, many compositions of breast milk are very useful for supporting gross motor development, including DHA and AA,

which are long-chain saturated fats that form more optimal brain cells for motor development. Breast milk is also a complex fluid that contains all the nutrients needed for the development of a baby's gross motor skills. Babies really need exclusive breastfeeding because it is rich in antibodies to help the baby's body fight infections and other diseases so that the process of gross motor development is not disturbed and runs optimally(Bahrudin, 2016).

In this study, only 1 baby (7.7%) was given exclusive breastfeeding but experienced abnormal gross motoric development, that is, a 12-month-old baby was unable to stand for 30 seconds or hold on and was unable to walk even though he was guided. According to(Santoso, Patience. Mina Yumei Santi, Y., & Nasyiatush Sholihah, 2020). The baby's gross motor skills are not only affected by exclusive breastfeeding, but are also influenced by the stimulation given to the baby. Researchers assume that the lack of stimulation to the baby causes the development of the baby's gross motor skills to be delayed even though the baby has been exclusively breastfed. The child's motor development will depend heavily on how much stimulation and encouragement is given.

Of the 21 respondents who did not give exclusive breastfeeding, there were 9 respondents (34.6%) who had normal gross motor skills according to their age and 12 respondents (92.3%) had abnormal gross motor skills, namely a 6 month old baby could not lift his head up to 900 , sitting head straight, and the body rests on the feet. At the age of 8 months the child cannot turn over and hold his head upright. At the age of 10 months the child cannot get up to stand, gets up and sits, and stands on his own. Anggraeni (2016) good genetic factors from the family will form gross motor skills that develop and become good too(Anggraini et al., 2016). According to Anggraeni (2016) genetics is the basic capital in achieving the results of children's motor development. From the existing phenomena, researchers assume normal gross motor skills are caused because babies have good and supportive genetic factors so that the formation of gross motor development of babies will be optimal. This research is in line with what was done(Lisa, 2012), out of 192 children, 60 (31.2%) non-exclusively breastfed children had normal gross motor development(Lisa, 2012).

Based on the results of the study, there was a significant difference in the average

gross motor development of infants aged 6-12 months between babies who were exclusively breastfed and those who were not exclusively breastfed. The mean difference in the gross motor development of babies who were given exclusive breastfeeding was 1.54 ± 0.81 (Mean ± SEM). When compared with the average gross motor development of babies who were not given exclusive breastfeeding, namely 1.33 ± 0.76, the difference was 0. 21±0.05.

Based on the results of bivariate analysis with valuesα0.05, it is known that gross motor development is determined by mother's age (p=0.015), mother's education (p=0.023), exclusive breastfeeding (p=0.002) and growth (p=0.003). So, the variables of mother's age, mother's education, exclusive breastfeeding and baby's growth will be followed by multivariate analysis.

To get the best logistic regression model, a possibility analysis will be carried out which can be formed using SPSS software showing that to test the variable mother's age (X1), mother's education (X2), exclusive breastfeeding (X3), growth (X4), test the variable age and mother's education (X1 and X2), test variables of exclusive breastfeeding and infant growth (X3 and X4), test variables of mother's age, mother's education, and exclusive breastfeeding (X1, X2, X3), test variables of mother's age, mother's education and infant growth (X1, X2, X4), mother's age variable test, mother's education, exclusive breastfeeding and infant growth (X1, X2, X3, X4). Test variables with logistic regression analysis are presented in table 7.

The p value of the significance of the variable of exclusive breastfeeding is 0.024 <0.05, so H0 is rejected. So, it can be concluded that there is a significant difference between the gross motor development of infants and exclusive breastfeeding with a coefficient of difference of 3.219. The variable is exclusive breastfeeding (p value 0.024 <0.05). Then the best model formed is:

$$\hat{\pi}(x) = \frac{\exp(-8{,}651 + 3{,}219\ X_1)}{1 + \exp(-8{,}651 + 3{,}219\ X_1)}$$

Based on the results above, we can interpret the Odds ratio that exclusive breastfeeding is the main factor that distinguishes gross motor development in infants aged 6-12 months (p value 0.024 <0.05) compared to other factors, namely mother's age, mother's education and baby's growth according to KMS. Infants who

are not exclusively breastfed have a risk of 25,002 times experiencing impaired gross motor development compared to infants who are exclusively breastfed for 6 months.

Table 7. Multivariate analysis of logistic regression test

							95% CI for EXP(B)	
		B	SE	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1a	ASI_E	3,219	1,804	3,184	1	024	25,002	.729	858,077
	Age_mother	1,057	.863	1,501	1	.220	2,878	.531	15,614
	Dik_ibu	-1,241	1,583	.615	1	.433	.289	013	6,427
	Grow	1,382	.842	2,693	1	.101	3,982	.764	20,743
	Constant	-8,651	3,044	8,079	1	.004	.000		

Conclusion

Based on the results of the logistic regression test, it was concluded that there was a significant difference between the gross motor development of infants and exclusive breastfeeding, the coefficient of difference was 3.219. Exclusive breastfeeding is the main factor that determines the gross motor development of infants aged 6-12 months. Differences in gross motor development of babies who are given exclusive breastfeeding will be 25,002 times earlier than babies who are not given exclusive breastfeeding.

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Castration Punishment for Sex Offenders: Reproductive Health Science Review

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Abstract

Sexual crime is a form of crime in a society whose development is increasing based on their motives, traits, form, intensity, and modes. Women and children are subjected to victims of sexual crimes. The increase in sexual crimes caused the government to regulate castration punishment for sex offenders. Castration in health is surgery on the reproductive organs or using certain chemicals to reduce and eliminate sexual drive in men. The implementation of chemical castration in Indonesia is expected to have a deterrent effect on the perpetrators and prevent new cases of sexual violence. On the other hand, the implementation of chemical castration is thought to be against human rights. Related to the reproductive health perspective, castration as punishment can cause a decreasing reproductive function to come into sexual desire. Behavior aberration is a form of integrated multifactorial motives and the reason will not always biological factor or sexual drive. This article discusses the handling of sexual crimes that are comprehensively studied, especially in the area of reproductive health.

Keywords: castrated punishment; reproductive health, sexual crime

Kejahatan seksual merupakan salah satu bentuk kejahatan dalam masyarakat yang perkembangannya semakin meningkat baik dari segi motif, sifat, bentuk, intensitas, maupun modus pelaku. Anak dan perempuan menjadi sasaran korban kejahatan seksual. Peningkatan kejahatan seksual menyebabkan pemerintah mengatur hukuman kebiri bagi pelaku kejahatan seksual. Kebiri dalam ilmu kesehatan adalah pembedahan pada organ reproduksi atau menggunakan bahan kimia tertentu untuk mengurangi dan menghilangkan dorongan seksual pada laki-laki. Pelaksanaan kebiri kimia di Indonesia diharapkan memberikan efek jera pada pelaku dan mencegah kasus kekerasan seksual yang baru. Namun, pelaksanaan kebiri kimia dianggap pelanggaran Hak Asasi Manusia. Menurut perspektif kesehatan reproduksi, hukuman kebiri berakibat penurunan fungsi reproduksi termasuk hasrat seksual. Penyimpangan perilaku terjadi akibat integrasi multifaktorial motif dan alasan pelaku bukan hanya hasrat biologis saja. Artikel ini membahas penanganan kejahatan seksual yang dikaji secara komprehensif terutama ranah kesehatan reproduksi.

Kata Kunci: hukuman kebiri; kesehatan reproduksi; kejahatan seksual

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Introduction

Sexual crime is one form of crime in a society whose development is increasing both in terms of motives, traits, form, intensity, and mode of the culprit (Sarkar, 2013). Sexual crime is included in the category of crime that can cause anxiety, insecurity, and disrupt people's welfare (Kristiani, 2014). Sexual violence is now an important and complex issue of all incidents of violence against children and women (Amalia, 2011; Andini et al., 2019). Sexual crime against children and women does not escape the attention of various parties. Cases of sexual crimes are increasing from year to year. This has a traumatic impact on the victim (Hikmah, 2017).

Effective efforts need to be made to anticipate sexual crimes in children and women (M. Handayani, 2017). Castration punishment on sexual offenders is considered to provide a maximum deterrent effect and has been successfully applied by several countries in the world. The United States, South Korea, Estonia, and Turkey have implemented castration penalties for sex offenders (Hartono, 2013). Castration has also been applied in several countries in Europe (Aagaard, 2014).

Castrated can be divided into surgical and chemical (Richard, 2014). Castration in health is surgery performed on the male reproductive organs or providing hormonal drugs. Castration hormonal is known as chemical castration which is done to reduce the recidivism of sexual violence (Douglas et al., 2013). Chemical castration has advantages compared to surgical castration, one of which is reversible (Worley & Worley, 2018). The chemical castration process can be carried out through the consumption of pills or administering anti-androgen injections. The anti-androgen hormone is an anti-male hormone or anti-testosterone. Giving anti-androgen drugs will result in men lacking the hormone testosterone so they do not feel sexual desire or drive. Anti-androgen drugs will have the same effect as physical castration (Gooren, 2011). The application of castration punishment with a long period of time can cause a decrease in testosterone levels and have an impact on the male reproductive system (Wilson & Roehrborn, 1999).

The Indonesian Child Protection Commission (KPAI) found hundreds of cases of sexual violence against children. The perpetrators are generally the closest person to the stepfather and biological victim, the closest family, and his friend. Around 218 cases of child sexual violence occurred in 2015 and 120 cases of child sexual violence in 2016. Then in 2017, sexual violence against children and women in the personal sphere ranks second, namely in the form of rape by 72% (2,399 cases), in the form of sexual abuse as much as 18% (601 cases), and sexual harassment by 5% (166 cases). The most recent sexual crime in 2019 is a case of sexual abuse of 9 children committed in the city of Jombang, East Java (Mardiya, 2017).

The problem of sexual crimes continues to be monitored and anticipated by the government by making prevention efforts (T. Handayani, 2016). However, the increase in the number of sexual crimes against children and women is getting higher every year (Murdiyanto, 2017; Rofidah et al., 2017). From these indications, it appears that the criminal law enforcement system, especially to prevent various criminal practices in the sexual field is still weak. Generally, sexual crimes will be revealed when the victim complains or the victim's family reports sexual harassment has occurred (Suok, 2015). The government continues to show attention to the community by providing a sense of security, comfort, and peace. The good faith of the government is outlined in new regulations in which there are castrated criminal sanctions for perpetrators of sexual crimes against children. The sentence aims to prevent an increase in cases of sexual violence against children. The purpose of the formation of these regulations is to provide protection for children as the next generation of the nation (Adam & Mahyani, 2018).

The implementation of chemical castration in Indonesia is expected to be able to provide a deterrent and deterrence effect to perpetrators of sexual violence. The majority of the community is aware that castration sanctions aim to reduce sexual crimes against children effectively (Heathcote, 2020). However, castration punishment as an indirect criminal sanction can be accepted by the general public. Some groups firmly reject castration sanctions on sexual offenders because they consider the

punishment inappropriate and violate human rights (Rohmawati, 2018).

The perspective of reproductive health science states that humans who commit behavioral deviations not only have one problem point but are multifactorial integrated. So, the reason for the offender is not only biological desire. Genetics, stressful life, special learning processes, and disturbances in the structural integrity of the brain can produce specific phenotypes of distorted sexual preferences (Tenbergen et al., 2015). This shows that the handling of sex offenders must be comprehensively studied. Therefore, this review is structured to illustrate changes in the behavior of sex offenders before and after castration punishment.

Method

This study shared the perspective of reproductive health review, in which describe the implementation of castration in sexual violence cases. The criteria for the references must be contain castration, include chemical or physical as a punishment. The problem of sexual violence in women and child sentenced as a complicated case and need to find comprehensive solutions. Criticizing the problem with various research studies to gain more alternatives to protect the women and child from sexual violence.

