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Phone/fax: (022) 4321213
E-mail: gmhc.unisba@gmail.com
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Discussion of the article reveals, explains, and discusses the results of the study with an analysis by the research design, interpretation, and explanation of its synthesis. Also, the results obtained are compared with the results of previous research of others.

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RESEARCH ARTICLE

Effect of Integrated Antenatal Care Training on Midwife Service Quality Improvement

Melsa Sagita Imaniar,[1,2] Hadi Susiarno,[3] Adhi Pribadi,[3] Herry Herman,[4] Dida Akhmad Gurnida,[5] Hadyana Sukandar[6]

[1]Department of Midwifery, Universitas Muhammadiyah Tasikmalaya, Tasikmalaya, Indonesia, [2]Midwifery Master Study Program, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia, [3]Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital, Bandung, Indonesia, [4]Department of Orthopaedics and Traumatology, Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital, Bandung, Indonesia, [5]Department of Child Health, Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital, Bandung, Indonesia, [6]Department of Public Health, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia

Abstract

Antenatal care (ANC) is the most effective strategy for preventing complications in pregnancy. However, the current quality of midwife antenatal care services is still considered low. One of the indicators used for assessing midwifery service quality is the technical competency indicator that includes history taking, physical examination, case management and follow up, examination recording, and effective information, communication, and education (IEC). This study aimed to measure the effect on integrated antenatal care training on the quality of midwife services. The design was a pre-test and post-test quasi-experimental study conducted in Manonjaya Public Health Center, Tasikmalaya district, from November to December 2017. Simple random sampling was applied to get 20 respondents for each intervention and control groups. The bivariate analyses used in this study were the paired t test and the Mann-Whitney test. Results showed an overall increase in service quality scores in the intervention and control groups by 5.5% and 0.86%, respectively, with a significant difference in the increase between the two groups ($p<0.05$). Therefore, there is a significant increase in the quality of midwife after implementing the integrated ANC module and training to midwives.

Key words: Integrated antenatal care, midwife, training

Pengaruh Pelatihan *Antenatal Care* Terpadu terhadap Peningkatan Kualitas Pelayanan Bidan

Abstrak

Antenatal care (ANC) merupakan strategi pencegahan komplikasi dalam kehamilan paling efektif. Namun, kualitas pelayanan *antenatal care* bidan saat ini dinilai masih rendah. Salah satu indikator yang digunakan untuk menilai kualitas pelayanan kebidanan adalah indikator kompetensi teknis yang meliputi anamnesis, pemeriksaan fisik, penatalaksanaan dan tindak lanjut kasus, pencatatan pemeriksaan, serta komunikasi, informasi, dan edukasi (KIE) yang efektif. Penelitian ini bertujuan mengukur pengaruh pelatihan *antenatal care* terpadu terhadap kualitas pelayanan bidan. Desain penelitian ini menggunakan *pre-test and post-test quasi-experimental* yang dilaksanakan di Puskesmas Manonjaya Kabupaten Tasikmalaya dari November hingga Desember 2017. Pengambilan sampel dilakukan secara *simple random sampling* untuk mendapatkan 20 responden untuk tiap-tiap kelompok intervensi dan kontrol. Analisis bivariat yang digunakan dalam penelitian ini adalah uji t berpasangan dan Uji Mann-Whitney. Hasil penelitian menunjukkan peningkatan skor kualitas pelayanan secara keseluruhan pada kelompok intervensi dan kontrol sebesar 5,5% dan 0,86% masing-masing dengan perbedaan peningkatan yang signifikan antara kedua kelompok ($p<0,05$). Simpulan, terdapat peningkatan kualitas bidan yang signifikan setelah penerapan modul ANC terintegrasi dan pelatihan kepada bidan.

Kata kunci: *Antenatal care* terpadu, bidan, pelatihan

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Correspondence: Melsa Sagita Imaniar, S.S.T., M.Keb. Department of Midwifery, Universitas Muhammadiyah Tasikmalaya. Jln. Tamansari km 2.5, Tasikmalaya 46191, West Java, Indonesia. E-mail: melsa.sagita@umtas.ac.id

Introduction

The Indonesia Demographic and Health Survey (IDHS) 2012 recorded an increase in MMR to 359 maternal deaths per 100,000 live births, which then decreased to 305 maternal deaths per 100,000 live births in Intercensal Population Survey 2015.[1,2] The World Health Organization (WHO) estimates that most of these deaths are avoidable through adequate access and good quality antenatal care.[3,4] Antenatal care (ANC) is the most effective prevention strategy that aims to reduce complications during pregnancy.[5–8] Antenatal care comprised of 10T standard includes maternal weight and height measurement; blood pressure check; upper arm circumference measurement; fundal height measurement; fetal presentation and heart rate assessment; TT vaccination status screening and vaccine provision if necessary; iron tablet provision; simple lab testing; case management; and counseling. However, the quality of ANC services is still not optimum due to the low compliance to the 10T standard.[5,9,10]

The evaluation of ANC service quality in 2014 used the technical competency indicators that include the midwife's level of knowledge as one of the measurable indicators. This evaluation suggested that there was inadequate knowledge on ANC among midwives reflected from the fact that of the 218 midwives participated in the evaluation, only 47 (21.6%) had insufficient knowledge.[5,6,11] Hence, improving knowledge regarding ANC service is an essential and necessary step to do.[3,4]

The Government of Indonesia, through its Ministry of Health, has issued a policy regarding ANC services. The Ministry of Health Republic of Indonesia Regulation, Number 25 of 2014 on Child Health Efforts, in Article 6 sub-article one letter b stated that a comprehensive and quality antenatal care service provided to all pregnant women through integration with other programs.[1,5,12,13] A midwife is required to be able to detect problems and diseases that may be experienced by a pregnant woman as early as possible that the pregnant woman will be well prepared to have a normal delivery process.[13–15] The integrated ANC training performed in this study is based on the module developed by researcher consul results with experts in their fields covering theory and 10T practice guidelines.[13] The first day's activities included exposure to the material and simulation of practice and the second day of the participant's field practice, accompanied by the facilitator doing the integrated ANC directly to the client. The training itself involved resource persons with the qualifications and certification as trainers (ToT, CTS) comprising of practicing midwives, obgyn specialists, Head of Tasikmalaya District Health Office Chairperson, and Head of Tasikmalaya Branch of Indonesian Midwife Association. The respondents participated in a 2-day training, with no one dropped out of the training. The training started with the ice-breaking activities since the respondents seemed to be passive at the beginning of the training. The fact that this training designed using the adult learning method by combining lectures, case studies, and group discussion helped the participants be actively involved in the training until the end of the training.[16,17]

Manonjaya Public Health Center is the public health center with the most significant contribution to MMR. It has a low K1 (first contact between the health provider and pregnant woman in the first trimester) and K4 (the fourth contact or more in the third trimester) coverage compared to other regions. Results of interviews with midwives regarding antenatal care service revealed that there was still a lack of understanding of the concept of integrated ANC service among midwives because midwives only used the 7T service standards.[18] Also, shortage of medical staff to implement the immunization program; the absence of the integrated management of childhood illness (IMCI) as a cross-sectoral intervention closely related to pregnancy examination; inadequate facilities and infrastructures; inadequate equipment for laboratory testing including for hemoglobin, HIV/AIDS, tuberculosis, and diabetes mellitus; and lack of tetanus toxoid immunization screening observed.[15]

This study aimed to measure the effect on integrated antenatal care training on the quality of midwife services.

Methods

The study was a quantitative quasi-experiment with pre-test and post-test control group design conducted in the working area of Manonjaya Public Health Center, Tasikmalaya District, from

November to December 2017. Participants of this study were midwives who work in the health center area of Manonjaya. Participants (40 midwives) recruited using simple random sampling 40. Participants divided into intervention (n=20) and control (n=20) groups, and both groups were given a pre-test on the quality of service.[17]

The intervention group then received a 2-day training program using the integrated ANC module with trainers from the health office. At the same time, the control group only received the same ANC module without any training. The control group expected to read the module independently. Both groups asked to carry out integrated ANC independent practice to the client directly for four weeks. Both groups received a post-test after four weeks to assess through a post-test to measure service quality four weeks later. Bivariate analyses used the chi-square test to see the characteristics of respondents the study and Mann-Whitney test to see differences in the quality score of ANC services before and after the intervention in the two groups.[16,19]

This study has been through ethical studies by the Health Research Ethics Committee of the Faculty of Medicine of Universitas Padjadjaran with letter number: 976/UN6.C.10/PN/2017.

Results

Before data were analyzed, a normality test performed to assess the distribution of data using the Shapiro-Wilk test, resulting in a normal distribution of data. The homogeneity test results revealed that the two groups had no significant differences at the time of pre-test measurements. Further analysis performed on the difference in the quality improvement of the Integrated ANC service. The detailed results of this study described in Table 1.

Table 1 shows no significant difference between the two groups in terms of age, education, and length of work experience, as evident from the chi-square test result ($p>0.05$). It means that the two groups were homogenous and comparable.

Then the two groups before being given modules and training, the ANC service quality measurements were carried out using a questionnaire by the facilitator. After giving modules and training, measurements retaken with the same questionnaire.

Table 2 presents the service quality scores from before and after the intervention and the percentage for each sub-variable. It is apparent that, except for examination and recording sub-variables, higher increases were seen for all sub-variables in the intervention group. For the examination sub-variable, the intervention group showed a slightly lower increase when compared to the control group (4.6% vs 4.7%). In comparison, no increase found for recording sub-variable (0%) for both intervention and

Table 1 Respondent Characteristics

Characteristics	Groups		p Value*
	Intervention (n=20)	Control (n=20)	
Age (years)			0.730
20–29	9	10	
30–39	6	7	
40–49	5	3	
Education			0.723
Diploma III	14	15	
Bachelor	6	5	
Master	10	0	
Length of work experience (years)			0.928
<5	6	6	
5–9	8	9	
≥10	6	5	

Note: *chi-square test

Table 2 Comparison of ANC Service Quality Score before and after Intervention

Midwife ANC Service Quality Score	Intervention Group (n=20)			Control Group (n=20)			p Value*
	Before	After	Increase	Before	After	Increase	
History taking			9.8%			1.8%	0.199
Median	57.5	60.4		44.6	43.8		
Range	45–62.5	55.8–65.0		35–49.3	33.3–51.7		
Examination			4.6%			4.7%	0.507
Median	64.0	66.2		57.4	59.6		
Range	55.9–76.5	61.8–75		48.5–72.1	52.9–73.6		
Case management			4.3%			0%	<0.001
Median	61.4	66.0		72.6	75.6		
Range	57.6–74.3	59–78.5		65.3–86.8	65.3–86.8		
Recording			0%			0%	1.0
Median	50	50		75	75		
Range	50–75	50–75		75–100	75–100		
IEC			8.8 %			0.6%	<0.001
Median	51.3	57.0		47.4	48.1		
Range	38.5–62.2	48.7–66.7		35.9–57.0	32.7–53.8		
Combined			5.5 %			0.86%	<0.001
Median	57.0	62.0		57.5	57.5		
Range	47.2–63.0	57.5–67.5		48.8–65.0	48.8–65.0		

Note: *Mann-Whitney test

Table 3 Effect of Integrated ANC Training on Midwife Service Quality

Service Quality (Dimension)	Groups		p Value	RR (95%CI)*
	Control (n=20)	Intervention (n=20)		
History taking				
≤median	12	8	0.206	1.50 (0.79–2.86)
>median	8	12		
Examination				
≤median	10	10	1.0	1.0 (0.54–1.86)
>median	10	10		
Case management				
≤median	20	2	<0.001	10.0 (2.68–37.24)
>median	0	18		
Recording				
≤median	20	20	1.0	
>median	0	0		
IEC				
≤median	14	6	0.011	2.33 (1.13–4.83)
>median	6	14		
Combined				
≤median	15	5	0.002	3.00 (1.35–6.68)
>median	5	15		

Note: *RR (95%CI): relative risk and confidence interval of 95%

control groups. In the control group, no increase observed for the case management sub-variable.

Overall, there was a statistically significant difference in the total scores of service quality between the intervention group (5.5% increase) and the control group (0.86%, $p<0.05$).

Table 3 shows that for the history-taking sub-variable, the participants in the control group had a 1.5 times higher risk to provide low-quality history taking when compared to those in the intervention group. The same condition was also seen for the risk of low-quality examination, where the participants in the control group had a one-time higher risk of providing low-quality examination than the intervention group. The results for case management and IEC sub-variables also presented higher risks for lower quality in the control group compared to the intervention group by showing ten times higher risk for case management and 2.3 higher risks for IEC.