The references were analyzed through multifactorial documents analysis such as health, law, and humanity. The study covered the problem of sexual violence in Indonesia with the castration as potentially punishment. Reproductive health issues became pro and contra in the community due to chemical castration effect on male reproductive function. This article showed the problem of sexual violence in the community and identified the solutions.

Result and Discussion

This research found that the perspective of the community in Indonesia about sexual perpetrators need the worst punishment which is chemical castration. Some sentenced that it is beyond the human right and it needs to consider the quality of life after castration punishment. Numerous countries have been applied castration with pro and contra related to the male reproductive issues. The issues is not just

infertility but also metabolism and depression carried out by chemical castration in men.

Implementation of Castration Punishment in the World

Some countries in the world have implemented castration punishment, although not many people can accept the implementation of the sentence. The practice of surgical castration in humans is not a new phenomenon. As far back as the fifth century, castration was carried out as a form of retribution on those who committed rape or adultery. Castration punishment in several countries becomes a punishment for sexual criminals, both rapists, and pedophiles. Generally, castration is done by injecting certain chemicals using two drugs namely cyproterone acetate and medroxyprogesterone acetate. The drug cyproterone acetate has been used for chemical castration in Europe while in America uses medroxyprogesterone acetate (Harrison, 2011).

The use of castration in Europe for sex offenders as a form of treatment has existed since the beginning of the 20th century. Denmark pioneered the first law in 1929 and legalized this type of medical intervention for sex offenders (Phenix & Hoberman, 2015). Shortly thereafter, Germany (1933), Norway (1934), Finland (1935), Estonia (1937), and Sweden (1944) imposed similar laws (Igoumenou, 2020). Germany used anti-androgens as a treatment for sexual paraphilia in the 1960s. That practice is part of treatment and not as a punishment. Norway has practiced castration since before World War II. There has been no follow-up or changes in the castration law in that country. Finland imposed castration punishment but has long since begun to be abandoned (Hagman, 2014). Then the Estonian government began imposing chemical castration sentences on sex offenders in 2012. Castration punishment in Estonia mainly applies to pedophiles. Sweden has been implementing castration penalties since before World War II and there has been no change in the rules of punishment (Syafrina, 2016). The United Kingdom has long implemented castration punishment, even 25 prisoners voluntarily received chemical injections in 2014. The policy is a derivative after World War II. At that time, homosexual acts between men were still illegal. Homosexuality is widely

regarded as a mental illness that can be treated with chemical castration. Nine states in the United States, namely California, Florida, Oregon, Texas, and Washington have also implemented castration penalties (Angkat, 2017).

Sexual criminals in Russia after being diagnosed with pedophilia by doctors can be castrated. The sentence threatens sex offenders who attack children under the age of 14 years. The Moldovan government began imposing castration penalties on child sex offenders in 2012. Poland has also been implementing castration penalties since 2010 and is still valid today. Poland has laws for mandatory chemical castration for the persecution of children under 15 years of age when convicts are released conditionally into society (Goswami, 2014). Castration punishment is given to child rapists. The prisoner should be accompanied by a psychiatrist before serving his sentence (Usfunan et al., 2017). Castration punishment in Argentina has only been enacted in one province namely Mendoza since 2010. Also, every sex offender or rapist in Mendoza is threatened with castration punishment chemically. Chemical castration penalties also apply in several states in Australia, namely western Australia, Queensland, and Victoria. In 2010, a child sex offender who was repeatedly caught in law in North Queensland was brought to trial again for harassing a minor. This man had served his castration chemical sentence before by voluntarily receiving treatment to reduce his libido (Ronken, 2017).

Two sex offenders in Victoria agreed in 2012 to undergo chemical castration sentences. Denmark has also been implementing castration penalties since before World War II. From 1935 to 1970 Denmark gave sexual offenders the choice of prison or surgical castration (Madnur, 2019). Turkey plans to start implementing castration chemical laws for pedophiles. The perpetrators of sexual crimes in the Netherlands can choose the punishment for him, whether imprisoned for a long time or neutered. Castration is done chemically. That is, for castration, the perpetrators may voluntarily ask for spaying to reduce sexual desire that is not fair or deviant sexual actions. The perpetrators of sexual crimes in France are also allowed to choose their sentences, choose to be jailed for a long time or neutered. Castration is also done

chemically (Eddyono et al., 2016). South Korea was the first country in Asia to legalize castration punishment (Koo et al., 2014). The law was passed in 2011 and permits castration injections into sexual crime defendants over the age of 19. The implementation of the sentence received a lot of criticism from the public. The injection given is leuprolide acetate (LA), a Gonadotropin-releasing hormone (GnRH) agonist, for three (3) months. Besides, Taiwan also applies special castration injections on pedophilia and recidivists of child sexual crimes (Azizah, 2017).

Castration Penalty Regulation in Indonesia

According to Christiansen's statement, "*the conception of problem crime and punishment is an essential part of the culture of any society*". The same was expressed by W. Clifford, "*the very foundation of any criminal justice system consists of the philosophy behind a given country*". The Indonesian state is based on Pancasila and the national development policy line aims to form a "Whole Indonesian Man". If the criminal is used as a means to an end, the humanistic approach must also be considered. This is important because the crime is essentially a humanitarian problem. Criminal contain elements of suffering that can attack the interests or values that are most valuable for human life (B. Arief, 2016). The Indonesian government responds responsibly to the phenomenon of crime against children and women. The stipulation of castration chemical punishment has been regulated in RI Law No. 17 of 2016 concerning the second amendment to Law No. 23 of 2002 concerning Child Protection. The President issued PERPPU No. 1 of 2016 as a result of the Second Amendment to Law Number 23 of 2002 concerning Child Protection. Article 81 of the revised law enforces chemical castration by force as additional punishment in article 76D for "*Anyone who commits violence or threatens violence to force children under 18 to have intimate relations with him or with others who cause more than one victim, serious injury, mental illness, infectious diseases, disruption or loss of reproductive function and / or the victim died*". Castration of chemicals will be carried out against the offender for a period of up to two years after the convicted serving a prison sentence. Offenders under the age of 18 are not subject to this penalty (H. Arief, 2017).

Generally, there are three difficulties that law enforcement officials might encounter in the process of enforcing chemical castration actions for sex offenders. Difficulties that might be found in the process of applying this castration chemical action is the difficulty to find the right executor. The doctor who is supposed to be the executor of this action provides rejection. Thus, the process of enforcing the punishment is considered difficult to enforce existing regulations with the conditions of the community and law enforcement officials who do not cooperate. This often happens among people who find it difficult to work together to carry out castration punishment. The rejection of the Indonesian Doctors Association (IDI) to become castrated executor in castration law enforcement raises the pros and cons. Council of Honor and Ethics of Medical Oath (MKKEK, Kodeki) Number 1 of 2016 towards Law No. 1 of 2016 states that the castration executor is a team of doctors (Saudi, 2016).

Amnesty International in 2016 stated that authorities in Indonesia must immediately revoke provisions that allow sex offenders to be punished by forced castration and even death. Sexual abuse of children is terrible. But the perpetrators who get chemical castration or execution are not justice. That adds to one cruelty to the other. Enforcement of castration chemical punishment legally without written consent as an act of punishment will be a cruel, inhuman, and degrading punishment of humans (Amnesty International, 2016).

Indonesian Community Perspective Regarding Castration

Castration punishment is against Human Rights (Human Rights) as stated in various international conventions that have been ratified in our national law including the Covenant on Civil and Political Rights (Covenant on Civil Rights / ICCPR), the Anti Torture Convention, and also the Convention on the Rights of the Child, corporal punishment in all forms must be interpreted as a form of torture and deeds of human dignity first if intended for retaliation with the main reason that the deterrent effect is scientifically doubtful (N. Hasanah & Soponyono, 2018).

The implementation of chemical castration is considered a violation of human rights. Human rights are essentially

the most basic rights possessed by all human beings as the supreme gift of God Almighty. The constitution states that the State must not punish humans by degrading human rights and human values. All actions that include violence, torture, cruel, inhuman or degrading punishment are considered contrary to the Constitution of the Republic of Indonesia (Hutapea, 2016). The implementation of chemical castration was considered by some to only focus on the perpetrators' retaliation, not on improving the action of the perpetrators. Castration law seems to return to the colonial era which is oriented to retaliation even though Indonesia has abandoned the theory of retaliation. Indonesia is now oriented to the goal of criminal justice to improve the personal perpetrators themselves, in addition to paying attention to the interests of victims (Krismiyarsi, 2018).

Organisms have antecedent functions, behavior, and consequence factors. The antecedent function is divided into two, namely distal/ past which contains significant and proximal/ initial experiences and events that are multifactorial, conditions, and situations. Habit into action is formed through cognitive function, distortion, frequency, intensity, number, duration, and meaning of events. After that, the consequence factor can be obtained from the proximal/initial impact: in the form of gratification, and the distal/past impact: in the form of social sanctions (Picture 1) (Wilcox et al., 2015).

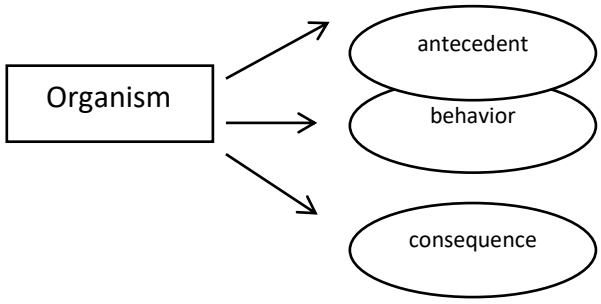

Figure 1. Organism Variable

Some people are worried that the perpetrators will become more aggressive because of psychological and social factors when castration is implemented in Indonesia. Negative feelings, such as hurt, anger, and revenge, have been formed since the perpetrator feels victimization on him. The social and psychological impact can be felt by the offender who receives castration punishment so that psychological and social assistance is needed to the perpetrator during and after serving the sentence (McMillan, 2013). Some argues that castration punishment is considered effective if it is adjusted with evidence that guarantees the use of chemical castration reduces the amount of violence against children and women (Tullio, 2010). The bad actions of someone who commits sexual crimes causes fear in the community. Generally, fear is felt by parents and women. This resulted in a reduction in security and comfort as a resident. Appropriate protection mechanisms and solutions are needed to deal with sexual offenders. Sexual violence is not just one problem but is a combination of moral, legal, and social deviations. Current developments reveal that therapy for sex offenders is chemical castration (Dibennardo, 2018).

Sentencing must be reviewed in terms of psychological and physical effects. The application of punishment should be regulated to the maximum so that everyone can think about the effects of actions obtained after committing a crime, especially the crime of rape of children. However, if we look again that criminal sanctions do not lie in the maximum threat, but rather on the purpose of criminal law, namely the effectiveness of the criminal law itself, so that people comply, obey, and do not commit criminal acts (Spriyono, 2020). The role of the perpetrator's environment is also very important to avoid recidivism and help the perpetrator to understand that sexual crimes are actions that are far from humanitarian principles (Kim et al., 2016). Deviant action known as crime requires an explanation by looking at the structural conditions that exist in society. Deviant action can be assessed in the context of power inequality, prosperity, and the field of authority relating to changes in the economic and political sectors in society. The limit of the size of the deviation is not only determined by the values and norms that are considered valid by the authorities, but by the size of the loss or severity (social injuries) caused by the act. Deviant action as a social process is considered to occur as a reaction to

one's class life. The main values in question are justice and protection of human rights (Handy et al., 2016).