When combined, the quality of care provided by participants who did not receive intervention was three times lower than those who received the intervention.

Discussion

Antenatal care is the most effective strategy to prevent complications in pregnancy.[7,20] However, the current quality of midwife antenatal care services in Indonesia is still considered low.[5,15] This may be attributed to the inadequate knowledge of the standardized antenatal care among midwives.[4] This study investigated the effect of integrated antenatal care training on the quality of midwife services by comparing the quality of midwife services before and after receiving the training. Two groups of midwives were assessed, namely the intervention group (n=20) and control group (n=20).

Most of the respondents were in the age group of 20–29 years old (n=9 in the intervention group and n=10 in the control group, p=0.730). This age group represents the young adulthood period, which is the optimum period for applying previously learned knowledge and skills. Age influences how fast a person understands things and how developed a person's mindset is. As people get older, the mindset and the ability to understand things become more developed.[19,21,22] The respondents in this study, therefore, were at their peak age to learn and apply the knowledge and skills they would learn in the training.

The majority of the respondents were Diploma III graduates (n=14 in the intervention group and n=15 in the control group, p=0.723). Education, which is a conscious and systematic process in school, family, and community to convey the purpose of a defined concept, is an important process to empower students to live a better life.[10] Thus, education level also determined who empowered the respondents in receiving the training.

In terms of the length of work experience, most respondents had been working as a midwife for 5–9 years (n=8 in the intervention group and n=9 in the control group, p=0.928). This experience also influenced how the respondents' performance in the training.

The analysis of the three aspects of characteristics demonstrated that the two groups were homogenous, thus suitable for comparison. Since the quality of services before the intervention was significantly different among the respondents, it was decided to compare the quality level achieved before and after the intervention in the same group first. Both the intervention and control groups showed an increase in quality. A comparison was then made between the increase in the intervention group and the increase in the control group.

The intervention group that received the ANC module and training achieved a higher increase in the quality of services (5.5%) than the control group that only received the ANC module and learned it independently (0.86%). This difference is statistically significant ($p<0.01$). This suggested that the integrated ANC training can improve the quality of midwife services in the work area of Manonjaya Public Health Center better than just providing the module. Training is also considered an acceptable approach by the midwives.

The Indonesian Health Profile 2015 stated that efforts to improve the quality of services, including antenatal care services, can take the training and training of trainers. It expected that by participating in training, midwives would be able to improve their competencies, which will eventually improve their quality of service.[23] A similar statement is also made by Mikrajab and Rachmawati[15] that routine technical training to improve obstetric competencies for midwives is very much needed.

The quality of antenatal care in Indonesia is still far from ideal, as depicted in a study by Ariyanti[25] that involved 69 midwives from an area in Indonesia. This study demonstrated that more than half of the respondents (60.4%) did not maintain complete patient history records, and only 56.5% performed all necessary steps when doing examinations. Although all midwives provided the necessary care to the patients, 65.2% did not have complete documentation of the patients, and only 52.2% provided complete IEC.

Training can improve a person's knowledge, skills, and attitudes because training generally aims to increase productivity.[5,19,24] Training defined as a short-term educational and learning process aimed at increasing knowledge, attitudes, and skills to improve individual competencies.[13] Integrated ANC training that adapted to various existing needs, especially those related to the ability to do tasks and the necessary competencies to provide the service, is very much needed.[18] The content of the integrated antenatal care module and its related training has been developed based on various needs that arise in various maternal health and antenatal care situations. It also considers actual issues faced during maternal health and antenatal care services, the policies and strategies to increase the coverage and quality of antenatal services, and the monitoring and implementation of the integrated antenatal services. The core materials in this training include integrated antenatal service concepts, history taking, physical examination, follow-up management, examination result recording (MCH/cohort/PWS/P4K), and effective IEC. These strengthened with materials regarding the latest developments in a maternal emergency, the role of midwives in improving ANC service quality, and integrated ANC practices.[3,5,25,26]

The integrated ANC training in this study considered successful because when the training provided to respondents who had never attended integrated ANC training before, it was able to increase the quality of midwife services. This training especially increases the midwives' knowledge and skills in conducting history taking, examination, case management, follow-up management, antenatal examination recording, and effective information, education, and communication (IEC) provision. Integrated ANC training is effectively designed to ensure optimal learning efficiency is achieved through a well-developed module and good resource persons.[7,9,20,27]

A significant increase in the quality of midwife services observed after the midwives receive the integrated ANC module and training. Nevertheless, further studies are needed to gain a more in-depth understanding of how the training affects the quality of service by comparing the implementation of the integrated ANC module in groups using different implementation technics.

Since many midwives still could not provide good quality antenatal services, the integrated ANC training should be available to them. It expected that the training would improve the midwives' capacity, and the pregnancy-related complication rate reduced.

Conclusion

There is a significant increase in the quality of midwife after implementing the integrated ANC module and training to midwives.

Conflict of Interest

All authors stated that there no conflict of interest in this study.

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RESEARCH ARTICLE

Influence of Adolescent Reproductive Health Promotion Media Booklet on Knowledge and Attitude of Adolescents Living in Work Area of Ibrahim Adjie Public Health Center in 2018

Sri Hennyati Amiruddin,[1] Sri Komalaningsih,[1] Ma'mun Sutisna,[1,2] Hidayat Wijayanegara,[1,3] Leri Septiani,[1,4] Herry Garna[1,5]

[1]Applied Midwifery Master Study Program, STIKes Dharma Husada, Bandung, Indonesia, [2]Politeknik Negeri Bandung, Bandung, Indonesia, [3]Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia, [4]RSIA Graha Bunda, Bandung, Indonesia, [5]Department of Child Health, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

Abstract

Adolescent period is a critical period that requires quality health services. The aim of this study was to analyze the effect of health education through booklet media on the knowledge and attitude towards reproductive health among adolescents. This was a quasi-experimental case control study with nonequivalent two group design conducted on 282 students of SMP Negeri 37, a public junior high school, in the work area of Ibrahim Adjie Public Health Center in Bandung city during December 2018–May 2019. Subjects were divided into two groups, intervention and control groups, with 141 subjects in each group. Data collected were tested for normality and homogeneity using Kolmogorov-Smirnov and Levene tests, respectively, followed by a bivariate analysis using Wilcoxon test to determine the difference. Knowledge of all students in both groups was poor during pre-test with an increase found in 135 subjects (95.7%) in the intervention group (p=0.001) and 63 subjects (44.7%) in the control group (p=0.003) based on the post-test results. Negative attitude was also seen in both groups during pre-test, with a shift towards positive attitude was evident in 134 students (95.0%) in the intervention group (p=0.001) and 117 students (83.0%) in the control group (p=0.002) based on post-test results. This presence that health information conveyed through booklet has a probability of giving 0.995 times stronger influence leaflet. Thus, the use of booklet can improve knowledge and attitude towards adolescent reproductive health.

Key words: Adolescent, attitude, knowledge, reproductive health booklet

Pengaruh *Booklet* Media Promosi Kesehatan Reproduksi Remaja terhadap Pengetahuan dan Sikap Remaja yang Bertempat Tinggal di Wilayah Kerja Puskesmas Ibrahim Adjie Tahun 2018

Abstrak

Masa remaja merupakan masa kritis yang membutuhkan pelayanan kesehatan yang berkualitas. Tujuan penelitian ini adalah menganalisis pengaruh pendidikan kesehatan melalui media *booklet* terhadap pengetahuan dan sikap remaja tentang kesehatan reproduksi. Penelitian ini merupakan penelitian *quasi-experimental case control* dengan rancangan *nonequivalent two group* yang dilaksanakan terhadap 282 siswa/i SMP Negeri 37 di wilayah kerja Puskesmas Ibrahim Adjie Kota Bandung selama Desember 2018–Mei 2019. Subjek dibagi menjadi dua kelompok, yaitu kelompok intervensi dan kontrol dengan 141 subjek di setiap kelompok. Data yang terkumpul diuji normalitas dan homogenitasnya masing-masing menggunakan Uji Kolmogorov-Smirnov dan Levene, dilanjutkan dengan analisis bivariat menggunakan Uji Wilcoxon untuk mengetahui perbedaannya. Pengetahuan semua siswa pada kedua kelompok kurang saat *pre-test* dengan peningkatan pengetahuan 135 subjek (95,7%) pada kelompok intervensi (p=0,001) dan 63 subjek (44,7%) pada kelompok kontrol (p=0,003) berdasar atas hasil *post-test*. Sikap negatif juga terlihat pada kedua kelompok selama *pre-test* dengan pergeseran ke arah sikap positif 134 siswa (95,0%) pada kelompok intervensi (p=0,001) dan 117 siswa (83,0%) pada kelompok kontrol (p=0,002) berdasar atas hasil *post-test*. Informasi kesehatan yang disampaikan melalui media *booklet* berpeluang memberikan pengaruh 0,995 kali lebih kuat daripada media *leaflet*. Dengan demikian, penggunaan *booklet* dapat meningkatkan pengetahuan dan sikap remaja terhadap kesehatan reproduksi. Simpulan, terdapat pengaruh pendidikan kesehatan melalui media *booklet* terhadap pengetahuan dan sikap remaja tentang kesehatan reproduksi.

Kata kunci: *Booklet* kesehatan reproduksi, pengetahuan, remaja, sikap

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Correspondence: Sri Hennyati Amiruddin. Applied Midwifery Master Study Program, STIKes Dharma Husada. Jln. Terusan Jakarta No. 71–75, Bandung 40282, West Java, Indonesia. E-mail: srihennyati@gmail.com

Introduction

Adolescent is a rapid growth and development period that involves physical, psychological, and intellectual growth and development. This period has unique characteristics including full of curiosity, love for adventures and challenges, and tendency to be involved in risk taking behaviors without good considerations. When adolescents decision making process during a conflict leads to a bad decision, they will be involved in risk behaviors that may have short term and long terms effects on physical and mental health.[1]

A study in 2012 by the National Agency for Demography and Family Planning (*Badan Kependudukan dan Keluarga Berencana Nasional*, BKKBN) presented that most of the problems experienced during the transitional period of adolescents are problems related to the triad of adolescent reproductive health (sexuality, HIV/AIDS, and illicit drug use).[2] A survey conducted by health offices in West Java and Bali stated that 5–7% of adolescents have experienced unwanted pregnancy and 12.2% have gone through abortion.[3]

The Ministry of Health of the Republic of Indonesia has introduced an adolescent friendly health service under the name of *pelayanan kesehatan peduli remaja* (PKPR) in the public health center (*pusat kesehatan masyarakat*, *puskesmas*) in 2014, which is based on the WHO recommendations. The services provided in PKPR include information and education services, clinicomedical services including relevant supporting tests, counseling, healthy lifestyle skill development, peer counselor training, and sociomedical referral services.[4,5] In its implementation, PKPR in *puskesmas* provides specific services that aim to meet the needs, wish, and preferences of adolescents.[6]

Currently, adolescents only receive information on reproductive health through education or as a part of a subject in their school. Nevertheless, an interview conducted to adolescents revealed that adolescents have never received reproductive health education through leaflet or booklet media both from school and *puskesmas*.[7–9] Leaflet is one of education media that are often used by *puskesmas* educator to increase knowledge. Leaflet has several disadvantages, including short period of information retainment and very brief explanation. Another printed media that is able to improve the effectiveness of education is booklet.[10–12] Booklet is one of printed media that can help health care workers to convey health messages through a book that contains text and images.[13] Booklet can increase knowledge adequately and the use of booklet has been shown to correlate with significant improvement of knowledge and attitude.[10–12]

This study aimed to analyze the influence of booklet as an education media on adolescents' knowledge and attitude towards reproductive health.

Methods

This was a quasi-experimental study with nonequivalent two group design conducted on junior high school adolescents who went to a public junior high school, SMP Negeri 37, in the work area of Puskesmas Ibrahim Adjie Bandung during the period of December 2018 to May 2019. Non-probability sampling was performed to get adequate number of subjects and 282 students were recruited as subjects. The subjects of this study were students who met the inclusion criteria and expressed their willingness to participate in the study after receiving information by signing the informed consent form.

The instruments used for collecting data include questionnaires for knowledge and attitude. The knowledge questionnaire consisted of 20 questions. A score was assigned to each question and the total score was used to classify the knowledge level using the following category: 76–100%=good, 56–75%=fair, and ≤56%=poor. The attitude questionnaire consisted of 20 statements. A score was assigned to each question and the total score was used to classify the attitude using the following category: 51–80=positive and 20–50=negative. The inclusion criteria in this study were adolescents aged 14–16 years and active students in the 7th grade of junior high school. The exclusion criteria was 7th grade students who did not come for data collection session.