The implementation of chemical castration is a new punishment in Indonesia. Pros and cons still occur related to the implementation of these actions. The implementation of castration crime is expected to be able to provide a deterrent effect and prevent new cases or prevent perpetrators from repeating the same mistakes so that they are expected to reduce the level of sexual crimes. The effects on everyone are not the same. This condition makes castration sanctions continue to cause pros and cons, including in developed countries. The debate is not only about human rights not to torture sanctions, but also there is no relationship between the cause of a person committing sexual crimes and the form of punishment. This shows that if the castration injection has not been proven to be able to suppress sexual crime cases (Khan & Mashru, 2016).

Children and Women as Victims

There are four main types of sex offenders. Type-I, the offender will deny committing an offense or criminal nature of the actions taken. Type-II, the offender claims to have committed a crime but blames non-sexual powers such as drugs, stress, alcohol, anger, strength, violence, and so on. Type-III, the offender is motivated by non-sexual emotions, such as anger or strength. Type-IV: parafiilia (Phenix, 2016).

The problem of crime and discrimination against children and women is increasing for a variety of reasons. Sexual violence that occurs in children and women should be considered as a form of violence that violates human dignity and dignity (Sumera, 2013). This form of action is a violation of norms, values, or decency in society. Sexual crime is a complex problem starting from the formulation of the problem to the evidence in court (Hermawati & Sofian, 2018). Women and girls generally become victims of sexual crimes. Incorrect dress code for someone, whose appearance is too attractive, mixed with the opposite sex, lack of awareness, disability, environmental factors, and problems in the family predispose to sexual harassment (Jayapalan et al., 2018). In contrast to other acts of violence, cases of sexual violence against children have a far more serious impact on children, both directly and long term. Cases of sexual crimes in children do not just leave physical injuries. This anarchistic act will have a bad effect on the

child's future. Adverse effects related to emotional, social, and psychological development (Kirton, 2011).

Sexual violence against women is considered to occur because of a value system that places women as weak and inferior to men. Women are still placed in positions of subordination and marginalization that can be controlled, exploited, or enslaved by men. Women are still seen as second class citizens. The action of sexual violence against women are an ongoing threat to women and have become a global issue. This sexual crime is then connoted as a crime against women because of their gender characteristics that are related to their role and position in the community. Therefore, this crime is referred to as gender-based violence (UNHCR, 2001).

Castration Penalty in Reproductive Health Study

Castration in terms of the medical world is also known as castration. Castration punishment which is often done is castration chemical punishment. The process can be through administering pills or anti-androgen injections. Anti-androgen hormone is a male anti-hormone /anti-testosterone. Anti-androgen drugs are considered to have the same effect as physical castration (Gabbard, 2001). Castration surgery with removal of the testicles results in the loss of certain parts of the reproductive organs permanently. Chemical castration is preferred because of the more practical and reversible consideration. Chemical castration is an act of injecting anti-testosterone into the male body to reduce levels of the hormone testosterone (Gomella, 2009).

The hormone testosterone is the main hormone in men that plays a role in a variety of functions, one of which is sexual function. That is, the testosterone effect on male sexual arousal (Celec et al., 2015). Testosterone and dihydrotestosterone hormones are responsible for sexual obligations. Testosterone production in men occurs mostly through the secretion of Leydig cells in the testes (Zirkin & Papadopoulos, 2018). Male reproductive function is important to maintain not only in terms of sexual drive. The role of hormonal coordination such as testosterone as one of the steroid hormones helps communication organs between the brain, the hypothalamus, and the anterior pituitary to the testis. In addition, testosterone is also needed for fat metabolism, maintaining bone strength, to the main

function of sperm formation or spermatogenesis (White & Porterfield, 2013). Chemical castration treatment by providing anti-testosterone results in impaired coordination between the brain and testicles resulting in decreased reproductive function. Chemical castration results in a decrease in testosterone levels, frequency and intensity of sexual arousal, frequency of masturbation, and sexual fantasy. The application of the castration penalty for a long period of time can lead to a drastic reduction in testosterone levels and adversely affects the male reproductive system. Some of the effects are a decrease in testicular function in the process of spermatogenesis, decreased activity of body fat metabolism, loss of sexual desire, and an increased risk of depression (Nieschlag et al., 2012).

Some of the side effects of chemical castration are decreased fertility, increased blood pressure, weight gain, hot flushes, fatigue, headaches, sleep disorders, disorders of sugar and lipid metabolism, and breast enlargement. The further serious impact of castration is to induce infertility, impotence, increase in the number of abnormal spermatozoa, decrease ejaculation volume, shrinkage of the seminal vessels causing hypogonadism, gynecomastia and so on (Wibowo et al., 2016). According to ethical point of view, the offender will be subject to hormonal treatment if several conditions that have been considered are met. First, the person has a paraphilia disorder diagnosed by a psychiatrist after an examination by a psychiatrist. Second, specific hormonal treatment of clinical signs, symptoms, and behavior that are tailored to the person's health condition. Third, the person's condition shows a significant risk of serious harm to his health or the physical or moral integrity of others. Fourth, there are no intrusive treatment tools available. Fifth, the psychiatrist is responsible for the patient who agrees to inform and take responsibility for the indications of the treatment and follow up including the somatic aspects. If necessary it can involve a consultant or endocrine expert (Thibaut et al., 2010).

Chemical castration penalties aim to reduce the deviant action of sex offenders (Wong & Gravel, 2018). Moreover, sanctions are effective anticipatory measures. Its specifications do not cause suffering or deprive independence and can restore certain

circumstances for the perpetrators and victims of both individuals, both public and civil (Soekarini, 2018). Studies of two different male populations who have undergone surgical castration have shown the impact of bilateral orchidectomy on sex drive, the capacity to maintain erections, and sexual interest. The impact was shown in sex offenders and patients with testicular/ metastatic prostate cancer. Newer oncology studies have the benefit and control of samples of better design than surgical castration trials that were formerly among sex offenders and can offer several empirical markers for sexual function (Weinbenger et al., 2005).

Castration punishment seems to be a type of cruel or sadistic punishment. Actually, the sentence is not commensurate with the impact that must be borne by the victim. Victims who receive sexual violence will experience severe depression, loss of future, and it is very likely that victims can be infected with infectious diseases, disrupted or lost reproductive function, experiencing mental disorders, and also lost their lives. In addition, sexual crimes can result in pregnancy and childbirth at the risk of maternal and infant death, unwanted pregnancies that often and often lead to unsafe abortion and its complications (H. Hasanah, 2016). Numerous research results indicate that castration punishment can be reversible. The effectiveness of anti-testosterone given in chemical castration penalties will be lost after the drug is stopped (Lee & Cho, 2013). The other fact states that the administration of anti-testosterone in a certain period has a different effect including returning the level of male fertility in different periods of time, although the exact mechanism is unknown (Swerdloff, 2019). Chemical castration punishment requires an in-depth study to adjust to the perpetrators' reproductive, psychological, and social functions. Anti-testosterone in the chemical castration is known to be reversible so that it can restore male fertility and sexual ability after giving it stopped due to psychological factors that can cause sexual arousal (Ratkoceri, 2017). When the injection period has been stopped, in men with hypersexual impulsively experience a surge in serum testosterone (Fong, 2006).

Based on the above, chemical castration can be used as an appropriate punishment imposed on perpetrators of sexual crimes against children and women or even as an

inhuman punishment. Chemical castration penalties can only be carried out after a judge's decision has been considered and carried out in a way or method based on applicable provisions. In addition, in the process of giving a sentence must pay attention to the rights of each party including the perpetrators and accompanied by a rehabilitation process (Sudewo & Abdurrahman, 2020). According to the main health perspective from the field of reproductive health, humans who commit action deviations do not only have one problem point. Problems that occur due to integrated multifactorial. If only the castration punishment, both chemical and physical, will not be effective if the motives or reasons of the perpetrators are not just biological desires. This shows that the handling of sexual offenders must be comprehensively studied to bring positive impacts to the continuity of a safe, peaceful, and healthy society as a whole.

Changes in Behavior Prevent Sexual Crimes in Children and Women

Interventions to prevent rape are carried out multifactorial in the fields of culture, media, and education. Programs are needed to raise awareness and change individual action and to regulate mass media. There are also some practices in the world of education that promise to change action in a positive direction. Mass media regulations have also been suggested not to include the true identity of the report or the anonymity of rape cases (Walby et al., 2013). Positive activities can be carried out to limit the circulation of pornography by involving children. The family relationship approach can influence interactions within the family and avoid the negative influence of peers. Health education also needs to be done in schools to increase children's awareness and provide information to parents about reproductive rights and how to maintain reproductive health. Educational programs in schools are expected to encourage positive attitudes and behavior in children (Miswanto, 2014).

Various efforts have been made by the state in order to improve the lives of women. Protection efforts continue to be made to eliminate discrimination against women. One way to prevent sexual crime is through empowering women. This needs to be improved and properly facilitated to increase women's participation in the decision-making process. Based on Indonesian statistics it is known that the number of women occupying

presentations is greater than men, which is 50.3%. This data shows that women are a greater resource than men. If supported by good quality and experience, women's welfare will improve (Fitri, 2010).

Women's empowerment is defined as a process of increasing awareness and capacity that leads to greater participation in making greater decisions. Empowering good women will reduce all forms of violence against women, including rape. In addition, women can exercise control for transformative actions in a better direction. Some forms of women's empowerment practices can be carried out in activities that involve democratic and independent economies (UNCITRAL, 2019).

Conclusions

Perpetrators of sexual crimes are a major threat to society, especially children and women. Rape is not limited to manifestations of extreme sexual urges but is allegedly due to violence, power, and aggression on perpetrators. Sexual crimes occur multifactorial reasons either intrinsically or extrinsically. Generally, these actions are considered as a response to uncontrolled sexual desire.

Castration is also called castration or castration. Castration is a surgical procedure and or uses certain chemicals to intending to reduce or eliminate the function of the reproductive organs and sexual desire. Castration punishment is still reaping the pros and cons in Indonesian society. Regulations that have been ratified through the Law on castration punishment of Indonesia have not yet known the actual impact because no perpetrators have been executed of castration to date. Some think that castration can be an appropriate sentence imposed on sex offenders against children and women. Others consider castration punishment as an inhuman punishment.

This perspective study recommend that castration is not the only option for punishment and it needs to ensure that is not another health problem. The cases with behavior aberration, psychology disorder, or mental health need support from multi sector to build strong protection for sexual violence cases.

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Implementation of the Anti-Anemia Student Program (Mahamia) in Classes of Pregnant Women

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Abstract

The prevalence of anemia among pregnant women based on WHO data is still quite high at 41.8%. Anemia has a bad effect on the mother, both in terms of pregnancy, childbirth, and postpartum, namely abortion, premature, low birth weight, prolonged labor, postpartum hemorrhage, shock, intrapartum and postpartum infection, and can even cause maternal death. Adherence to consuming Fe tablets was measured by the accuracy of the amount, method, and frequency of consumption per day. The non-compliance of pregnant women taking Fe tablets can have a greater chance of developing anemia. The Class Program for Pregnant Women (KIH) is a means to learn together about health for mothers in groups that aim to increase knowledge and skills about pregnancy, pregnancy care, understanding, attitudes, and behavior of pregnant women in nutritional management, including giving Fe tablets to control anemia. Midwifery students as prospective health workers must have competence in providing midwifery care for pregnant women, one of the competencies is handling anemia and pregnant women. The purpose of this study was to determine the increase in Hb in pregnant women through the Anti-Anemia Student Program (Mahamia) through KIH. This study used a true experimental design with a pre-posttest control group design. The research was conducted in the working area of Public Health Center Leuwigajah Cimahi, with purposive sampling, the number of intervention groups was 20 respondents and the control group was 20 respondents. The research analysis used a paired t-test with the result that there was an increase in the mean Hb in the intervention group before and after treatment was 9.075 to 11.180 with an ap value of 0. 000 (p> 0.05), and there was an increase in the mean Hb in the control group before and after treatment, 10.150 to 11.016 with an ap value of 0.000 (p> 0.05). From the research results, it is hoped that the Mahamia Program through KIH can increase Hb levels in pregnant women who are anemic.

Keywords: Anemia; pregnant mothers; Pregnant Women Class; Mahamia

Prevalensi anemia ibu hamil berdasarkan data WHO masih cukup tinggi yaitu sebesar 41,8%. Anemia memberikan pengaruh buruk bagi ibu, baik dalam masalah kehamilan, persalinan, nifas, yaitu abortus, prematur, BBLR, partus lama, perdarahan post-partum, syok, infeksi intra partum maupun post-partum bahkan dapat menyebabkan kematian ibu. Kepatuhan mengonsumsi tablet Fe diukur dari ketepatan jumlah, cara, dan frekuensi konsumsi perhari. Ketidakpatuhan ibu hamil meminum tablet Fe dapat memiliki peluang yang lebih besar untuk terkena anemia. Program Kelas Ibu Hamil (KIH) merupakan sarana untuk belajar bersama tentang kesehatan bagi ibu dalam kelompok yang bertujuan meningkatkan pengetahuan dan keterampilan mengenai kehamilan, perawatan kehamilan, pemahaman, sikap dan

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perilaku ibu hamil dalam pengaturan gizi termasuk pemberian tablet Fe untuk penanggulangan anemia. Mahasiswa kebidanan sebagai calon tenaga kesehatan harus memiliki kompetensi dalam melakukan asuhan kebidanan pada ibu hamil, salah satu kompetensinya adalah melakukan penanganan pada ibu hamil anemia. Tujuan penelitian ini untuk mengetahui peningkatan Hb pada ibu hamil melalui program Mahasiswa Anti-Anemia (Mahamia) melalui KIH. Penelitian ini menggunakan rancangan *true experiment* dengan *pre-posttest with control group design*. Penelitian dilakukan di Wilayah kerja Puskesmas Leuwigajah Cimahi, dengan *purposive sampling*, jumlah kelompok intervensi 20 responden dan kelompok kontrol 20 responden. Analisis penelitian menggunakan uji t berpasangan dengan hasil terdapat peningkatan rerata Hb pada kelompok intervensi sebelum dan setelah diberikan perlakuan yaitu 9.075 menjadi 11.180 dengan nilai p 0.000 (p>0.05), dan terdapat peningkatan rerata Hb pada kelompok kontrol sebelum dan setelah diberikan perlakuan yaitu 10.150 menjadi 11.016 dengan nilai p 0.000 (p>0.05). Dari hasil penelitian Program Mahamia melalui KIH mampu meningkatkan kadar Hb pada ibu hamil yang anemia.

Kata Kunci: Anemia; Ibu Hamil; Kelas Ibu Hamil; Mahamia

Introduction

Anemia is a nutritional problem in Indonesia that must be taken seriously, especially nutritional anemia. Nutritional anemia is a health problem that plays a role in causing high maternal mortality rates, infant mortality rates, and low work productivity, work performance, sports achievements, and learning abilities (Ramadani & Mayoritha, 2012). Overcoming nutritional anemia is one of the potential programs to improve the quality of human resources. Pregnant women are a group that is vulnerable to nutritional problems, especially anemia due to iron (Fe) deficiency (Ramadani & Mayoritha, 2012) (Fatimah et al., 2011). According to (Riskesdas, 2018)in Indonesia, the prevalence of anemia in pregnant women is quite high, namely 48.9%, an increase from 2013 of 37.1%. Citing the health profile of Cimahi City, the prevalence of anemia in pregnant women is 8.81% (Cimahi City Health Office, 2018).

Iron tablets during pregnancy are very important because they can help the process of forming red blood cells so that they can prevent anemia/anemia. Iron deficiency (iron deficiency anemia) during pregnancy can have an adverse impact on both the mother and the fetus, including low birth weight (LBW), premature birth, and bleeding during delivery. The success of the program to prevent and treat anemia in pregnant women depends on the distribution of iron supplements in adequate quantities and individual adherence to treatment.(Eka Devi Utami, Lilin Turlina, 2010) (Agustiningsih &

Muwakhidah, 2018) (Anggraini, 2018). The impact if pregnant women do not want or don't regularly take iron tablets at the right dose can cause anemia or anemia will not be treated.(Adi et al., 2012) (Lestari, 2015). There are several factors that influence the adherence of pregnant women to consuming iron tablets, including the behavior of health workers, the mother's motivation, family role, mother's knowledge. Non-compliance occurs because pregnant women feel nauseous due to the taste and smell of iron tablets, and feel bored so pregnant women often forget and are lazy to consume them (Lestari, 2015).

There are many causes that make pregnant women disobedient in taking iron tablets, an appeal to health workers is needed to increase the knowledge of pregnant women by providing health education about the benefits of iron tablets (Lestari, 2015) (Nursani, 2018). Health education is an activity to convey messages to individuals, groups or communities in the hope that with health education one can gain knowledge about health and this knowledge is expected to influence behavior change (Handayani, 2013).

The Pregnant Women Class (KIH) is a health program that is expected to play a role in reducing morbidity and mortality due to pregnancy, childbirth and the puerperium. KIH is a shared learning tool that pregnant women need to follow in order to gain sufficient knowledge, so as to prevent complications in pregnancy and to be able to change behavior to be positive so that it is expected that mothers can have their pregnancies checked and give birth to health workers. The purpose of holding KIH is to increase mother's knowledge about maternal and child health, so as to reduce the occurrence of maternal mortality (Andriani et al., 2016) (Agustiningsih & Muwakhidah, 2018) (RI Ministry of Health, 2014). The purpose of this study was to determine the increase in hemoglobin in pregnant women through the Anti-Anemia Student Program (Mahamia) through classes for pregnant women.

Methods

This study uses a true experiment design with pretest-posttest with control group design. The sample in this study were pregnant women with anemia in the 1st and 2nd trimesters in the working area

of the Leuwigajah Health Center, South Cimahi, with a total of 40 pregnant women. Techniques*sampling* used is*purposive sampling*in a manner*random sampling.*

The sample in this study was divided into 2 groups, namely the intervention group and the control group. The intervention group and the control group were previously examined for hemoglobin (Hb). Furthermore, the intervention group was given Health Education through the pregnant women class for 4 meetings, then monitored compliance with Fe consumption and fulfillment of balanced nutrition using a monitoring card by midwifery students (Anti Anemia Student program), while the control group was given Health Education in the pregnant women class 2 meetings and without monitoring compliance with Fe consumption, the evaluation was carried out for 2 months (8 weeks). Doing the final test (*posttest***)**performed to determine the increase in hemoglobin levels. Data analysis used paired t test. The following is the flow of this research:

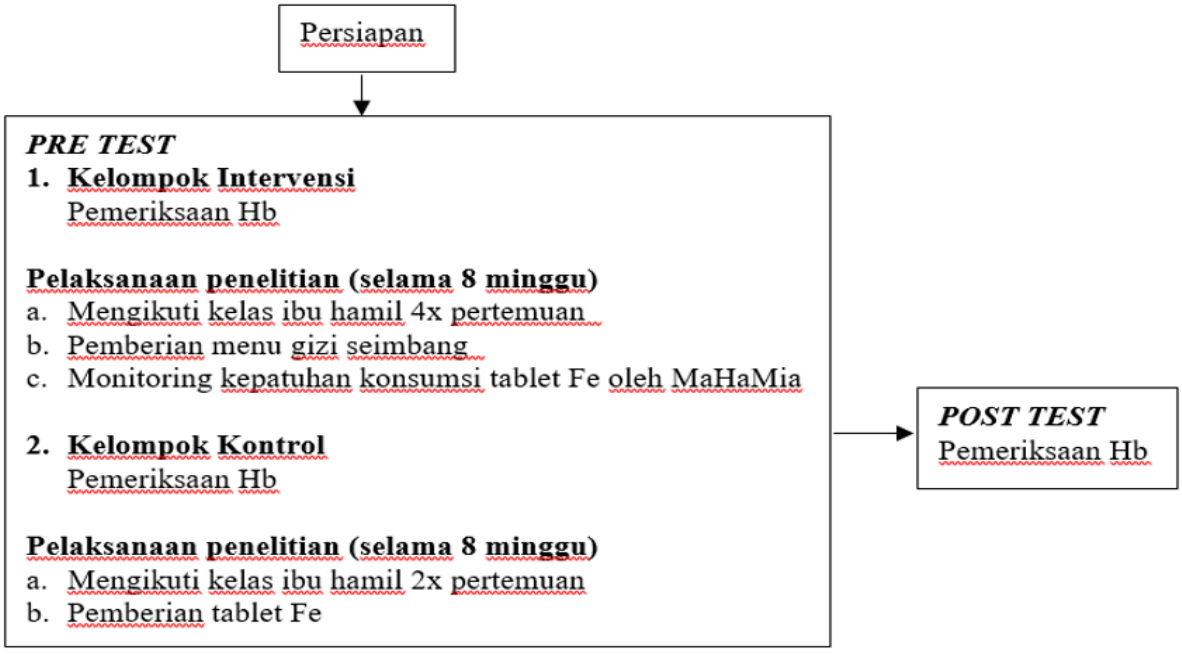

Figure 1. Research Flow

Results and Discussion

This research was conducted in the Work Area of the Leuwigajah Community Health Center, Jl. Kihapit Barat RT. 08/09 Leuwigajah Kec. South Cimahi, Cimahi City, with research respondents being first trimester pregnant women who experience anemia. This study aims to determine the increase in Hb in pregnant women through the Anti-Anemia Student (Mahamia) program through pregnant women classes. This research was conducted in April - September 2020 in the working area of the Leuwigajah Health Center, Cimahi City. During the pretest, Hb examination was carried out for pregnant women in the first trimester at the Leuwigajah Health Center and the working area of the Leuwigajah Health Center. This examination aims to determine the Hb level of pregnant women. Based on the results of the examination, pregnant women with anemia were divided into 2 groups, namely the intervention group and the control group. After the pretest activities, the intervention group participated in class activities for pregnant women which were held every 2 weeks for 4 meetings, followed by monitoring adherence to taking Fe tablets and consuming a balanced nutritional menu once every 1 week by midwifery students (Mahamia Program). In the control group, class activities for pregnant women were carried out every 1 month for 2 meetings, pregnant women were given Fe tablets without any monitoring from Mahamia. In the Posttest activity, pregnant women were collected again for Hb examination at the Leuwigajah Health Center. Based on the research, the results of univariate and bivariate data were obtained as explained in the table below: followed by monitoring adherence to taking Fe tablets and consumption of a balanced nutritional menu once a week by midwifery students (Mahamia Program). In the control group, class activities for pregnant women were carried out every 1 month for 2 meetings, pregnant women were given Fe tablets without any monitoring from Mahamia. In the Posttest activity, pregnant women were collected again for Hb examination at the Leuwigajah Health Center. Based on the research, the results of

univariate and bivariate data were obtained as explained in the table below: followed by monitoring adherence to taking Fe tablets and consumption of a balanced nutritional menu once a week by midwifery students (Mahamia Program). In the control group, class activities for pregnant women were carried out every 1 month for 2 meetings, pregnant women were given Fe tablets without any monitoring from Mahamia. In the Posttest activity, pregnant women were collected again for Hb examination at the Leuwigajah Health Center. Based on the research, the results of univariate and bivariate data were obtained as explained in the table below: In the Posttest activity, pregnant women were collected again for Hb examination at the Leuwigajah Health Center. Based on the research, the results of univariate and bivariate data were obtained as explained in the table below: In the Posttest activity, pregnant women were collected again for Hb examination at the Leuwigajah Health Center. Based on the research, the results of univariate and bivariate data were obtained as explained in the table below:

Table 1. Frequency Distribution of Respondent Characteristics

Variable	F	%
Intervention Group		
Age		
No Risk	19	95.0
Risk	1	5.0
Education		
Low education	3	15.0
Moderate education	10	50.0
Higher education	7	35.0
Work		
Doesn't work	17	85.0
Work	3	15.0
Parity		
Primipara	6	30.0
Multipara	11	55.0
grandmulti	3	15.0
Total	20	100.0
Control Group		
Age		
No Risk	17	85.0
Risk	3	15.0

Education_		
Low education	5	25.0
Moderate education	13	65.0
Higher education	2	10.0
Work		
Doesn't work	10	50.0
Work	10	50.0
Parity		
Primipara	7	35.0
Multipara	10	50.0
grandmulti	3	15.0
Total	20	100.0

Based on Table 1, it shows that in the intervention group there were 19 respondents (95%) with age not at risk, as many as 10 respondents (50%) with medium or high school education levels, as many as 17 respondents (85%) did not work or were housewives, as many as 11 respondents (55%) were multiparous. In the control group there were 17 respondents (85%) of non-risk age, 13 respondents (65%) with medium or high school education levels, 10 respondents (50%) did not work or were housewives, 10 respondents (50%) are multiparous.