Ethical clearance for this study was obtained from the Health Ethics Committee of Applied Midwifery Master Study Program in STIKes Dharma Husada Bandung with the issuance of the ethical clearance No. 064/SDHB/SKet/PSKBS2/I/2019.

Results

The analysis of variance on the characteristics of the subjects resulted in $p>0.05$. Hence, no

Table 1 Subject Characteristic Distribution

Characteristics	Intervention Group (Booklet) n=141	Control Group (Leaflet) n=141	p Value*
Gender			
Male	69	64	0.553
Female	72	77	
Living arrangement			
With parents	129	124	
Other family member	5	8	0.522
One of the parents	7	9	
Rent a room/in dormitory	0	0	
Information source			
Printed media	23	28	
Electronic/internet media	10	14	0.703
Peer	86	79	
Health worker	15	11	
Parents	7	9	

Note: descriptive analysis *t test

significant differences were found among the subjects.

Analysis using Wilcoxon test presented a difference between pre-test and post-test results of knowledge questionnaire (p=0.001) in the intervention group as well as a difference between the pre-test and post-test knowledge in the control group (p=0.003).

For the attitude component, a difference was also found between pre-test and post-test in the intervention group (p=0.001) and control group (p=0.002).

Analysis using multiple logistic regression showed that respondents who received health education through booklet has a possibility to get 0.995 times higher knowledge compared to those who received education through leaflet. The R^2=17.2% was interpreted as showing that the influence produced by booklet in providing health education to subjects was 17.2%, while the remaining 82.8% was due to other factors that were not assessed in this study.

Discussion

Characteristics of the respondents observed in this study include gender, living arrangement, and information source. These are considered as confounding variables that may influence the results of the study. Based on the results from the Indonesian Adolescent Reproductive Health Survey (*Survei Kesehatan Reproduksi Remaja Indonesia*, SKKRI), risk behaviors relate to knowledge, attitude, age, gender, and access to

Table 2 Influence of Health Education Using Booklet Compared to Leaflet on Adolescent Knowledge and Attitude

Knowledge and Attitude	Intervention (Booklet)		Mean Rank (p Value*)	Control (Leaflet)		Mean Rank (p Value*)
	Pre-test	Post-test		Pre-test	Post-test	
Knowledge						
Good	0 (0%)	135 (95.5 %)		0 (0%)	63 (44.7%)	
Fair	0 (0%)	6 (4.3%)	71.00	0 (0%)	31 (21.0%)	71.00
Poor	141 (100%)	0 (0%)	(0.001)	141 (100%)	47 (33.3%)	(0.003)
Attitude						
Positive	0 (0%)	134 (95.0%)	0.001	0 (0%)	117 (83.0%)	71.00
Negative	141 (100%)	7 (45.0%)	(0.001)	141 (100%)	24 (17.0%)	(*0.002)

Note: *Wilcoxon test

Table 3 Comparison of Influence between Use of Booklet and Leaflet as Health Education Media on Reproductive Health Knowledge Level and Attitude among Adolescents

Variables	Coef. B	SE	p Value*	OR Adjusted (95%CI)
Initial Model				
Knowledge	−0.005	0.001	0.000	0.995 (0.993–0.997)
Attitude	−0.003	0.002	0.240	0.997 (0.993–1.002)
End Model				
Knowledge	−0.005	0.001	0.000	0.995 (0.993–0.997)

Note: *multiple logistic regression test, R^2=17.2%

information media.[14]

Health education through booklet media has been suggested to produce a mean knowledge score that is significantly different compared to before receiving health education through booklet media.[10–12] The same is also true for the mean attitude score after receiving health education booklet in one day. This supports the assumption of Bhinnety[15] that stated the ability of human being to retain newly gained information in the temporary memory bank is very limited and vulnerable to forgetfulness if there is no opportunity to repeat the information. In this study, adolescents had received inadequate health education before the study.

Adolescents have the right to receive health education to improve their knowledge and attitude in maintaining their reproductive health so that they can protect themselves from adolescent reproductive health problems. Health education to increase positive behaviors is influenced by various factors, including media used.[16,17] Health education media is a vehicle and effort to present information in the form of printed and electronic media so that the knowledge of the target will improve and will eventually leads to positive health-related behaviors.[18] Media has a strong influence in changing the health psychology and behaviors.[19] Furthermore, Gold et al.[20] also concluded that the use of booklet in health education improves adolescents' knowledge and attitude towards reproductive health.

This current study showed that the difference in the knowledge and attitude gained through the use of booklet and leaflet before health education was significant ($p \leq 0.05$). The difference was also significant after health education was performed. This shows that there was a difference in respondents' knowledge and attitude between those who received health education through booklet and those who received it through leaflet.[21–24]

The higher increase in knowledge and attitude after receiving health education through booklet can be seen as an opportunity to achieve better health education results. Nurrasyidah et al.[24] stated that booklet is effective due to its broad use, easy-to-carry nature, and personal presentation of information. Booklet is already widely used as an effective health education media to provide information on reproductive and sexual health because it can change people's behavior as shown in Africa and Pakistan.[26] Different from communities in other countries, Indonesian people often considered reproductive health education for adolescents as teaching sex to adolescents that the majority still considers this as a taboo. This leads to inadequate information on reproductive health for adolescents. Booklet as a printed media has the advantages of durability, ability to be used by many people, inexpensive price, no requirement for electricity, easy to carry, and easy to understand.[27]

Conclusion

Health education using booklet media influences adolescents' knowledge and attitude towards reproductive health.

Conflict of Interest

All authors stated that there no conflict of interest in this study.

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RESEARCH ARTICLE

Determinants Associated with Discontinuation of Modern Contraceptive in East Kalimantan: a Further Analysis of Indonesia Demographic and Health Survey 2017

Ike Anggraeni,[1] Annisa Nurrachmawati,[1] Winardi,[2] Hasmawati,[1] Dewi Endah Ramadhani[2]

[1]Department of Biostatistics and Health Reproduction, Faculty of Public Health, Universitas Mulawarman, Samarinda, Indonesia, [2]National Population and Family Planning Board East Kalimantan Representative, Samarinda, Indonesia

Abstract

The national family planning program in East Kalimantan needs to achieve a larger target on modern contraceptives. Despite the fertility decline, this program still facing increasing discontinuation rates. A better understanding of the factors behind the discontinuation of a modern method would help in improving programs. This study aims to analyze the determinants of discontinuation of modern contraceptive use. This was a cross-sectional study, the dataset came from Indonesia Demographic and Health Survey 2017 of East Kalimantan Province. The sample is all couples of childbearing age between 10–49 years with marital status who have used and are still using contraception (408 samples). Descriptive analyses were used to assess the reasons for discontinuation. Multiple logistic regression was used to estimate the likelihood of discontinuation by demographic characteristics and others. The proportion of respondents who continue using modern contraceptives was 51%, against 49% discontinuation. The reasons for discontinuation were the husband's disapproval (31%) and health problems related to side effects (26.5%). In the multivariate analysis showed maternal age, women who live in urban areas and women with birth planning near the future will have an opportunity to discontinue in modern contraceptives. It concluded that there is still high modern contraceptive discontinuation in East Kalimantan, therefore it needed for disseminating information through entertainment-education in social media, health workers better counseling services from also better tools, and include the male participation in family planning counseling.

Key words: Family planning, fertility, modern contraceptive discontinuation

Determinan yang Berhubungan dengan Putus Pakai Kontrasepsi Modern di Kalimantan Timur: Analisis Lanjut Survei Demografi dan Kesehatan Indonesia 2017

Abstrak

Program keluarga berencana nasional di Kalimantan Timur perlu mencapai target yang lebih baik dalam penggunaan kontrasepsi modern. Meskipun terdapat penurunan fertilitas, namun program keluarga berencana masih menghadapi peningkatan angka putus pakai. Pemahaman yang lebih baik tentang faktor-faktor di balik putus pakai metode kontrasepsi modern akan membantu meningkatkan program. Penelitian ini bertujuan menganalisis faktor-faktor penentu putus pakai penggunaan kontrasepsi modern. Desain penelitian ini adalah *cross-sectional*, set data berasal dari Survei Demografi Kesehatan Indonesia 2017 untuk Provinsi Kalimantan Timur. Sampel adalah semua pasangan usia subur berusia 10–49 tahun dengan status perkawinan baik bagi yang pernah menggunakan dan masih menggunakan kontrasepsi, yaitu 408 sampel. Analisis deskriptif digunakan untuk menilai alasan putus pakai. Regresi logistik berganda digunakan untuk memperkirakan kemungkinan putus pakai berdasar atas karakteristik demografis dan lainnya. Proporsi responden yang masih terus menggunakan kontrasepsi modern adalah 51% dibanding dengan 49% putus pakai. Alasan penghentian adalah ketidaksetujuan suami (31%) dan masalah kesehatan yang berkaitan dengan efek samping (26,5%). Analisis multivariat menunjukkan usia ibu, wanita yang tinggal di daerah perkotaan, dan wanita dengan perencanaan kelahiran dalam waktu dekat akan memiliki kesempatan untuk berhenti menggunakan kontrasepsi modern. Dapat disimpulkan bahwa kejadian putus pakai kontrasepsi modern masih tinggi di Kalimantan Timur, oleh karena itu diperlukan diseminasi informasi melalui *entertainment-education* dalam sosial media, layanan konseling dari petugas kesehatan, serta alat bantu konseling yang lebih baik dan juga keikutsertaan pria dalam proses konseling.

Kata kunci: Fertilitas, keluarga berencana, putus pakai kontrasepsi modern

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Correspondence: Ike Anggraeni. Department of Biostatistics and Health Reproduction, Faculty of Public Health, Universitas Mulawarman. Jln. Sambaliung Kampus Unmul Gunung Kelua, Samarinda 75123, East Kalimantan, Indonesia. E-mail: ikeanggraeni@fkm.unmul.ac.id

Introduction

Family planning intervention believed had contributed to birth rates and mortality rate reduction, which led to decline in population growth rates, especially in developing countries. Indonesia as one of a country with high use of contraception and low fertility.[1] Data from Indonesia Demographic and Health Survey (IDHS) showed the total fertility rate (TFR) has decreased by 0.2 points, from 2.6 per woman of childbearing age to 2.4 per woman. [2,3] These showed the progress achieved by the family planning program in the past 5 years and its contribution to the demographic transition situation in Indonesia. However, Indonesia still deals with the high dropout of modern contraception, which increase 27% in 2012 to 34% in 2017.[3]

Some studies revealed that there are several factors influenced contraceptive dropout such as age, level of education and side effect of contraceptive use.[4–6] Another study shows that the factors that most determine the incidence of contraception discontinuation are the wife's age, number of children and the composition of children after controlled by husband & wife education factors, living area, household expenditure per capita, history of wife menstruation, husband and wife health knowledge.[7]

The IDHS 2012 results show that the highest number of family planning discontinuation was in pill contraceptive users (40.7%) followed by injection (24.7%).[2] The magnitude of short-term contraceptive use generally impacts the high rate of discontinuation of injecting contraceptives, implants and IUDs showing a drop-out rate above 20% during the first 12 months due to side effects. Side effects can cause women stop using certain types of contraception or switch to use other types of contraception methods.[8] Study of Yideta et al.[9] showed that contraceptive discontinuation was found to be highest for the contraceptive pills (30.0%). Agrahari et al.[10] stated methods that require active user involvement and compliance to be used properly such as pills, are more likely to be discontinued. Meanwhile, long acting method showed less discontinuation as was observed among users of the implant in Modey et al.[11]

Many factors related to the discontinuation of contraception and these were specific in each community. It is important to identify these factors, in order to provide a basis for developing policies and programs that are more effective in overcoming barriers to the use of family planning.

This study aimed to analyze determinant (demography, parity, wealth index and fertility preference with discontinuation) related to modern contraceptive discontinuation in East Kalimantan.

Methods

The study analyzed data derived from the IDHS 2017 of East Kalimantan Province. The IDHS represents households and women of reproductive age (i.e., 15–49 years) based on stratified multi-stage sampling technique.[3] A cross-sectional design was used in this study to determine the effect of demographic factors, parity factors, wealth index factors and fertility preference factors on the discontinuation using of modern contraceptives.

The analysis unit was all female respondents (1,221 women) of childbearing age (15–49 years), who had a history of family planning use within the 5 years before the survey. The dependent variable in this study was the modern family planning discontinuity, which obtained from several questions about contraception. The first question, the respondent asked was: “Do you use methods to prevent pregnancy now (Q303)?” If the answer "Yes" then respondent asked about type of method used (Q304). Further, they asked deeply about family planning methods that were returned in the last 5 years, if the respondent answered that they did not use contraception methods since 2012, then it was coded into missing data.