Table 2. Differences in Average Hb Before and After in the Intervention Group and the Control Group

Variable	Pre	Post	% Increase	p-value*
Hb_Intervention				
Means	9075	11.180	23.2%	0.000
Median	9050	10,950		
SD	1.0452	0.8532		
Minimum-Maximum	7.2-10.6	9.8-13.4		
Hb_kontrol				
Means	10,150	11016	8.5%	0.000
Median	10,200	11.150		
SD	.3791	.7802		
Minimum-Maximum	9.4-10.9	9.2-12.1		

*paired t test

Based on the table. 2 shows that there was an increase in the average Hb in the intervention group before and after being given treatment, namely 9,075 to 11,180 with a percentage increase of 23.2% and a p value of 0.000 (p> 0.05), it can be concluded

that there is a difference in Hb values before and after being given treatment in the intervention group. In the control group, it was found that there was an increase in the average Hb before and after being given treatment, namely 10,150 to 11,016 with a percentage increase of 8.5% and a p value of 0,000 (p> 0.05), meaning that there was a difference in Hb values before and after being given treatment in the control group. This study showed an increase in the average hemoglobin before and after anemic pregnant women attended classes for pregnant women, with a p-value of 0.000> 0.005. Good health behavior such as adherence to taking Fe Tablets during pregnancy cannot be formed just like that, but is influenced by many factors. According to(S. Notoadmodjo, 2012)Health behavior is an individual response to certain objects related to the incidence of disease, the health care system, food and drink, and the environment. Notoatmodjo also stated that efforts to change individual behavior for the better required knowledge, facilities, and support. There are 3 factors that influence behavior change, namely: predisposing factors such as knowledge, attitudes, beliefs, beliefs, values, and so on, supporting factors such as the physical environment and health facilities or facilities and driving factors such as health workers, community leaders, and groups. Mother's knowledge about Fe tablets will affect adherence behavior in taking Fe tablets which can then result in a high or low incidence of anemia in pregnant women. Knowledge is not only obtained from formal education. Knowledge can be obtained from the social environment, mass media information, family or husband support as well as from health worker counseling(Mandagi, 2019). Counseling and motivation of health workers is another factor that can influence knowledge. Education and motivation are useful when the patient learns that new healthy behaviors are important. If health workers provide motivation to consume iron tablets in pregnant women, consumption of iron tablets will be easier to achieve (Agustiningsih & Muwakhidah, 2018).

The results showed that there was a significant difference in the increase in Hb levels between pregnant women who attended 4 classes of pregnant women and pregnant women who attended 2 classes of pregnant women. That is, the Intervention Class for Pregnant Women (KIH) indirectly

affects hemoglobin levels of pregnant women by providing recommendations to pregnant women regarding consumption patterns of iron-containing foods and recommendations for taking blood-boosting tablets during pregnancy. The increase in the respondent's Hb level in this study is likely as a result of learning experiences in the class of pregnant women, as well as the first benchmark for evaluating the implementation of the class training program for pregnant women, which is then followed by changes in behavior by conducting antenatal care visits according to the schedule based on ideal standards (Handayani, 2013) which states that there is an effect of the support of health workers, in this case in the class of pregnant women, with the behavior of pregnant women towards anemia. Pregnant women who have the awareness to take part in the Pregnant Women Class will increase their knowledge about the importance of maintaining health during pregnancy, maintaining behavior with a balanced nutritional diet so that they do not suffer from anemia, so that they will get normal deliveries and healthy babies. A good understanding of pregnant women about pregnancy will support pregnant women to have a motivation to do something that is positive and useful so that it creates positive behavior from the results of attending classes for pregnant women.

The increase in hemoglobin in the intervention group was 23.2% greater than the control group which only had an increase in hemoglobin of 8.5%. This shows that companion support does play a role for respondents in increasing adherence to consuming Fe tablets (Aditianti et al., 2015). The role of a companion in taking medication in pregnant women with anemia can increase maternal compliance in consuming Fe tablets so that consuming full Fe tablets can increase the increase in Hb in pregnant women, so the prevalence of anemia can be reduced (Handayani, 2013). In the intervention group that involved midwifery students in controlling pregnant women taking Fe, the assistance with taking this medicine could strengthen the desire of pregnant women to consume Fe tablets. With a strong desire in pregnant women, it can increase maternal adherence in consuming Fe tablets (Waliyo & Agusanty, 2013). After consuming Fe for two months by administering 60 tablets 1x1 per day involving anti-anemia students as a

companion for taking medication, the intervention group showed an increase in the average Hb before and after being given treatment, namely 9,075 to 11,180 with a percentage increase of 23.2%.

In the control group, there was only an average increase in HB of 8.5%, this was due to mothers who did not regularly take fe tablets. Maternal irregularity can occur because pregnant women feel nauseous due to the taste and smell of tablets. In addition, iron tablets consumed every day cause boredom, so pregnant women forget and are lazy to consume them. Motivation is the most dominant factor associated with adherence to consuming fe tablets. The better the motivation, the more obedient pregnant women are in taking Fe tablets, so it is important for companions to take medication involving students to monitor, record and remind and provide support to pregnant women.

Conclusion

Based on the results of the paired t test, it was found that there was an increase in the average Hb in the intervention group before and after being given treatment, namely 9,075 to 11,180 with a percentage increase of 23.2% and a p value of 0.000 (p> 0.05). In the control group it was found that there was an increase in the average Hb before and after being given treatment, namely 10,150 to 11,016 with a percentage increase of 8.5% and a p value of 0,000 (p> 0.05). The Mahamia program through KIH was able to increase Hb levels in anemic pregnant women in the Working Area of the Leuwigajah Health Center in South Cimahi, Cimahi City, West Java.

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Effect of Mackerel Oil During Pregnancy on Synapsin Expression in Newborn Rattus Novergius Cerebrum

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Abstract

The increase in the number of cells indicates a good synapse function, so that it can be linked to human intelligence. The rapid rate of synaptogenesis, myelination occurs in the first 1000 days of life. The public has not realized the importance of nutrition during pregnancy which contributes to the intelligence of the baby that will be born later. One of them is mackerel oil which contains omega 3. This study aims to analyze the effect of mackerel oil during pregnancy on synapsin expression in the cerebrum. This type of research is true experimental with a posttest-only control group design. The research samples were 30 pregnant Rattus norvegicus mothers aged 2-3 months. The 3 groups were randomly divided namely the control group (K1), the mackerel fish oil treatment group (K2), and the treatment group who were given omega-3 supplements (K3). This research was conducted at the Experimental Animal Cages and Pathology Laboratory, Faculty of Veterinary Medicine, Airlangga University. ANOVA test results on synapsin expression in the cerebrum showed that there was a significant difference with a p-value of 0.000. Synapsin expression in the cerebrum of newborn Rattus norvegicus which was given mackerel oil in the mother of Rattus norvegicus during pregnancy showed higher results than other groups.

Keywords: cerebrum; mackerel oil; synapsin

Penambahan jumlah sel menunjukkan fungsi sinaps yang baik, sehingga dapat dihubungkan dengan kecerdasan manusia. Pesatnya laju sinaptogenesis, mielinisasi terjadi pada 1000 hari pertama kehidupan. Masyarakat belum menyadari pentingnya gizi selama kehamilan yang berkontribusi terhadap kecerdasan bayi yang akan dilahirkannya kelak. Salah satunya yaitu minyak ikan kembung yang banyak mengandung omega 3. Penelitian ini bertujuan untuk menganalisis pengaruh minyak ikan kembung selama kebuntingan terhadap ekspresi *synapsin* di cerebrum. Jenis penelitian adalah *true eksperimental* dengan desain *posttest-only control group*. Sampel penelitan adalah induk *Rattus norvegicus* bunting usia 2-3 bulan sebanyak 30 ekor. 3 kelompok dibagi secara acak, yaitu kelompok kontrol (K1), kelompok perlakuan minyak ikan kembung (K2), dan kelompok perlakuan yang diberi suplemen omega-3 (K3). Penelitian ini dilakukan di Kandang Hewan Coba dan Laboratorium Patologi, Fakultas Kedokteran Hewan, Universitas Airlangga. Hasil Uji ANOVA pada ekspresi *synapsin* di cerebrum menunjukkan bahwa terdapat perbedaan signifikan denga *p-value* 0,000. Ekspresi *synapsin* di cerebrum *Rattus norvegicus* baru lahir yang diberi minyak ikan kembung pada induk *Rattus norvegicus* selama kebuntingan menujukkan hasil lebih tinggi dibanding kelompok lain.

Kata Kunci: cerebrum; minyak ikan kembung; *synapsin*

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Introduction

Stunting is one of the nutritional problems faced by the world, especially in poor and developing countries. Stunting is a serious problem due to the high risk of morbidity and mortality and can affect brain development to suboptimal levels. This has an impact on stunting growth (Unicef, 2013). Growth failure due to the accumulation of insufficient nutrients lasts a long time from pregnancy to 24 months of age (Bloem et al., 2013)

Based on the results of basic health research Riskesdas, (2013) in Indonesia in 2013-2018, more than 30% of children under five are stunted. It is known from the total percentage, of toddlers in the very short category in 2013, namely 19.2%, increased to 19.3% in 2018. One of the factors directly causing the high incidence of stunting is the lack of nutritious food intake. People also do not realize the importance of nutrition during pregnancy. This contributes to the nutritional state of the baby who will be born later. The nutritional status of pregnant women greatly influences the state of health and development of the fetus. During pregnancy, the fetus is completely dependent on the mother's intake and storage of nutrients (Woldeamanuel et al., 2019).

The rate of synaptogenesis in the first 1000 days of life is very rapidly developing in the brain (Burciu et al., 2014). The brain is a cognitive organ (Norouzkhani et al., 2022). An increase in the number of cells shows good synapse function, so it can be linked to human intelligence (Joewono, 2020). This process is supported by synapsin as a marker of synaptogenesis. Synapsin is a synaptic vesicle phosphoprotein produced from a single primordial syn gene located presynaptically. Synapsin is regulated by BDNF, a neurotrophin that helps stimulate and control the most active neurogenesis in the hippocampus (Fornasiero et al., 2010). Synapsin is a specific phosphoprotein of nerve terminals and plays a role in axon elongation (regulation of axonogenesis), maintenance of synaptic contacts (synaptogenesis), and neurotransmitter release (Evergren et al., 2007). The more neurotransmitters that are formed and the connections between neurons that are formed, the more synapses are formed so that information is processed faster, it is hoped that the smarter it will be (Joewono, 2019).

The gestation period is a good opportunity to provide optimal stimulation and nutrition to ensure normal development and support the speed of processing in the brain so that the quality of the brain increases so that it can influence future behavior such as influencing emotions, learning abilities, and memory (Joewono, 2019). Appropriate strategies and responses are needed to overcome and reduce the prevalence of stunting (RI, 2019).

Interventions carried out in order to accelerate the reduction of stunting are increasing the availability and access to nutritious food, especially during pregnancy (Mitra, 2015). Fulfillment of adequate nutrition, both macro-nutrients and micro-nutrients is urgently needed to avoid or minimize the risk of stunting (Branca & Ferrari, 2002). Pregnant women are encouraged to provide brain nutrition or brain booster during pregnancy (Fitriyani et al., 2017). You can fulfill

your nutritional needs during pregnancy by consuming nutritious foods, one of which is fish, which contains lots of omega-3. The omega-3 index is higher in children who are not stunted (Adjepong et al., 2018).

The level of omega-3 fatty acids in mackerel is quite high, around 8.5 g/100 g of meat, with EPA content of 0.93 g/100 g of meat and DHA of 5.7 g/100 g of meat (Latupeirissa & Rumahlatu, 2016). Mackerel is a type of local fish that is easy to obtain in Indonesian waters in large enough quantities and is easy to obtain and has important economic value (Prahadina et al., 2015). Omega-3 is a polyunsaturated fatty acid (PUFA) that contains Docosahexaenoic acid (DHA) and Eicosapentaenoic acid (EPA) (Siriwardhana et al., 2012). DHA and EPA are found in abundance in the cerebrum which is considered important for their capacity (Simopoulos, 2016). DHA rapidly accumulates in the brain during gestation and the availability of DHA via transfer from maternal stores impacts the degree of incorporation of DHA into neural tissue (Weiser et al., n.d.).

This research was conducted on experimental white rats (Rattus norvegicus) because this experimental research has limited ethical constraints that are not possible in humans. This research is a series of studies to educate humans since the fetal period. The results of the study are expected to show efforts to increase the biopsychosocial potential of the fetus in the womb through the nutrition of mackerel oil containing omega 3 on the expression of synapsin in the cerebrum of newborn Rattus norvegicus.

Methods

This research is a laboratory experiment by conducting experiments using female Rattus norvegicus animals. The research design is true experimental with a posttest-only control group design. The research sample was randomly divided into three groups. Group 1 was the control group which did not receive any treatment. Group 2 is the treatment group that was given mackerel oil which contains omega-3. Group 3 is the treatment group that was given supplements containing omega-3.

The samples used were female rats (Rattus norvegicus) aged 2-3 months and weighing 120-130 grams. All samples taken previously had been acclimatized for 1 week. Mother Rattus norvegicus who was sick and her child Rattus norvegicus died in the womb and were not used in this study. Samples were given treatment at the age of 1-17 days of gestation. Each group consisted of 10 Rattus norvegicus broodstock.

The study was conducted at the Experimental Animal Cage and Pathology Laboratory, Faculty of Veterinary Medicine, Airlangga University, Surabaya from March to September 2020. The dosage was determined based on Global recommendations for EPA and DHA for pregnant women which had been converted for experimental animals so that a dose of 5.4 mg was obtained. /200 gr BW/ day. Experimental animals Rattus norvegicus female estrus synchronization using PMSG and hCG. Furthermore, Rattus norvegicus females mated with male rats aged 2-3 months. After mating, vaginal plugs were observed as a sign of pregnancy.

Section Caesarea is done to give birth to Rattus norvegicus. Immediately after birth, the brain tissue of Rattus norvegicus children was taken to examine synapsin expression by immunohistochemistry. The data for each sample is the average value *Immuno Reactive Score* (IRS) observed at 5x visual field (LP) at 400x magnification. Analysis of synapsin expression in the cerebrum of newborn Rattus norvegicus between groups was tested for data normality. Normally distributed data were analyzed using a one-way Analysis of Variance (ANOVA) followed by a different test. This research has received approval for ethical feasibility from the Ethics Committee of the Faculty of Veterinary Medicine, Airlangga University with number 2.KE.036.04.2020.

Results and Discussion

All pregnant Rattus norvegicus parents were weighed before being sacrificed. Based on Table 1, the results of the descriptive analysis of the characteristic data showed that the largest mean pregnant weight of the main Rattus norvegicus came from the group that was given the treatment in the form of mackerel oil, namely 253.70 grams.

All children of Rattus norvegicus were born by sectio caesarea on the 18th day of gestation which was then weighed and selected three children of Rattus norvegicus were from one parent with one largest weight, one medium weight, and one smallest weight, then decapitation was carried out. Each of the three brains of Rattus norvegicus children from one parent was made into one preparation and stained. Based on Table 2, it shows that the lowest average body weight, body length, and head weight of Rattus norvegicus children came from the control group with respective averages of 2.78 grams, 3.55 cm, and 0.85 grams.

Table 1. Characteristics of the initial and final body weight of Rattus norvegicus broodstock

Experimental Animal Group	Mean ± SD Initial Weight	Mean ± SD Final Weight
No Treatment	124.50±3.60	231.60±45.87
Mackerel Oil	127.00±2.75	253.70±94.49
Omega 3 supplements	125.60±3.17	240.00±52.01

Table 2. Characteristics of newborn Rattus norvegicus children

Experimental Animal Group	Mean ± SD Weight	Mean ± SD Body Length	Mean ± SD Head Weight
No Treatment	2.78±1.26	3.55±0.71	0.85±0.26
Mackerel Oil	4.27±1.29	4.59±0.41	1.22±0.40
Omega 3 supplements	3.66±1.27	3.88±0.72	1.01±0.41

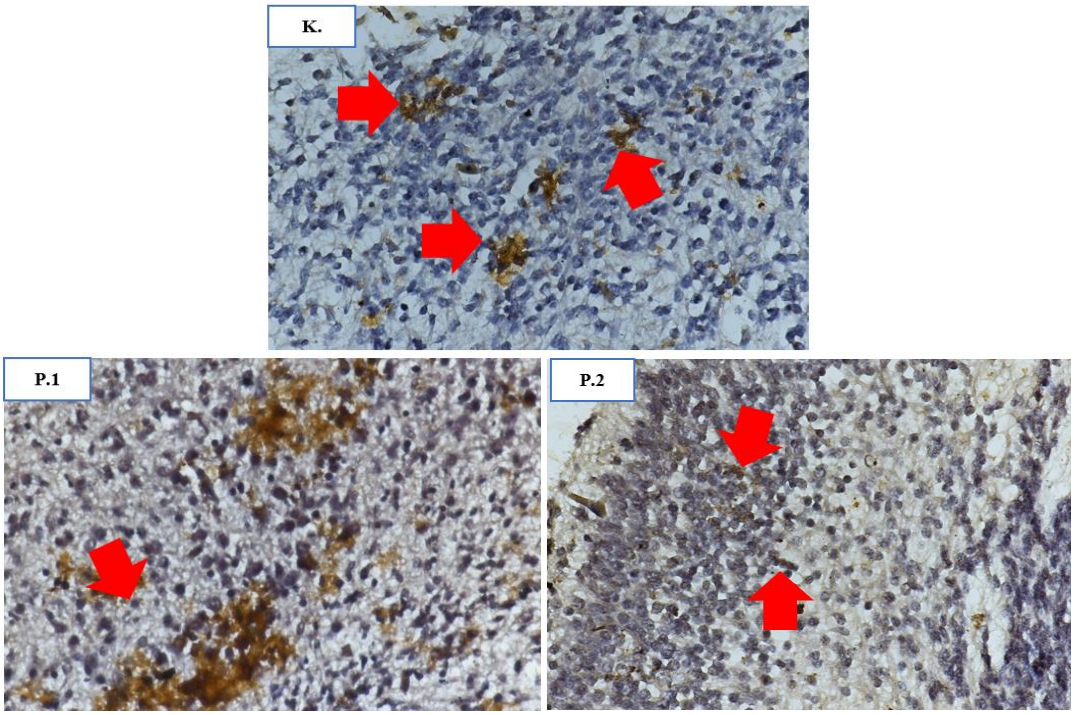

Figure 1. Comparison of synapsin expression in the brain of Rattus norvegicus children (K1, K2, K3). IHC. 400x.

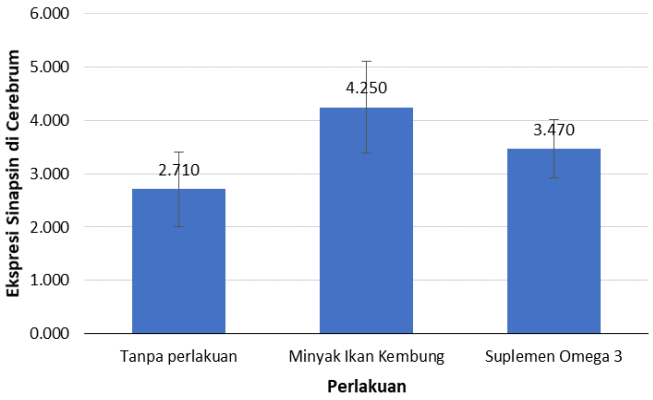

Figure 2. Graph of mean synapsin expression in the cerebrum of Rattus norvegicus children

Table 3. Statistical test results of synapsin expression in the cerebrum of Rattus norvegicus children

Experimental Animal Group	Normality test	ANOVA test	BNT test
No Treatment	0.941		2.710±0.705
Mackerel Oil	0.465	0.000	4.250±0.864
Omega 3 supplements	0.799		3.470±0.560

A comparison of the synapsin expression in the fetal brain between groups can be seen in Figure 1. The red arrows indicate the presence of apoptotic expression in the cerebrum which is indicated by the presence of chromogen brown color. The results of observations in each group per 5x field of view then the average synapsin expression in the cerebrum was tested for normality using the Shapiro-Wilk. The results of the normality test showed that the data distribution was normal in all groups. A statistical analysis followed by an ANOVA parametric test with significant results with a p-value of 0.000. Figure 2 shows the average synapsin expression in the cerebrum in the control group was 2.710, the mackerel oil group was 4.250, and the omega 3 supplement group was 3.470. The test continued with BNT and showed that there were differences in the results of synapsin expression in the cerebrum.

Omega-3 fatty acids are essential for proper brain development and function whereas DHA is maintained by the nerve membranes. Pregnant rats were fed adequate omega-3 fatty acids or a diet less than 14 days gestation and their pups were reared on their respective diets. Continuing this diet for three generations resulted in a loss of about 70% of DHA in the brain (Desai et al., 2014). DHA has been shown to be a major component of neuronal membranes that enhance synaptogenesis. The provision of DHA improves nerve function by supporting synaptic membranes. One source of supporting food is mackerel (Wingate D.S., 2019). DHA supplementation uniquely enhances neurite outgrowth, synapsin puncta formation, and expression of synaptic proteins, particularly synapsin and glutamate receptors. In DHA-supplemented neurons,

Nutritional status in the womb is often used as an indicator of weight at birth. In children over 5 years old, stunting, thinness, and low body weight are the main indicators used to measure the nutritional status of individual children (Lutter et al., 2011). Among these indicators, stunting and wasting are used as nutritional indexes for cumulative and acute malnutrition. Low body weight is a composite indicator that can reflect acute weight loss, stunting, or both. Lynn, (2009) showed that the average score on intelligence tests increased with improved prenatal nutrition. These results reflect the important role of prenatal nutrition on intellectual development (Li et al., 2016). Mackerel oil is one of the treatments that can be used to increase synapsin expression in the cerebrum of Rattus norvegicus children.