As many as 462 women using contraception methods for the last 5 years consisted of 408 modern, 52 traditional, and 759 who did not use family planning at that time. Since research focuses on the types of modern family planning methods, the number of samples taken were 408 respondents.

Respondents classified as discontinued using modern contraceptive, if they currently not using or using traditional methods and the previous (the last 5 years) using a modern contraceptive method. Respondents classified as continue using a modern family planning, if for 5 years until now use any of modern contraceptive.

Independent variables obtained from several questions, that is respondent age (Q106), residence (Q102), education (Q108), parity

(Q314A), wealth index (Q HWLTHI), working status (Q909), fertility preferences (Q803), and the desire to add children (Q804), sourced from the Standard Recode Manual for DHS-7.[12]

Descriptive analyses carried out to provide information on each possible determinant. Bivariate analysis, used to determine the relationship between independent variables on the dependent variable. Multiple logistic regression analyses conducted to determine determinants that influence women's discontinuation decision in modern contraceptives.

Results

Respondent characteristic's distribution based on demographic factors, parity and wealth index can be seen in Table 1. Table 1 showed that most of the respondents were around 30–34 years (25.7%) and majority resided in urban areas (74.3%).

Table 1 Respondent Characteristic

Variables	n=408	%
Age (years)		
15–19	6	1.5
20–24	38	9.3
25–29	78	19.1
30–34	105	25.7
35–39	81	19.9
40–44	69	16.9
45–49	31	7.6
Residence		
Urban	303	74.3
Rural	105	25.7
Education		
Primary	122	29.9
Secondary	252	61.8
Higher	34	8.3
Occupation		
Work	208	51.0
Not work	200	49.0
Literacy		
Cannot read at all	5	1.2
Can only read sentence part	7	1.7
Can read entire sentence	396	97.1
Wealth index		
Lowest	54	13.2
Second	98	24.0
Middle	95	23.3
Fourth	79	19.4
Highest	82	20.1

More than half of the respondents complete a secondary education (61.8%). The employment status of respondents was not much different, 51% who work and 49.0% who do not work. Almost all respondents were able to read all sentences well (97.1%) and 24.0% of respondents were in the lower middle wealth index, 23.3% were included in the middle, and 13.2% respondents had the lowest wealth index.

Table 2 provides information, the highest number of children born was around 1–2 children (55.9%). Out of 408 respondents, 55.9% used modern methods and 7.8% used traditional methods, and 36.3% remained did not use any.

Among respondents who used modern contraception methods, most respondents used pill (19.9%) and 3 months injectable (17.4%), and the least used type of contraception was vasectomy (0.2%), tubectomy (1%) and implants (3.2%). The proportion of respondents who discontinue using modern contraceptive was 49% with the most common reason, because, their husband's disapproval (31%) and health problems (26.55%) and most of last method discontinued were short-acting contraceptive methods like injection (51.0%) and pills (41.0%).

The fertility preference factor regarding the ideal number of children desired by both partners was 2 children (50.5%) and more than half of the respondents (62.0%) stated that they did not want to have more children. However 58.3% respondents answered did not have planning for pregnancy.

Result analyses showed that of the 8 risk factors, there was only 1 factor, wealth index was found not significant with modern contraceptive discontinuation. While 7 other determinants such age, residence, education, employment, parity, ideal number of children, birth planning and desire to add children (p value<0.05) had an association with the modern contraceptive discontinuation.

From the entire analysis process that has been carried out it can be concluded that, of the 7 variables thought to be related to modern contraceptive discontinuation, apparently there were only 3 variables that were significantly related to the modern contraceptive discontinuation.

The results of the analysis, obtained the value of Exp(B) of age was 1.098 (95%CI: 1.05–1.13). It indicates that every 1 year increase in maternal age has a tendency discontinuation modern contraceptive by 1.098 times. The Exp(B) of

Table 2 Characteristics of the Respondents based on Fertility Determinant

Variables	n=408	Percentage
Parity		
0	6	1.5
1–2	228	55.9
≥3	174	42.6
Type of contraceptive method		
Not using	148	36.3
Traditional	32	7.8
Modern	228	55.9
Current use of a modern contraceptive method (n=228)		
Pill	81	19.9
IUD/intrauterine devices	16	3.9
1-month injectable	27	6.6
3-month injectable	71	17.4
Condom	15	3.7
Implant	13	3.2
Tubectomy	4	1.0
Vasectomy	1	0.2
Discontinuation of family planning		
Continue of contraceptive	208	51.0
Discontinue of modern contraceptive	200	49.0
Reason of discontinuation of modern contraceptive (n=200)		
Want to get pregnant	9	4.5
Husband disapproval	62	31.0
Fear of side effects	2	1.0
Health problems	53	26.5
Access/availability	15	7.5
Want more an effective method	2	1.0
Not comfortable to use	5	2.5
Rarely had sex	2	1.0
Finance	11	5.5
No reason	3	1.5
Menopause	4	2.0
Divorce	6	3.0
Forced the IUD out	18	9.0
Others	1	0.5
Do not know	7	3.5
Last method discontinued in last 5 years (n=200)		
Pill	82	41.0
Injection	102	51.0
Implants/norplants/IUD	16	8.0
Fertility preferences desire more children		
Want to have more children	155	38.0
Do not want to have more children	253	62.0
Ideal number of children		
0	5	1.2
1	11	2.7
2	206	50.5
3	74	18.1
4	54	13.2
5	18	4.4
6+	6	1.5
Not know	34	8.3
Birth planning in future		
Wanted immediately	51	12.5
Wanted later	119	29.2
Not decided/do not know	238	58.3

Table 3 Relation between Demography, Parity, Wealth Index and Fertility Preference with Discontinuation of Modern Contraceptive

Variables	p Value
Age	<0.001***
Residence	<0.001***
Education	0.008**
Occupation	0.005**
Parity	0.011*
Wealth index	0.66
Fertility preference	
Birth planning in the future	<0.001***
Desire of more kids	0.0088**

Note: *significant in p value<0.05, **significant in p<0.01, ***significant in p<0.001

residence was 2.009 have meant that women who live in urban areas will have the opportunity to discontinue using modern contraceptive by 2.009 times compared to women who live in rural areas. While the birth planning factor (1) with Exp(B) value of 2.636, means that women who desired birth planning later has a tendency discontinue using modern contraceptive by 2.636 times compared to mothers who do not have birth planning, on the other hand women who plan immediate birth, have a tendency to discontinue using modern contraceptive by 14.101 times compared to mothers who do not have birth planning.

The Nagelkerke's R^2 value described in Table 4 shows the value of 0.201 which means that the regression model obtained can explain 20.1% of modern contraceptive discontinuation variations and 79.9% could explained by variables outside the study. While the value of Hosmer and Lemeshow test (>0.05) which means that the model has sufficiently explained the data goodness of fit.

Discussion

Contraceptive method choice in East Kalimantan was similar to national level. Most of women adopted reversible method like pills (19.9%), injectable (17.4%), IUD (3.9%) while vasectomy was less common (0.2%). The discontinuation of modern contraceptive methods occurred more on women who use short-acting methods that could be easily discontinued, such as injections, pills and condoms compared to long term methods such as the implants and intrauterine devices (IUD). This is similar with the study of Barden-O'Fallon et al.[13] which found that implants was the lowest (6.3%) while condoms was the highest discontinuation rate (62.9%). Some study had proven that discontinuation of contraception often leads to unintended pregnancies,[14–16] reduces the impact of family planning programs, and contributes to poor reproductive health indicators for women and high.[17] These reasons what made the problem of contraceptive discontinuation important to overcome.

Multivariate analysis showed there were three significant variables related to the discontinuation of contraceptive modern use, that is maternal age with value of Exp(B): 1.098 (95%CI: 1.05–1.13), urban residence (Exp(B): 2.009), and planning for pregnancy (Exp(B): 14.101). Young women, according to study in Kenya tends to have good knowledge and awareness of contraception, but still had a barrier in terms of myths and misconceptions and also the influence of social network approval on the use of family planning, beyond the individual's beliefs.[18] In that settings, mass and peer campaign strategies needed for family planning program so it could engage with the wider community.

In line with study of Safari et al.[19] and Ariffuddin et al.[20] which stated that there was a

Table 4 Final Model of Logistic Regression Result

Variables	p Value	B	Exp(B)	95%CI
Age	<0.001	0.094	1.098	1.05–1.13
Residence	0.005	0.697	2.009	1.23–3.28
Birth planning in the future	<0.001			
Birth planning (1)	0.001	0.949	2.636	1.49–4.47
Birth planning (2)	<0.001	2.617	14.101	5.77–33.7
Nagelkerke's R^2			0.201	
Hosmer and lemeshow test			0.355	

correlation of maternal age with discontinuation of modern contraception. The aging period of 20–35 years is time for birth spacing period, to meet that contraception with long duration (2–4 years) and reversible is needed. Meanwhile, for women over 35 years old, it is the phase to limit births, long term contraceptive was more appropriate.

This study also found that 12.5% respondent still have the desire to have more children in the near future, and in the multivariate analysis showed this associate with discontinuation. Its similar with study of Bakibinga et al.[21] also showed that women who wanted more children had higher opportunity to have contraceptive discontinuation compared to women wanted no more children.

Desire for more children made women choose the short term contraceptive method such pills and injections, which easily self-discontinuation. Study of Curtis[15] stated that pill and condoms are predominate in the mix of reversible methods in Brazil tending to lead to high discontinuation rate among reversible method. In the meantime, other studies in Bangladesh and Ethiopia found that fertility preference to space or to limit births, was associated with contraceptive discontinuation.[9,22]

Another possible explanation about how fertility preference affected discontinuation is ambivalence about contraceptive use and about pregnancy intentions co-exist. The increase of desire to had more than two children will increase the likelihood of women abandoned their use of modern contraceptive. Study of Khalil et al.[23] showed that the proportion of individuals who stated that they planned to use family planning in the future decreased from 80% among women with one child to 41% among women with four or more children.

More complicated with 31% husband disapproval of contraceptive use, this will lead women to use traditional methods or not use modern contraceptive at all. Study of Osei et al.[24] stated that women in supportive relationships are more likely than those in unsupportive relationships to continue use of modern contraceptives. The result of study in India and Ethiopia also found that women having support from the husband for contraceptive use were less likely to discontinue the method.[25,26] This may lead to suggest that family planning field workers should continue to give information and motivate woman also their husband to improve beliefs and attitudes so they would continue using a modern especially long-acting modern contraceptive as the most effective and reliable method for their childbearing plan.

In order to prevent a health problem or complain after using modern contraceptive methods, a better and effective counseling from midwife and other health workers about types of contraceptive information, benefit and side effect should be given. A systematic review found that interventions targeting women, initiating a method (including structured counseling on side effects) tended to show positive effects on contraceptive continuation.[27]

A decision making tool in choosing a contraceptive method had been launched by National Family Planning Coordinating Agency to support health workers in counseling, but according to the latest study in Yogyakarta, the utilization of the tool was still low and the use of assistive devices has not been effective in increasing the use of long-term contraception methods.[28] In order to optimize the tool utilization, National Family Planning Coordinating Agency should review or improved these tools to overcome the obstacles encountered.

The study also found that women in urban areas were found to be associated with higher risk of contraceptive discontinuation, which could be caused by better access to family planning information and services that allows women to discontinue contraception in order to find a better method for them. Similar to the study, the result of study in Haiti revealed that the availability of contraceptive options in urban areas would also impact women's contraceptive use choices and determines the method mix among the users.[29] Therefore, it's necessary to increase the demand for modern contraceptive, though strengthens adequate information using the most appropriate mass media that accessible for women in urban setting.

A meta-analysis found that campaign format that included an entertainment-education component were positively related to family planning behaviors for women compared to mass media campaign that used only a traditional advertising format.[30] A longitudinal study in Nigeria proved that entertainment-education intervention in urban area with 30 minute radio magazine with various magazine elements, such as listener interviews and call-in "ask the expert", could increase modern contraceptives used between 2.3 to 15.5% in each city.[31] With

the current advancement of social media, most informative social media could be used as an option of modern contraceptive family planning campaign with a wider range of target. Some studies had proven that social media effective for disseminating information targeting young and productive ages (18–44 years).[32,33]

The finding of this study implies that the high percentage of modern contraceptive discontinuation still needs attention and overcome immediately. Maternal age, women who live in urban areas and women with birth planning near future will have an opportunity to discontinue in modern contraceptive. It indicated the importance of promoting a long-acting methods contraceptive through entertainment-education in social media. We also need to emphasize the role of family planning field workers; to motivate woman to continue using the modern contraceptive method. Some effort also needed for male involvement in family planning and their support in the modern contraceptive method, the couple counseling should be promoted in order to obtain belief and attitudes that impact on reducing discontinuation. National Family Planning Coordinating Agency should make a review and improvement of the current family planning decision making tools to strengthen the health workers' ability to provide better counseling.

Conclusion

It concluded that there is still high modern contraceptive discontinuation in East Kalimantan province, therefore it needed for disseminating information through entertainment-education in social media, health workers better counseling services from also better tools, and include the male participation in family planning counseling.

Conflict of Interest

There was no conflict of interest.

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RESEARCH ARTICLE

Correlation of Thrombocytopenia and Length of Hospitalization in Dengue Child Patient

Riyadi Adrizain,[1] Ananda Hanifah Husna,[2] Andri Rezano[3]

[1]Department of Child Health, Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital, Bandung, Indonesia, [2]Medical Undergraduate Study Program, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia, [3]Department of Biomedical Sciences, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia

Abstract

Dengue virus infection (DVI) is one of the major health problems that cause 500 thousand patients hospitalized annually. Thrombocytopenia is one of the abnormal hematologic findings that is always found in DVI patients. This study aimed to determine the correlation of thrombocytopenia and length of hospitalization in dengue child patients. This retrospective analysis study used secondary data from seven major hospitals in Bandung with a total sampling method. The inclusion criteria were patients aged 0–18 years old diagnosed with dengue fever (DF), or dengue hemorrhagic fever (DHF), or dengue shock syndrome (DSS) who was admitted from January to December 2015 and excluded when there was comorbid as well as incomplete data. The correlation was analyzed by Spearman's rank correlation test. There were 2,025 samples from a total of 5,712 DVI cases during 2015. Among those who admitted, most of the patients experienced severe thrombocytopenia (40%) with the average length of hospitalization was 4.84 days. This result was not much different from the patients with moderate (38.1%) and mild (21.9%) thrombocytopenia who were treated for an average of 4.13 days and 4.08 days, respectively. The analysis of correlation obtained a significant relationship between thrombocytopenia and length of hospitalization despite showing a weak correlation (r=0.231, p=0.001). In conclusion, there is a weak correlation between thrombocytopenia and length of hospitalization among dengue child patients.

Key words: Dengue virus infection, length of hospitalization, thrombocytopenia

Korelasi Trombositopenia dengan Lama Rawat Inap pada Pasien Anak Terinfeksi Virus Dengue

Abstrak

Infeksi virus dengue (IVD) merupakan salah satu masalah kesehatan utama yang menyebabkan 500 ribu pasien dirawat di rumah sakit setiap tahun. Trombositopenia adalah salah satu temuan abnormal hematologi yang selalu ditemukan pada pasien IVD. Penelitian ini bertujuan mengetahui korelasi trombositopenia dengan lama rawat inap pada pasien anak terinfeksi virus dengue. Penelitian analitik retrospektif ini menggunakan data sekunder tujuh rumah sakit besar di Kota Bandung dengan metode *total sampling*. Kriteria inklusi adalah pasien anak usia 0–18 tahun yang didiagnosis demam dengue (DD), atau demam berdarah dengue (DBD), atau sindrom syok dengue (SSD) yang dirawat dari bulan Januari hingga Desember 2015. Kriteria eksklusi meliputi komorbiditas dan data rekam medis yang tidak lengkap. Analisis dilakukan dengan uji korelasi rank Spearman. Terdapat 2.025 sampel dari total 5.712 kasus IVD selama tahun 2015. Di antara yang dirawat, sebagian besar pasien mengalami trombositopenia berat (40%) dengan lama rawat inap rerata 4,84 hari. Hasil ini tidak jauh berbeda dengan pasien dengan trombositopenia sedang (38,1%) dan ringan (21,9%) yang dirawat selama rerata 4,13 hari dan 4,08 hari masing-masing. Analisis korelasi diperoleh hubungan yang bermakna antara trombositopenia dan lama rawat inap meskipun dengan nilai korelasi lemah (r=0,231; p=0,001). Simpulan, terdapat korelasi lemah antara trombositopenia dan lama rawat inap pada pasien anak terinfeksi virus dengue.

Kata kunci: Infeksi virus dengue, lama rawat inap, trombositopenia

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Correspondence: Andri Rezano, MD, Ph.D. Department of Biomedical Sciences, Faculty of Medicine, Universitas Padjadjaran. Jln. Raya Bandung-Sumedang km 21, Jatinangor, Sumedang 45363, West Java, Indonesia. E-mail: andri.rezano@unpad.ac.id

Introduction

Dengue virus infection (DVI) is a major public health problem in many tropical and sub-tropical countries.[1–3] It is estimated that 2.5 billion people are at risk of suffering from DVI and more than 75% of these people live in the Asia-Pacific region.[1,4,5] Indonesia as one of the countries with category A for endemicity of dengue fever (DF) and dengue hemorrhagic fever (DHF) shows that DVI is still the main health problem as well as the cause of hospitalization and death, especially among the children.[1,6] The incidence of DHF in 2018 reached 65,602 cases with the highest number of cases (8,732 cases) is in the West Java.[7] Based on WHO report, about half a million people suffering from DHF require hospitalization each year.[1]

Clinical manifestations of DVI are varying from mild to severe degrees which in some cases can cause fatal conditions and death.[8,9] Thrombocytopenia (thrombocyte level<150,000 cells/mm^3) is the most common finding in DVI patients and is one of the WHO criteria used as a potential indicator of clinical severity.[10–12]

The huge number of cases with a high need for health services such as hospitalization directly makes a disease costs even greater. This must be considered especially by a country implementing the universal health coverage system, such as Indonesia. So, it becomes important for clinicians to be able to determine which patients need to be hospitalized as well as determine the patient's length of stay effectively and efficiently.

Research in 2010 stated that there was a weak correlation between platelet counts with a length of stay (r=0.262).[13] This study was conducted to determine the correlation between thrombocytopenia and length of stay in dengue child patients who were admitted at the hospital in Bandung during 2015.

Methods

This study was a correlational analysis with a retrospective cross-sectional design to determine the correlation of thrombocytopenia with a length of hospitalization in child patients infected with dengue virus.

The instrument used in this study was secondary data from the main research on "Hospital-based surveillance: accuracy, adequacy, and timeliness of dengue case reports in Bandung, West Java, Indonesia of 2015" in the form of medical records from a database of seven major hospitals in Bandung city (St. Borromeus Hospital, Advent Hospital, Hermina Pasteur Mother and Child Hospital, Hermina Arcamanik Hospital, Limijati Mother and Child Hospital, Santo Yusuf Hospital, and Dr. Hasan Sadikin General Hospital Bandung) in the period of January to December 2015. The inclusion criteria were data of child patients aged 0–18 years who were diagnosed with DF, or DHF, or dengue shock syndrome (DSS). The exclusion criteria were patients with comorbid and incomplete medical record data. The number of samples was determined through the total sampling method. The variables assessed in this study were the degree of thrombocytopenia as the independent variable and length of hospitalization as the dependent variable. The length of hospitalization was arbitrarily determined and grouped into <3 days, 3–5 days, and >5 days.

The correlation of thrombocytopenia with a length of hospitalization was analyzed using the Spearman's rank test. The hypothesis test is significant if it meets the p value<0.05. The strength of correlation between thrombocytopenia and length of hospitalization in child patients infected with dengue virus is expressed by the correlation coefficient (r). Data analysis was performed using IBM® SPSS® version 25 and the results were presented in the form of tables.

This research was conducted after obtaining approval from the Health Research Ethics Committee of Faculty of Medicine of Universitas Padjadjaran Bandung with the letter number: 1371/UN6.KEP/EC/2019.

Results

From 1 January to 31 December 2015 there were 5,712 DVI cases collected from the database of seven major hospitals in Bandung. This study only involved 2,025 samples, all of which were child patients aged 0–18 years old with a diagnosis of DF, or DHF, or DSS. Based on Table 1, the sample that had the most characteristic value was male (51.7%), age≤15 years old (89.1%), DHF (59.2%), and severe thrombocytopenia (40%).

The clinical diagnosis terminology used in this study follows the WHO 2011 guideline criteria. Thrombocytopenia is established when the number of thrombocyte/platelets in the blood <150,000 cells/mm^3.[1] It can be identified through the results of hematological laboratory

Table 1 Characteristics of the Subjects by Gender, Age, Clinical Diagnosis and Degree of Thrombocytopenia

Variables	Categories	n=2,025	Persentage
Gender	Male	1,046	51.7
	Female	979	48.3
Age (years)	≤15	1,804	89.1
	>15	221	10.9
Clinical diagnosis	Dengue fever (DF)	714	35.3
	Dengue hemorrhagic fever (DHF)	1,199	59.2
	Dengue shock syndrome (DSS)	112	5.5
Thrombocytopenia	Mild (100,000–<150,000 cells/mm^3)	444	21.9
	Moderate (50,000–<100,000 cells/mm^3)	772	38.1
	Severe (<50,000 cells/mm^3)	809	40.0

Table 2 The Degree of Thrombocytopenia in Various Clinical Diagnoses

Severity of Infection	Thrombocytopenia						Total	
	Mild		Moderate		Severe			
	n	%	n	%	n	%	n	%
DF	238	33.3	292	40.9	184	25.8	714	35.3
DHF	204	17.0	472	39.4	523	43.6	1,199	59.2
DSS	2	1.8	8	7.1	102	91.1	112	5.5
Total	444	21.9	772	38.1	809	40.0	2,025	100.0

Table 3 Duration of Hospitalization of Dengue Child Patients by the Degree of Thrombocytopenia

Thrombocytopenia	Duration of Hospitalization					
	<3 Days		3–5 Days		>5 Days	
	n	%	n	%	n	%
Mild (100,000–<150,000 cells/mm^3)	84	18.9	282	63.5	78	17.6
Moderate (50,000–<100,000 cells/mm^3)	90	11.7	546	70.7	136	17.6
Severe (<50,000 cells/mm^3)	36	4.4	540	66.7	233	28.8

tests. The platelet value used in this study was the lowest platelet level of the entire platelet serial examination during hospitalization.

The occurrence of thrombocytopenia in various clinical conditions of patients is further presented in Table 2. According to the table, this study found that most of the DF patients (40.9%) had moderate thrombocytopenia. While the majority of both DHF (43.6%) and DSS (91.1%) patients have experienced severe thrombocytopenia.

From the analysis of the data, the average length of hospitalization of the dengue patient was 4 (±2 days). Based on Table 3, most of the patients with mild, moderate, and severe thrombocytopenia were treated for the same period of 3–5 days. Furthermore, the average length of hospitalization of dengue patients based on the degree of thrombocytopenia showed that patients with mild thrombocytopenia underwent hospitalization for an average of 4.08 days. Whereas in patients with moderate and severe thrombocytopenia underwent hospitalization for an average of 4.13 days and 4.84 days,

respectively.

Based on the Spearman's rank test, this study found a significant relationship between thrombocytopenia and length of hospitalization ($p<0.001$) with the weak correlation ($r = 0.231$).

Discussion

In this study, as presented in Table 1, the majority of DVI cases (59.2%) in hospitalized child patient was the DHF. This finding was likely due to the majority of mild cases of DVI (DF) could be treated as an outpatient as stated in one of study in 2015.[14] Moreover, this result was also consistent with the reference stating that children become the most impatient patient in the case of DHF.[15]

The majority of patients in this study had a severe degree of thrombocytopenia (40.0%). This result was in line with the proportion of diagnosis the majority of patients involved in this study which mostly were severe cases (DHF) patients. This finding seemed consistent with the study stating that thrombocytopenia was seen to be more relevant in those with severe dengue.[16,17]

From the data presented in Table 2, this study found that patients with DHF and DSS had more severe conditions compared with DF patients. It was known from the finding of severe thrombocytopenia both in DHF (43.6%) and DSS (91.1%) patients, while most of the DF patients experienced moderate thrombocytopenia (40.9%). This result was in line with the WHO guideline which considered thrombocytopenia as one of the criteria indeterminate the clinical severity of DVI.[1]

The length of hospitalization represents the time in a treatment period that was calculated by the subtraction of the date of discharge and the date of admission the patient was hospitalized.[15] In this study, the patient's length of hospitalization was stated in the unit of the day. Further analysis from the results of this study showed that most of the patients with mild, moderate, or severe thrombocytopenia were treated for an average of 4 days (range in 2–6 days). Another study that was conducted in Semarang (2015–2016) found that the average length of hospitalization of 137 child patients was 5.47 days. This difference of an average length of hospitalization may be due to criteria inclusion used in this study which only included DHF patients as the subject.[15]

This length of hospitalization was further classified into 3 groups, <3 days, 3–5 days, and >5 days. This classification is based on the average length of hospitalization of dengue patients in Dr. Hasan Sadikin General Hospital Bandung. In mild thrombocytopenia, the average length of stay of the patient was 4.08 (97 hours) days. Whereas in patients with moderate and severe thrombocytopenia the average length of hospitalization was 4.13 days (99 hours) and 4.84 days (116 hours), respectively. This result showed that the difference in duration of hospitalization between the patients with mild, moderate, and severe thrombocytopenia was not more than 24 hours. In general, the result indicated that all of the patients with mild, moderate, and severe thrombocytopenia were hospitalized for 4 days. But with more detailed calculations, this study found that there was a little difference in length of stay among patients. The more severe degree of thrombocytopenia the longer duration of hospitalization.