Conclusion

Mackerel oil has a significant effect on synapsin expression. Synapsin expression in the cerebrum of Rattus norvegicus newborns who were given mackerel oil during pregnancy was higher than those who were not given mackerel oil and omega-3 supplements.

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The Ratio of Bax And Bcl-2 in the Cerebrum of Newborn Rattus Novergius Given Mackerel Oil During Pregnancy

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Abstract

The quality of a nation is determined by nutritional intake during pregnancy. Pregnancy is the right time to prepare the brain's potential optimally, one of which is the intake of mackerel oil which is rich in omega-3. Omega-3 fatty acids can stimulate gene expression and nerve activity, increase synaptogenesis and neurogenesis, and prevent apoptosis. This study aims to analyze the intake of mackerel oil during pregnancy to the ratio of Bcl-2 / Bax in the cerebrum. This research is a true experiment with a posttest-only control group design. 30 pregnant Rattus norvegicus mothers aged 2-3 months were divided into 3 groups, namely the control group (K), the mackerel fish oil group (P1), and the omega-3 supplement group (P2). This research was conducted at the Experimental Animal Cages and Pathology Laboratory, Faculty of Veterinary Medicine, Airlangga University. The mean Bcl-2 / Bax cerebrum ratio was 1.127 ± 0.342 (K), 3.928 ± 1.984 (P1), and 2.526 ± 1.122 (P2). The ANOVA test on the Bcl-2 / Bax ratio in the cerebrum showed a significant difference with a p-value of 0.000. The Bcl-2 / Bax ratio in the cerebrum of Rattus norvegicus newborns treated with mackerel oil on Rattus norvegicus mothers during pregnancy showed higher results than the other groups.

Keywords: Cerebrum; Mackerel Oil; Bax, Bcl-2

Kualitas suatu bangsa ditentukan oleh asupan nutrisi selama masa kehamilan. Kehamilan merupakan masa yang tepat untuk menyiapkan potensi otak dengan optimal, salah satunya dengan asupan minyak ikan kembung yang kaya akan omega-3. Asam lemak omega-3 dapat merangsang ekspresi gen dan aktivitas saraf, meningkatkan sinaptogenesis dan neurogenesis, serta mencegah terjadinya apoptosis. Penelitian ini bertujuan untuk menganalisis asupan minyak ikan kembung selama kebuntingan terhadap rasio Bcl-2/Bax di *cerebrum*. Penelitian ini merupakan *true experiment* dengan *posttest-only control group design*. 30 induk *Rattus norvegicus* bunting usia 2-3 bulan dibagi menjadi 3 kelompok yaitu kelompok kontrol (K), kelompok minyak ikan kembung (P1), dan kelompok suplemen omega-3 (P2). Penelitian ini dilakukan di Kandang Hewan Coba dan Laboratorium Patologi, Fakultas Kedokteran Hewan, Universitas Airlangga. Rerata rasio Bcl-2/Bax *cerebrum* yaitu 1,127±0,342 (K), 3,928±1,984 (P1), dan 2,526±1,122 (P2). Uji ANOVA pada rasio Bcl-2/Bax di *cerebrum* menunjukkan bahwa terdapat perbedaan signifikan dengan *p-value* 0,000. Rasio Bcl-2/Bax di *cerebrum Rattus norvegicus* baru lahir yang diberi minyak ikan kembung pada induk *Rattus norvegicus* selama kebuntingan menunjukkan hasil lebih tinggi dibanding kelompok lain.

Kata Kunci: Cerebrum; Minyak Ikan Kembung; Bax; Bcl-2

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Introduction

The success of national development of a nation is determined by the availability of good quality Human Resources (HR) from the fields of education and health. Efforts that can be made to improve the quality of human resources include improving nutritional status and brain quality, starting from the conception phase (UNDP, 2018). Adequate nutrition is the main and most important factor that has a role in determining the success of body and brain growth in the fetus. Nutritional intake affects fetal brain development during its early life in the womb (Syari et al., 2015).

The development of brain cells undergoes a series of processes such as proliferation, migration, synaptogenesis, and apoptosis during pregnancy (Stiles & Jernigan, 2010). Pregnancy is the right time to prepare brain potential optimally and is a window of opportunity for parents (Hidayati & Joewono, 2018). Providing optimal nutrition is one of the factors that plays a strong role in brain development during pregnancy (Cusick & Georgieff, 2016).

Nutrition plays an important role in the human life cycle, especially the brain because it determines the quality of human resources in the future as the next generation of the nation. Adequate nutrition is needed to achieve good growth and development. Food that is lacking both in quality and quantity will cause nutritional problems. The state of malnutrition can result in structural and functional changes in the brain (Georgieff, 2007). In addition, malnutrition can affect a low level of intelligence because brain growth and development have started from the time in the womb (Cao et al., 2009).

Brain development is influenced by the mother's nutritional intake during pregnancy. One of the most important nutrients for brain growth is omega-3 fatty acids. Omega-3 is a polyunsaturated fatty acid (PUFA) that contains Docosahexaenoic Acid (DHA) and Eicosapentaenoic Acid (EPA). This fatty acid is not produced by the body so it requires intake of omega-3 fatty acids from outside. Fatty acids consumed during pregnancy will be transferred by the mother to the fetus through the placenta. Studies on the consumption of fish oil containing EPA and DHA have been shown to increase fetal brain growth and development (Arterburn et al., 2006).

Omega-3 fatty acids can induce the expression and activation of Uncoupling Proteins (UCPs) to reduce Reactive Oxygen Species (ROS), reduce neuronal dysfunction, and induce neuroprotective effects. Omega-3 fatty acids can

also activate Peroxisome Proliferator-Actived Receptor α (PPARα) and induce up-regulation of energy transcripts so as to increase energy reserves, stabilize synapse function, and limit hyperexcitability, and can reduce brain edema, release of cytochrome c, and decrease pro-apoptotic protein Bax and increased anti-apoptotic Bcl-2, strengthen AMPK which can regulate cell synthesis thereby inhibiting aerobic glycolysis (Tan et al., 2019).

Programmed cell death in the process of apoptosis provides signals and is mediated by several genes that code for proteins. Apoptotic events occur after the disruption of the mitochondrial membrane barrier function by releasing cytochrome c through the caspase-3 pathway in normal cells (Xiao & Zhang, 2008). The main process of apoptosis is controlled by Bcl-2 group proteins. Changes in mitochondrial membrane conformation depend on the ratio between the pro-apoptotic protein Bax and the anti-apoptotic protein Bcl-2 (D'Archivio et al., 2008).

Omega-3 fatty acids can be found in significant quantities in marine fish such as mackerel. The highest amount of omega-3 mackerel is 414.7 and 956.0 mg/100 g for EPA and DHA, respectively (Rincón-Cervera et al., 2020). Based on data released by the Nutrition Institute of the Ministry of Health of the Republic of Indonesia, several types of Indonesian sea fish have a high content of omega-3 fatty acids (up to 10.9 g/100 g) including mackerel (Hafiludin, 2011). In this study mackerel was chosen because it has a high omega-3 content, is easy to obtain, and has a relatively low price. Ethically, this research could not be carried out on humans, so this research was carried out on experimental animals, Rattus norvegicus.

Methods

This research is an experimental laboratory with a posttest-only control group research design. This study used experimental animals which were divided into 3 groups. The first group was not given any treatment acting as the control group (K), while the other 2 groups were given a different treatment, namely the second group was given mackerel oil (P1) and the third group was given omega-3 supplements (P3).

The experimental animals in this study were adult female Rattus norvegicus aged 2-3 months of the Sprague Dawley strain with a pre-pregnancy weight of 120-130 grams. Giving treatment to the mackerel oil group (K2) and the omega-3 supplement group (K3) at the age of 1-17 days of gestation, and the group without treatment were only given standard feed. Before

the treatment was given, the rats were adapted for one week and randomly divided (simple random sampling) to be included in the study group. Each group consisted of 10 Rattus norvegicus broodstock. The inclusion criteria in this study were normal and healthy female rats, had never given birth, and had never been used as experimental animals for other studies.

The experimental animals performed estrus synchronization using PMSG and hCG and then mated with male rats with the same age range. After mating, vaginal obstruction was observed as a sign of pregnancy. There were no sick mother rats, dead rats in utero (IUFD), and born before 18 days of gestation (premature) in this study. Furthermore, soon the child Rattus norvegicus was born by sectio caesarea at the 18th day of gestation. All pregnant Rattus norvegicus parents were weighed before being sacrificed. Three children were selected from each parent with the largest weight, one medium weight, and the smallest weight, then decapitation was carried out. Each of the three brains of Rattus norvegicus children from one parent was made into one preparation and stained. The brain tissue was taken for examination of the Bcl-2/Bax ratio by immunohistochemistry.

The research was located at the Experimental Animal Cages and Pathology Laboratory, Faculty of Veterinary Medicine, Airlangga University, Surabaya, which was conducted from April to September 2020. This research received ethical approval from the Ethics Committee of the Faculty of Veterinary Medicine, Airlangga University, Surabaya with number 2. KE. 034.04.2020.

The dosage calculation is based on the Food and Agriculture Organization of the United Nations (FAO) for pregnant women, namely EPA+DHA of 300 mg/day. For administration to experimental animals, it has been converted by multiplying by 0.018 per 200 grams of rat body weight, so that the dose of mackerel oil in experimental animals is 3.24 mg/120 grams BW/day. The fatty acid content of mackerel extract was determined by GC-MS. The omega-3 supplement group was given a dose based on supplements containing 360 mg EPA and 240 mg DHA, namely 6.48 mg/120 BW/day after being converted to experimental animals.

The data for each research subject is the average Immuno Reactive Score (IRS) observed in five visual fields with 400x magnification. Statistical calculation using SPSS software tools. A normality test was performed with Shapiro-Wilk. If the data is normally distributed, the analysis of

differences in the Bcl-2/Bax ratio between groups uses the one-way Analysis of Variance (ANOVA) test and is continued with a different test for each group. The significance limit is 0.05 with a 95% confidence level.

Results and Discussion

This study used the parent Rattus norvegicus Sprague Dawley strain with an initial weight range of 120-130 grams. During pregnancy, the weight of the Rattus norvegicus brood ranges from 231-240 grams. After being treated for 17 days with mackerel oil and omega-3 supplements, all pregnant Rattus norvegicus parents were weighed before being sacrificed. Based on Table 1, the results of the descriptive analysis of characteristic data showed that the highest mean initial and final body weight of Rattus norvegicus came from the group that was given mackerel oil treatment, namely 127.00 grams and 253.70 grams, respectively.