This finding was confirmed by the result from Spearman's rank correlation test. In this study, it was found that there was a relationship between thrombocytopenia with a length of stay in child patients infected with dengue virus ($p<0.001$) with a weak correlation ($r=0.231$) as presented in Table 4. The results of this study are in accordance with previous studies which showed an association between thrombocytopenia and length of stay but with weak correlation ($r=0.262$).[13]

The health system problem currently being faced by Indonesia today is the Social Security Administrator (*Badan Penyelenggara Jaminan Sosial*, BPJS) budget deficit which reaches 28 trillion IDR. Dengue virus infection is one of the diseases borne by the BPJS, so health services for dengue cases including hospitalization directly contribute to the costs incurred, and the deficit currently being experienced by BPJS. Indonesia was the country with the highest economic burden of dengue in the region, followed by Thailand, representing about 34% and 31% of the total economic burden of dengue, respectively.[18] Inpatients that are actually not needed by DVI patients are often performed especially in child dengue patients.[14] This is caused by parents concerns about uncertain conditions and the potential for fatal outcomes due to dengue infection.[14] Hospitalization that is too early makes the long duration of hospitalization of patients becomes longer and consequently, the burden of costs incurred becomes even greater. Total

2015 economic burden of dengue in Indonesia was estimated at 381.15 million USD which comprised 355.2 million USD for hospitalized and 26.2 million USD for ambulatory care cases.[19] In addition, the number of beds available for inpatients in hospitals is limited. The ratio of beds in hospitals in Indonesia in 2015 was 1.21 per 1,000 population. This ratio increased compared to 2014, which was 1.07 per 1,000 population. Although the ratio of beds to the population in Indonesia in 2015 was sufficient, there are still six provinces with insufficient ratios of beds to population, one of which is the province of West Java (0.84).[20]

Limitations of this study were in the use of cross-sectional study design so the results show less interrelationship between variables.

Conclusion

From this study there is weak correlation between thrombocytopenia and hospitalization duration of dengue child patients. However, the difference in length of hospitalization between mild and severe thrombocytopenia is less than 24 hours. We proved that the degree of thrombocytopenia is not predictive of length of hospitalization among dengue child patients.

Conflict of Interest

The authors declare that there was no conflict of interest.

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RESEARCH ARTICLE

Measuring Envy Level among Students of a Faculty of Medicine

Eka Nurhayati,[1] Susan Fitriyana,[1] Eva Rianti Indriyanti[2]
[1]Department of Public Health, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia,
[2]Department of Biochemistry, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

Abstract

Envy is a negative emotion that painful and unpleasant, caused by feelings of inferiority when someone compared themselves to others. Envy is divided into benign and malicious envy. Benign envy could be leverage to motivate someone to improve themselves until they reach or even exceed the envied person's level. In contrast, malicious is destructive that someone could do anything to pull the envied person down to the same level as themselves or even lower. This study aimed to measure benign and malicious envy among the students of the Faculty of Medicine Universitas Islam Bandung. It was a descriptive study involving 152 students. Measurement made using the Benign and Malicious Envy Scale (BeMaS), which uses 6 points Likert scale during November 2019. Data analysis using Microsoft Excel. The study results showed envy among the students dominated by positive or productive envy, the mean value for benign envy (4.57), and malicious envy (1.92). It showed that benign envy push students to be more competitive rather than destructive envy. The conclusion of this study that the level of envy students of the Faculty of Medicine Universitas Islam Bandung dominated by benign envy. The faculty is responsible for developing strategies to increase the benign envy level and control the malicious envy level.

Key words: BeMaS, benign envy, envy, malicious envy

Pengukuran Tingkat Iri pada Mahasiswa Fakultas Kedokteran

Abstrak

Iri adalah emosi negatif menyakitkan dan tidak menyenangkan yang diakibatkan oleh perasaan inferior ketika membandingkan diri dengan orang lain. Iri terbagi atas *benign envy* dan *malicious envy*. *Benign envy* bersifat memotivasi seseorang untuk terus memperbaiki diri sampai mencapai bahkan melebihi apa yang dimiliki kompetitornya. Sebaliknya, *malicious envy* bersifat destruktif ketika seseorang berupaya untuk menarik kompetitornya ke level yang sama dengan dirinya atau bahkan lebih rendah. Penelitian ini bertujuan mengukur tingkat *benign* dan *malicious envy* pada mahasiswa Fakultas Kedokteran Universitas Islam Bandung. Penelitian ini merupakan penelitian deskriptif dengan melibatkan 152 mahasiswa sebagai subjek penelitian. Pengukuran dilakukan menggunakan *Benign and Malicious Envy Scale* (BeMaS) selama November 2019 menggunakan 6 poin Skala Likert dan analisis data menggunakan Microsoft Excel. Hasil penelitian menunjukkan bahwa rerata *benign envy* (4,57) lebih tinggi dibanding dengan *malicious envy* (1,92). Hal ini menunjukkan bahwa iri yang bersifat positif atau produktif jauh lebih tinggi dibanding dengan nilai iri yang bersifat destruktif. Simpulan penelitian ini adalah bahwa tingkat iri pada mahasiswa Fakultas Kedokteran Universitas Islam Bandung lebih dominan pada *benign envy* dibanding dengan *malicious envy*. Tugas fakultas adalah mengembangkan strategi agar dapat meningkatkan nilai *benign envy* serta berupaya mengendalikan tingkat *malicious envy*.

Kata kunci: BeMas, *benign envy*, iri, *malicious envy*

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Correspondence: Eka Nurhayati, dr., MKM. Department of Public Health, Faculty of Medicine, Universitas Islam Bandung. Jln. Tamansari No. 22, Bandung 40116, West Java, Indonesia. E-mail: nurhayatieka1@gmail.com

Introduction

In organizational or social life, emotions can impact attitudes, behavior, cognition, and even personality.[1] One of the emotions that occurs in social life today in a world full of competition is envy. To define envy, many researchers referred to the definitions of Parrott and Smith and Kim and Smith. They defined envy as painful and unpleasant negative emotions caused by feelings of inferiority that arise due to comparing themselves to others who are considered to be more superior.[2–8] Another definition by Adrianson and Ramdhani[9] described envy as a mixed and vague feeling, but also accompanied by inferiority and desire to have what others have. Envy can make a person stimulated to compete and try to narrow the gap with the envied person.[5,10]

We generally associate envy with something wicked or sinful, but previous studies about envy revealed that envy could also have ethical impacts on someone's life. Envy can be divided into two, benign and malicious envy.[3,9,11] Xiang et al.[12] quoted Smith stated that the difference between benign and malicious envy is hostility. Benign envy is never accompanied by hostility, while malicious envy is mostly accompanied by anger, hatred, and hostility.

Benign envy is positive envy. Benign envy stimulates someone to compete and achieve or even exceed every quality owned by the envied person. It leverages someone to push themselves up to have the same quality as the envied person.[5,10,12–15] According to van de Ven et al.,[5] the feeling of benign envy motivates a person to improve themselves to reach and even exceed their goals. Whereas malicious envy is destructive. It stimulates someone to pull the envied person down to the same level as theirs or even lower.[3,5,10–15] Some studies showed that malicious envy is associated with mental disorders[16,17] and poor behavior.[2,4,13]

In line with the studies above, envy in Islam also divided into two, *ghibtah* (benign envy) and *hasad* (malicious envy). Khan and Gani[18] quoted Shaykh Mufi Shafi Usmani as saying that *ghibtah* means having the same blessings as those of others without any intention of seizing the blessings. On the other hand, *hasad* is hatred for other's blessings. In Islam, *hasad* is considered as the disease of the heart and sin, which can deplete goodness.[18,19]

Studies on envy have already been conducted in various fields such as work environment, organizations, salespersons, and education. Someone could feel envy for others in personal development, materials, social relations, romance, family, faith, physical performance, and academic performance.[20] In the world of the work environment, benign envy proved to be related to increased self-esteem,[15] motivation, job satisfaction,[14,21] and success.[22] While malicious envy is associated with low self-esteem,[15] job satisfaction, and a tendency to change profession.[14,21] Another study showed that malicious envy in the work environment could influence cognitive processes and cause negative behavior.[23]

In the education world, students are guided not only to build friendships and cooperation but also to compete with each other to perform the best academic achievement. This competition can eventually spark envy. Sitinjak[24] conducted one of the studies on envy that was done among students. In his study, Sitinjak showed that envy stimulated students to work and study harder to improve their academic performance.

Other studies on envy conducted among students carried out by Xiang et al.,[12] which linked benign and malicious envy with gratitude and social support. The study revealed that gratitude is directly linked to benign envy and inversely to malicious envy. The higher the gratitude, the higher the level of benign envy and the lower the level of malicious envy. Another study carried out by Vrabel et al.[15] also showed that students experienced a higher level of malicious envy with low admiration rates, a high level of rivalry, and a low level of self-esteem.

Measuring the level of benign and malicious envy among students of faculty of medicine can help the faculty develop strategies to improve student's academic performance. The competitive environment in the faculty has pushed the students to show their best academic performance. Based on these reasons, this study aimed to measure the level of benign and malicious envy among students of the Faculty of Medicine Universitas Islam Bandung.

Methods

A descriptive study was conducted in November 2019 involving 152 students of the Faculty of Medicine Universitas Islam Bandung using consecutive sampling. Measurements made using

the benign and malicious envy scale (BeMaS) developed by Lange and Crusius,[13] that have been translated into Indonesian. On this scale, ten statements consist of five statements for each benign and malicious envy. The benign envy statements were numbers 1, 3, 4, 7, and 9, while the malicious envy statements were numbers 2, 5, 6, 8, and 10 in 6 points value each statement Likert scale. The reliability value of BeMaS is a=0.85.[10,12,13,24]

Measurements are made by disseminating the scale via Google forms to students. Participants were asked to rate each statement using a Likert scale from 1 (strongly disagree) to 6 (strongly agree). To reduce bias, we did not ask for name or grade, and we also did not include the title of the scale in the forms. Data analyzed with simple descriptive statistical analysis using Microsoft Excel to measure the means and standard deviations.

The study protocol was approved by the Health Research Ethics Committee of the Faculty of Medicine, Universitas Islam Bandung, Indonesia through the issuance of the ethical approval letter number: 292/Komite Etik.FK/IV/2019.

Results

The characteristic of respondents described in Tabel 1. The respondents dominated by a female (67.8%) and age between 16–20 (56.6%).

The results of this study are described in Table 2, it can be seen that the mean value of benign envy (4.57) is higher than malicious envy (1.92). In benign envy, the greatest mean is the statement about self-improvement (5.29). In malicious envy, the greatest mean is the statement regarding hatred for the envied person (2.06). The result was obtained by calculating the mean value of benign envy from item 1, 3, 4, 7, and 9, and mean value of malicious envy from item number 2, 5, 6, 8, and 10. Mean value obtained from the sum of participant answer on 6 points Likert scale on every item.[13]

Table 1 Characteristics of the Respondents

Characteristics	n=152	%
Gender		
Male	49	32.2
Female	103	67.8
Age (years)		
16–20	86	56.6
21–25	66	42.8

Discussion

Envy is a negative emotion that arises from an inferior feeling when someone compares themselves to the envied person who is considered to have better quality than themselves. That feeling then stimulates the desire to achieve the same level or even more.[2–8] Envy can occur in every field, including in the world of education. Based on the results of this study, it can be seen that the mean value of benign envy is higher than malicious envy. It shows that envy is dominated by positive envy, which can encourage students to achieve better academic performances rather than hostility to the envied person.