After weighing the mother rat's body weight, the baby rats were born by sectio caesarea. Based on Table 2, shows that the highest average body weight, body length, and head weight of Rattus norvegicus children came from the treatment group given mackerel oil with respective averages of 4.27 grams, 4.59 cm, and 1.22 grams

Table 1. Characteristics of the parent Rattus norvegicus

Animal Group	Mean ± SD Initial Body Weight	Mean ± SD Final Body Weight
K	124.50±3.60	231.60±45.87
P1	127.00±2.75	253.70±94.49
P2	125.60±3.17	240.00±52.01

Table 2. Characteristics of newborn Rattus norvegicus

Animal Group	Mean ± SD Body Weight	Mean ± SD Body Length	Mean ± SD Head Weight
K	2.78±1.26	3.55±0.71	0.85±0.26
P1	4.27±1.29	4.59±0.41	1.22±0.40
P2	3.66±1.27	3.88±0.72	1.01±0.41

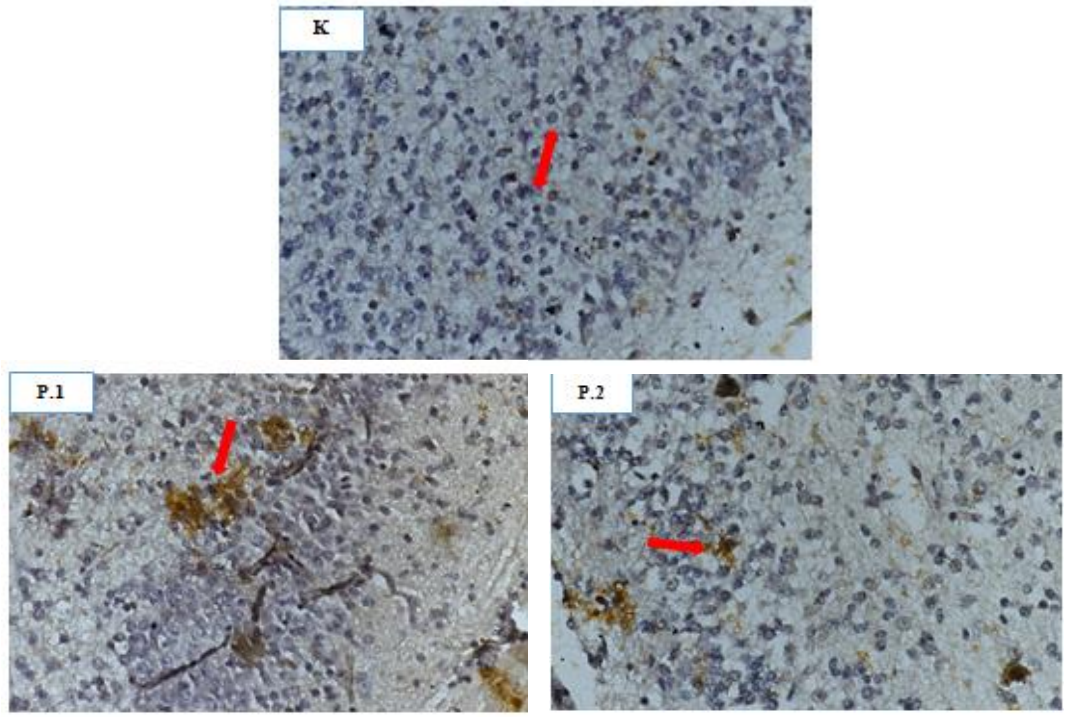

Figure 1. Histological picture of Bcl-2 expression in the cerebrum of newborn Rattus norvegicus (K, P.1, P.2) by immunohistochemical examination. 400x magnification. The red arrow indicates the presence expression of Bcl-2 in the cerebrum which is marked by the presence of brown chromogen.

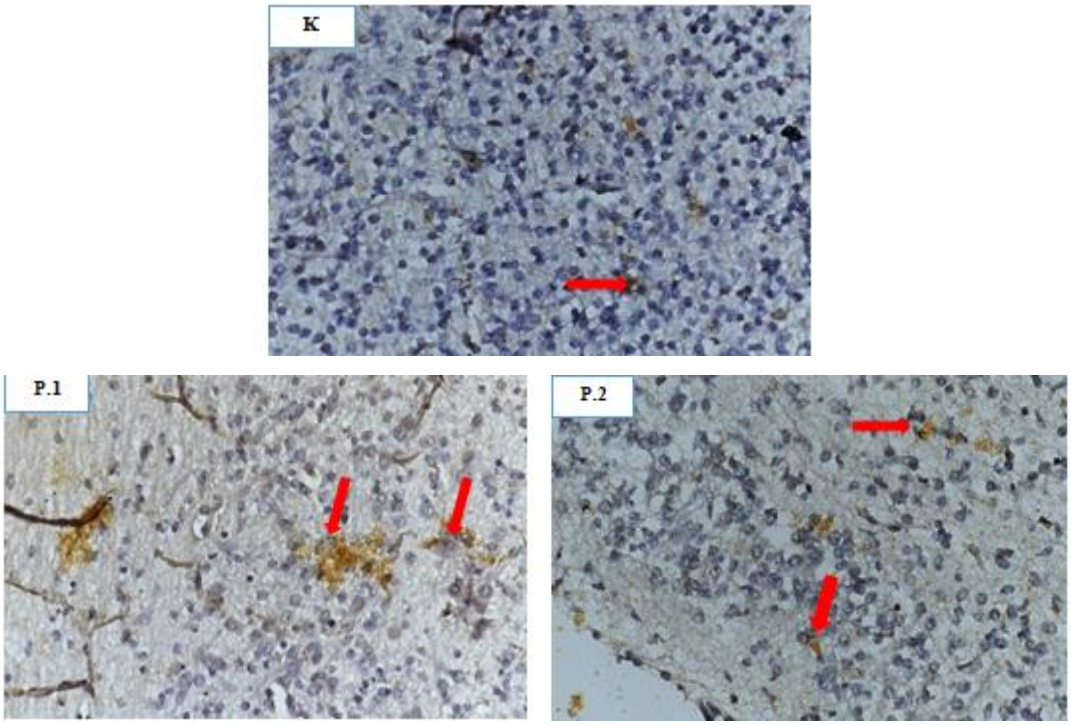

Figure 2. Histological picture of Bax expression in the cerebrum of newborn Rattus norvegicus (K, P.1, P.2) by immunohistochemical examination. 400x magnification. The red arrow indicates Bax's expression on *cerebrum*indicated by the presence of a brown color chromogen.

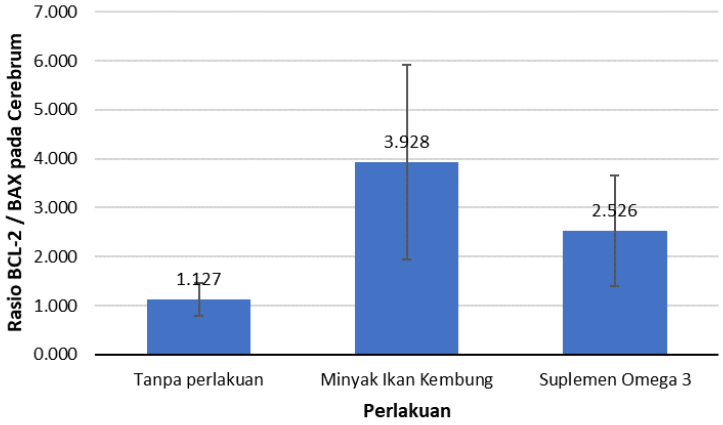

Figure 3. Graph of the mean Bcl-2/Bax ratio in newborn Rattus norvegicus cerebrum

Table 3. Statistical test results of the ratio of Bcl-2/Bax in newborn Rattus norvegicus cerebrum

Animal Group	*Shapiro-Wilk*	ANOVA test	Test Dunnet T3
K	0.167		1.127±0.342
P1	0.074	0.000	3,928±1,984
P2	0.496		2.526±1.122

Histological expression of Bcl-2/Bax in newborn Rattus norvegicus cerebrum (K, P.1, P.2) was performed by immunohistochemical examination (IHC). The red arrows indicate the presence of Bcl-2/Bax expression in the cerebrum which is indicated by the presence of brown chromogen. Figure 3 shows the highest average Bcl-2/Bax ratio in the cerebrum of rats given mackerel oil of 3.928.

Normality test using Shapiro-Wilk on Bcl-2/Bax ratio data in each group. In the normality test, it was obtained that the p-value was > 0.05 in each group, indicating that the data distribution was normal. Furthermore, the statistical analysis used was ANOVA parametric test which aims to assess differences between groups. The results of the ANOVA test obtained a significance value of 0.000 which indicated that there was a significant difference between groups in the Bcl-2/Bax ratio in the cerebrum of Rattus norvegicus. Therefore, it was continued with the Dunnett T3 test (Table 3).

Administration of EPA and DHA during pregnancy is necessary to support the processes of neurogenesis and synaptogenesis which have effects on monoaminergic, cholinergic, and GABAergic neurotransmitters (Healy-Stoffel & Levant, 2018). EPA and DHA are concentrated in the brain and have anti-oxidative, anti-inflammatory, and anti-apoptotic effects (Crupi et al., 2013).

The control and regulation of apoptosis in the intrinsic pathway occurs via the Bcl-2 family of proteins. This pathway occurs due to increased mitochondrial permeability and the release of

pro-apoptotic molecules into the cytoplasm, without the role of death receptors. Growth factors and several other signals stimulate the production of anti-apoptotic proteins, namely the Bcl-2 group. Bcl-2 is an anti-apoptotic protein and Bax is a pro-apoptotic protein. This protein has a special meaning because it can determine whether cells carry out apoptosis or not (Elmore, 2007).

Anti-apoptotic proteins are normally located in the mitochondrial and cytoplasmic membranes. When cells experience a decrease in survival signal or experience stress, Bcl-2 and or Bcl-xl disappears from the mitochondrial membrane and is replaced by pro-apoptotic members such as Bax which were previously present in the cytosol. When an apoptotic signal is present, pro-apoptotic protein translocation occurs from the cytosol to the mitochondrial membrane (Bouchier-Hayes et al., 2005).

The ratio of the anti-apoptotic Bcl-2 family to the pro-apoptotic Bcl-2 determines whether or not an apoptotic process takes place. Cells with more pro-apoptotic proteins will be sensitive to apoptosis. In the mechanism of action Bcl-2 family members demerise to determine the apoptotic pathway. Bcl-XL homodimer will suppress apoptosis or active death cell (ACD) and Bcl-XL/Bax heterodimerization will inhibit apoptosis. Homoditerous Bax will activate apoptosis, and Bcl-XL/Bax heterodimerization will inhibit apoptosis. The combination of the two will induce apoptosis (Ehrlich, 2013).

Bcl-2 and its relatives comprise the Bcl-2 family of proteins, having a role in controlling outer mitochondrial membrane integrity and apoptosis (Chipuk et al., 2010). Over-expression of Bcl-2 prevents permeability transitions in the membrane and prevents apoptosis by preventing the formation of pores in the membrane by Bax and preventing the release of cytochrome c and Apoptosis Inducing Factor (AIF) from mitochondria during apoptosis (Reed, 2000).

Apoptosis is an active form of cell death in which regulation of specific proteins generates anti- or pro-apoptotic signals. Two of the protein families involved in this regulation are the Bcl and caspase proteins. Research by Mooney & Miller, (2000) showed that bax expression increased and the ratio of Bcl-2 expression to Bax expression decreased. Studies of human brain tissue and experimental animal models have proven that the Bcl-2 family regulates cell death by apoptosis in the nervous system. Bcl-2 acts as an anti-apoptotic agent while Bax acts as a pro-apoptotic agent. The Bcl-2 gene is important in the regulation of apoptosis which encodes various proteins that play a key role in the regulation of cell apoptosis. The Bax gene is expressed in the brain and identified as a pro-apoptotic homologue to Bcl-2. Interactions between Bcl2 family members both in the cytosol and in mitochondria determine survival or death (Akhtar et al., 2004). The Bcl-2/Bax ratio determines cell death or survival after an apoptotic stimulus (Mahdavi et al., 2018).

Increased caspase-3/7 activity and changes in the Bcl-2/Bax ratio could be key determinants in cytochrome c release, caspase-3/7 activation, and the initiation of apoptosis. Decreasing this ratio can exacerbate apoptosis, and increasing this ratio can reverse the deleterious effects of cytotoxic

stimuli (Eleawa et al., 2014). Whereas Bax has been shown to trigger cell death, anti-apoptotic Bcl-2 can block cytochrome c release and caspase activation (Yiran et al., 2013)

Conclusion

The Bcl-2/Bax ratio in the cerebrum of Rattus norvegicus newborns who were given mackerel oil during pregnancy was higher than those who were not given mackerel oil and omega-3 supplements.

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