Based on the study conducted by Crusius and Lange,[3] a person with benign envy focus on both the envied person and the envied object. In contrast, malicious envy only focuses on the envied person rather than the envied object. It showed that there was different motivation between benign and malicious envy. In relevance to this study, it showed that the students compete not only with other students, but also chasing for envy objects such as grade, activity, or performance.

According to Sitinjak,[24] when the students felt envy, it would become the motivation to work harder, improving attitudes, and being more active in academic activities. Sitinjak also stated that the smaller value of malicious envy does not mean that it must be ignored, but it must be controlled that it would not develop more destructive. In line with Sitinjak[24] and Lange and Crusius,[13] also showed that benign envy was linked to motivation for success, whereas malicious envy was linked to anxiety or fear to reach some standard or goals.

In this current study, even though the malicious envy level is lower than the benign envy level, that does not mean that it can be ignored. The faculty is responsible for facilitating students to control and limit malicious envy level. Armalita and Helmi[25] that quoted Smith and Kim, showed that envy caused conflict in an interpersonal relationship, including the conflict in a group.

Table 2 The Benign and Malicious Envy Level among Students of the Faculty of Medicine

BeMaS Item	Benign Envy	Malicious Envy
When I envy others, I focus on how I can become equally successful in the future.	4.67	–
I wish that superior people lose their advantage.	–	1.86
If I notice that another person is better than me, I try to improve myself.	5.29	–
Envying others motivates me to accomplish my goals.	4.31	–
If other people have something that I want for myself, I wish to take it away from them.	–	1.93
I feel ill will toward people I envy.	–	2.06
I strive to reach other people's superior achievements.	3.82	–
Envious feelings cause me to dislike the other person.	–	2.05
If someone has superior qualities, achievements, or possessions, I try to attain them for myself.	4.56	–
Seeing other people's achievements makes me resent them.	–	1.66
Mean	4.57	1.92
Standard Deviation	0.68	0.73

Students are divided into groups for academic activities such as tutorials or laboratory activities in the faculty of medicine. If the faculty ignored the malicious envy level, it could develop into more destructive and cause great friction in groups, which could influence academics performance. To avoid the development of malicious envy, an activity like peer assessment which can be used to develop teamwork skill, discussion skill and also to learn to handle feedback from other students.[26]

Based on a study conducted by Xiang et al.,[12] envy relates to gratitude and social support. Students with higher benign envy levels usually full of gratitude and have higher social support, vice versa. It showed that gratitude and social support are essential to increase benign envy and reduce the level of malicious envy. The faculty's current responsibility is to facilitate students with activities to increase gratitude and provide optimal social support. In this Faculty of Medicine, the activities implemented to develop the specific advantages, known as Islamic Insert Medical Curriculum (IIMC).

The limitation of this study was that the measurement was only conducted for the envy level. In the future, another study must be conducted to show the relationship or influence of envy on group dynamics and academic performances that Faculty can develop strategies to increase student motivations.

Conclusion

The conclusion of this study that the level of envy students of the Faculty of Medicine Universitas Islam Bandung dominated by benign envy. The faculty is responsible for facilitating the students with positive activities to increase the benign envy level and control malicious envy level.

Conflict of Interest

All researchers do not have a conflict of interest with the subjects of this study.

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RESEARCH ARTICLE

Factors Affecting Surgical Waiting Time in Cancer Patients at Referral Hospitals of West Java Province

Yuli Susanti,[1] Siska Nia Irasanti,[1] Ieva Baniasih Akbar,[2] Wawang S. Sukarya[3]
[1]Department of Public Health, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia,
[2]Department of Physiology, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia,
[3]Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

Abstract

A challenge for hospitals in facing the high number of patient visits is to provide quality services. One of the vital services in dealing with patients, especially those who will have cancer surgery considering the high rate of mortality cancer, is an improvement in waiting time (WT). Waiting time for elective surgery is one indicator of service quality with a standard of ≤2 days. This research aimed to determine the average WT for surgery, influencing factors, and optimal queuing models. The method used was quantitative and qualitative methods applied to 207 samples with consecutive sampling at West Java Provincial Al-Ihsan Regional General Hospital Bandung from October to December 2016. The analysis used partial least squares (PLS). The results of the study showed that the average WT for surgery was 32 days. Factors that influence WT were inpatient rooms, number of medical personnel, condition of patients, and health insurance. The optimal queue model to reduce surgical waiting time are adding inpatient beds, oncologist doctor, and creating an online system for registration and confirmation of inpatient rooms and operating.

Key words: Queue model, service quality, surgery waiting time

Faktor yang Memengaruhi Waktu Tunggu Operasi Pasien Kanker di Rumah Sakit Rujukan Jawa Barat

Abstrak

Tantangan bagi rumah sakit dalam menghadapi jumlah kunjungan pasien yang tinggi adalah mampu memberikan pelayanan berkualitas. Salah satu pelayanan signifikan bagi pasien kanker yang akan menjalani operasi adalah perbaikan waktu tunggu karena mortalitas pasien kanker yang tinggi. Waktu tunggu operasi elektif merupakan salah satu indikator mutu pelayanan dengan standar ≤2 hari. Penelitian bertujuan mengetahui waktu tunggu operasi rerata, faktor yang memengaruhi, dan model antrean yang optimal. Metode yang digunakan adalah kuantitatif dan kualitatif yang diterapkan pada 207 sampel secara *consecutive sampling* di RSUD Al-Ihsan Provinsi Jawa Barat Bandung dari Oktober hingga Desember 2016. Analisis menggunakan *partial least squares* (PLS). Hasil penelitian menunjukkan bahwa waktu tunggu operasi rerata adalah 32 hari. Faktor yang berpengaruh terhadap waktu tunggu operasi adalah ruang rawat inap, jumlah tenaga medis, kondisi pasien, dan jaminan kesehatan. Model antrean yang optimal untuk menurunkan waktu tunggu operasi adalah penambahan tempat tidur rawat inap, penambahan dokter spesialis bedah onkologi, serta pembuatan sistem daring untuk pendaftaran dan konfirmasi kesiapan ruang rawat inap dan ruang operasi.

Kata kunci: Model antrean, mutu pelayanan, waktu tunggu operasi

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Correspondence: Yuli Susanti, MD. Department of Public Health, Faculty of Medicine, Universitas Islam Bandung. Jln. Tamansari No. 22, Bandung 40116, West Java, Indonesia. E-mail: yulisusantiarmandha@gmail.com

Introduction

A hospital as a place to conduct health care is required to provide excellent services. The queue in several hospital units is one of the phenomena that appear in the era of universal health coverage.[1] This matter contributes to progressivity disease such as malignancy. Malignancy is the most familiar as a characterization of cancer.[2]

Cancer is one of the main causes of death worldwide. In 2012, there were around 8.2 million deaths caused by cancer, and the number of patients with cancer increases every year.[2] Based on the GLOBOCAN (International Agency for Research on Cancer) data in 2018, it was estimated that there are 18.1 million new cases of cancer. This prediction is assumed to increase in the future.[3] Breast cancer is the most commonly diagnosed cancer in females and the leading cause of cancer death worldwide.[4] According to the Basic Health Research (*Riskesdas*) 2013, the prevalence of cancer in all ages in Indonesia was 0.14% or 347,792 people. West Java placed the third rank in the province with the highest estimated number of patients with cancer in Indonesia after Central Java and East Java as many as 45,473 people.[5]

Based on the Decree of the Minister of Health Republic of Indonesia (*Kepmenkes*) Number 129/Menkes/SK/II/2008 concerning Hospital Minimum Service Standards, the waiting time for surgery (operation) is a period since the doctors decide to do a planned operation (elective) until the operation is carried out with the standard waiting time less than or equal to two days (≤2 days).[6]

The waiting time for surgery in Dharmais Cancer Hospital Jakarta is 5.39 days,[7] while it can take 3–6 months in Dr. Hasan Sadikin General Hospital (RSHS) Bandung.[8] It showed that the minimum service standards stipulated by the Ministry of Health have not been fulfilled yet. The waiting time for surgery among breast cancer patient in Norway began decreasing from 2011 and 2014 after using the cancer patient pathway (CPP) that can be described as a set maximum days' patients experienced from the hospital receives the referral to the first specialist visit, to a clinical decision and to start of treatment.[9]

Many children wait too long for surgery in Canada. Specific attention is required, particularly in dentistry, ophthalmology, plastic surgery, and cancer care. Improved access may be realized with the use of national wait-time targets.[10] This research aimed to provide an overview of average waiting time in cancer surgery patients, to analyze the influencing factors, and to acquire optimal queueing models.

Methods

This research used a mixed method of qualitative and quantitative with a cross-sectional design. The quantitative method was implemented by doing observation and survey techniques to get information about waiting time and factors that affect surgical waiting time. The survey instrument was developed with 19 questions about medical staff, management, and hospital facilities, health insurance, and patient conditions. The dimensions included in the questionnaire listed in Table 1.

The response was obtained from 207 cancer patients consecutively sampling at West Java Provincial Al-Ihsan Regional General Hospital from October to December 2016. The samples accomplish inclusion criteria: 1. National Health Insurance patients with cancer diagnose, 2. operative action with a referral, 3. the patient was in the hospital at the time of the study, and 4. patients who were willing to be a respondent.

The three-point Likert response format (ranging from good=3, fair=2, and poor=1). The data analysis used partial least squares (PLS) to analyze factors influencing the operation waiting time.

The qualitative method used interviews and focus group discussions to understand information about the surgery queue. The qualitative method used purposive sampling in specific target groups that were capable of providing the needed information was from 18 people. They were medical doctors, surgeons, oncologists, anesthesiologists, nurses, hospital managers (director/vice director, head of ward services, head of outpatient services, and hospital staff).

The discussion starts with the average waiting time in the hospital and tries to find the causes of long waiting time in cancer patients. The results are categorized into four categories: medical staff, management, and hospital facilities, health insurance, and patient conditions. This study had approved by the Health Research Ethics Committee of the Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia,

Table 1 Questionnaire Dimensions

Medical staff	
1	Number of surgeons in the hospital
2	Number of oncologist surgeon in the hospital
3	Number of anesthesiologist in the hospital
4	Number of nurse in operating theatre
5	Number of nurse in oncology clinic
6	Oncological clinic services in a week
7	Duration of service in oncology clinic
8	Ratio of patient and surgeon
Management and hospital facilities	
1	Numbers of inpatient ward for cancer patient
2	Numbers of operating room theater
3	Availability of diagnostic equipment for cancer patient
4	Accessibility of admission for outpatient of cancer patient
5	Accessibility of admission for inpatient ward of cancer patient
6	Operational time of operating theater
7	Ratio of patient and number of inpatient ward
Health insurance	
1	Accessibility of referral document to hospital
2	Accessibility of health insurance administration process
Patient conditions	
1	Urgency of surgery based on patient condition
2	Physical condition and comorbid in cancer patient that affected the operating schedule

through the issuance of the ethical clearance number: LB.04.01/A05/EC/335/XI/2016.

Results

The waiting time for elective surgery at referral hospital was calculated based on three parameters; (1) the date of the first visit to the hospital as a patient, (2) the approval date of surgery from the oncologist, (3) and the date of surgery. Based on the three parameters, patient waiting times obtained: the waiting time for the operation (calculated from the approval date of operation to the time of operation, and the total patient waiting time (calculated from the first date of registering as a patient until the time of surgery). The waiting time for surgery and the total patient waiting time in the West Java Provincial Al-Ihsan Regional General Hospital were 32-days and 63-days, respectively.

Based on the national standards set by *Kepmenkes* Number 129/Menkes/SK/II/2008, the surgery waiting time indicator does not meet minimum service standards.[6] The confirmatory factor analysis (CFA) is used to evaluate the causality relationship between indicators and latent variables shown in the convergent validity measure. Convergent validity was seen from the assessment of the validity and reliability of measurements.[11]

Based on Table 2, it can be seen that all the factors in each construct of medical staff (TM), management and hospital facilities (MRS), health insurance (HL), and patient condition (PAS) have a loading factor, $\lambda \geq 0.5$. It shows that all factors are valid, while CR values were >0.7 and VE>0.5. It indicates that all the variables were reliable.[11]

The evaluation of convergent validity is the evaluation of the average variance extracted (AVE) value. AVE results on each construct were above 0.5, so it concluded that the construct had a good convergent validity.[12]

Analysis of structural models among variables formed from the measurement models. In this research, there are four exogenous variables and one endogenous variable. Exogenous variables are medical staff (TM), management and hospital facilities (MRS), health insurance (HEALTH), and patients (PASIEN). Furthermore, the endogenous variable included in this research

Table 2 CFA Validity and Reliability

Latent Variable	Manifest Variable	λ	λ2	e	CR	VE
TM	TM1	0.637	0.637	0.363	0.94	0.7
	TM2	0.696	0.696	0.304		
	TM3	0.770	0.770	0.230		
	TM4	0.699	0.699	0.301		
	TM5	0.796	0.796	0.204		
	TM6	0.781	0.781	0.219		
	TM7	0.779	0.779	0.221		
	TM8	0.668	0.668	0.332		
MRS	MRS1	0.789	0.789	0.211	0.96	0.8
	MRS2	0.829	0.829	0.171		
	MRS3	0.870	0.87	0.130		
	MRS4	0.770	0.77	0.230		
	MRS5	0.774	0.774	0.226		
	MRS6	0.757	0.757	0.243		
	MRS7	0.778	0.778	0.222		
HL	HL1	0.902	0.902	0.098	0.94	0.9
	HL2	0.885	0.885	0.115		
PAS	PAS1	0.858	0.858	0.142	0.91	0.9
	PAS2	0.856	0.856	0.144		

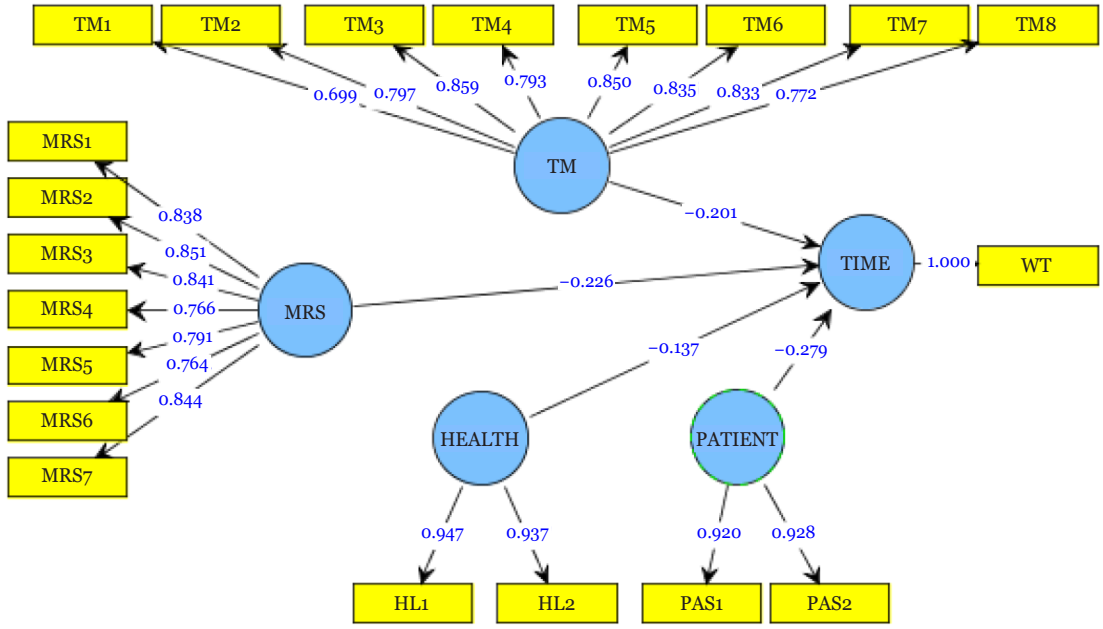

Figure Model of the Surgical Waiting Time

is the surgical waiting time (WT) variable. The complete relationship between the variables in this research is described in Figure.

The testing of structural models is carried out by testing the significance of each parameter. The test was carried out by comparing t statistics with t tables (at a 5% significance level) and then looking at the R^2 value, a goodness-fit model test—

Table 3 Parameter Coefficient

Dimension	λ	T-statistics	R^2
TM → WT	−0.201	2.582	0.568
MRS → WT	−0.226	4.600	
HEALTH → WT	−0.137	1.562	
PATIENT → WT	−0.279	3.928	

Note: significant at the 0.05 level of significance, t table=1.96

the parameter coefficient test listed in Table 3.

The parameter coefficient of each exogenous latent variable was negative, meaning that there was an un-directional influence on WT. If TM increases by 1 unit, it will decrease WT by 0.201; if MRS increases by 1 unit, it will decrease WT by 0.226; if HEALTH increases by 1 unit, it will decrease WT by 0.137; if the PATIENT increases by 1 unit it will decrease WT by 0.279. R square value of 0.568 showed that TM, MRS, HEALTH, and PATIENT were able to explain the WT construct variable as many as 56.8%, and other constructs indicated the remaining as many as 43.2% besides TM, MRS, HEALTH, and PATIENT.

The effect of each variable partially and simultaneously is presented in Table 4. Based on Table 4, the obtained t value of TM, MRS, and PATIENT variables were 2.582, 46.00, and 3.928. Because the t value for each of these variables was greater than the t table (t table with a significance of 5% of 1.96), it concluded a significant influence of each variable was TM, MRS, and PATIENT on WT. The HEALTH variable had a statistical t value as many as 1.562 because the value was lower than 1.96, meaning that there was no significant effect of HEALTH on WT.

Based on the simultaneous calculation test, it obtained that the F value (32.2130) was >F table (2.465). It indicated that TM, MRS, HEALTH, and PATIENT had a significant effect on waiting time (WT).

Based on Table 5, medical staff (TM) influence the surgical waiting time (WT) was 13.0%, and management and hospital facilities (MRS) was 15.6%. While the influence of health insurance (HEALTH) was 8.6%; the influence of patient condition (PATIENT) was 19.6%, and the total influence of the variables on waiting time was 56.8%.

Discussion

The waiting time for cancer surgery in the West Java referral hospital has not met the Ministry of Health's minimum hospital standard, which is ≤two days. At present, the number of surgical oncologists is only one; this is still lacking because the number of oncology patient visits to the clinic is quite high, with only three times per week of polyclinic service days. The number of inpatient rooms (beds), specifically surgery inpatient rooms with a total number of 52 beds, also causes the waiting time of surgery for cancer patients.

Based on the results of PLS analysis, the patient's condition factor is the most substantial value on waiting time because it has the most significant influence on cancer patient waiting time as much as 19.6%. Observations made, and interviews with respondents indicated that the patient's condition is essential because the operation can be canceled if the patient's physical condition is getting worse. The medical preparation for each patient is different depending on the level of complexity of the operation and the risk of patient anesthesia. Patients with multi-morbidity had a longer time to surgery than those without comorbidity among colorectal cancer patients in Spain.[13]

Several factors that cause changes in elective

Table 4 Partial and Simultaneous Effect of Variables to Waiting Time

Partial Effect	λ	T-Statistics	Conclusion
TM → WT	−0.201	2.582	Significant
MRS → WT	−0.226	4.600	Significant
HEALTH → WT	−0.137	1.562	Not significant
PATIENT → WT	−0.279	3.928	Significant
Simultaneous Effect	**R^2**		**F Value**
TM, MRS, HEALTH, and PATIENTS → WT	0.568		32.2130

surgery schedules are the patient's clinical condition and still need another examination.[14] Coordination of imaging and clinical care reduces wait times in patients with abnormal screening mammograms and symptomatic breast presentations.[15] In this research, respondents said that the patient's medical preparation did not significantly influence the waiting time for elective surgery. Medical preparations that must be passed by patients can usually be completed in one day. Patient characteristics, tumor biology, and stage do not influence time intervals from diagnosis to surgical treatment in breast cancers.[16] However, there are still incidents when the surgery is canceled due to a decreased physical condition of the patient. It is an event that cannot be avoided or predicted. Prioritizing patients on the waiting list is usually carried out in two ways: assigning a priority score to each patient and categorizing patients into several priority classes with different service time targets. The development of homogenous waiting groups (HWG) is a promising tool for improving patients' prioritization of waiting to see a specialist or to receive a diagnostic test.[17] Shorter wait times for most treatments for postmenopausal women diagnosed in the Breast Assessment Centre (BAC) further supports that women with an abnormal mammogram should be managed through organized assessment.[18]

The second factor influencing the waiting time of surgery for cancer patients in referral hospital is management and hospital facilities (MRS) as many as 15.6%. The facility factor, especially the number of beds in the inpatient room, was still felt poor by both patients and hospital staff. Queues occur in the admission department. Currently, the hospital does not have a hospital management information system, so confirmation of the availability of inpatient rooms and the operating room is manually handled, thereby increasing waiting times. The number of beds available is 52 beds for surgical care. Inpatient rooms still have to adjust the needs of the class of patients' rooms. Currently, the most significant number is class 3 inpatient rooms, whereas overall national health insurance patients are treated in class 1 and class 2 rooms.

The third factor that influences waiting time is the number of medical staff as many as 13%. Currently, the hospital only has one oncologist. Admittedly, this is not sufficient considering that the hospital is one of the Referral Hospital, so the low number of oncologist influence the length of waiting time. Hospital managers must quantify appropriate service capacity to meet the patient demand, balancing system utilization, and patient's wait time.[19] Long waiting queues are symptomatic of inefficiency in-hospital services. Adding several doctors can effectively achieve optimal performance in the outpatient department at Anglo Gold Ashanti Hospital.[20] The implementation of nurse navigation for breast cancer patients is effective in reducing wait times for surgical treatment in Canada.[21]

Another factor that influences surgery wait time is health insurance. Patients with statutory insurance are more likely to report long waiting times for examinations, discharge, and to speak with the physician than private insurance holders.[22] State-level Medicaid policies (joint federal-state program covering health care services to low-income population) and patient characteristics can affect receipt of timely surgery among Medicaid beneficiaries with breast cancer.[23] In Indonesia, the form of compulsory or statutory health insurance is the JKN-BPJS participant.

The administration of national insurance (BPJS) participants considered having an effect on 8.6% on the waiting time of cancer patients' surgery in this hospital. In general, the referral administration requirements were considered quite good and easy by most respondents. There are administrative differences that must be completed by BPJS patients, namely the Surgery Proof Letter file. The stipulation of this policy is carried out to minimize the cancellation of essential operations before enacting the policy. The waiting time for the emergency operation is also associated with informed consent from the family or the insurance, human resource, and the equipment of operation.[24]

The number of nurses and specialist surgeons positively influence waiting times.[25] Based on the observation, the surgical oncologist is only one person and felt still lacking, but this was considered less important by respondents in influencing waiting times because five general surgeons at the hospital could still do cancer surgery.

The availability of sufficient human resources and followed by high-quality professionals following their functions and duties is one indicator of an effective and efficient hospital success. The lack of HR in the Central Surgical

Installation can affect the service process to patients, which results in suboptimal service to patients. The problem of the number of human resources that are not following needs can affect waiting times. Lack of human resources has resulted in the delay of surgery and disruption of processes in the operating room.[26] According to observations and interviews conducted by the research team, the lack of human resources influences waiting time, but it is not significant.

Conclusion

Based on the formulation of the problem, the results of the study, and the discussion presented earlier, the conclusions can be drawn as follows: the waiting time for cancer surgery on national health insurance (BPJS) patients at west java referral hospital are 32 days, the factors that influence the waiting time for cancer surgery was the condition of patients (19.6%), hospital facilities and management (15.6%), medical personnel (13%) and health insurance (BPJS). The optimal queuing model to reduce operating WT in West Java Referral Hospital is by adding inpatient beds, surgical oncologists, and creating an online system for registration and confirmation of inpatient and operating room readiness.

Conflict of Interest

No conflict of interest.

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RESEARCH ARTICLE

Death Receptor Fas as Molecular Target of Soursop Leaves Novel Isolate in Liver Cancer Targeted Therapy

Maya Tejasari,[1] Dwi Prasetyo,[2] Siti Aminah Abdurachman,[3] Herri S. Sastramihardja[4]

[1]Department of Histology, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia, [2]Department of Child Health, Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital, Bandung, Indonesia, [3]Department of Internal Medicine, Faculty of Medicine, Universitas Padjadjaran/ Dr. Hasan Sadikin General Hospital Bandung, [4]Department of Farmacology, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

Abstract

In the past few decades, no effective systemic therapeutic modalities established in the unresectable liver cancer stage, so the prognosis remains poor. Apoptotic dysregulation of cancer cells through Fas gene expression linked to tumor development, progression, and resistance to treatment. Soursop plants believed to have potent anticancer activity. It hypothesized that active compounds in the soursop leaves would induce apoptosis by interfering with Fas gene expression in liver cancer cells. The study objective was to explore the role of an isolated from soursop leaves against Fas gene expression in liver cancer cells. This study used the HepG2 cell line culture, and treatment groups were given novel isolate (SF-1603) from soursop leaves with three different doses which conducted in Bandung in 2017. Observations assessed in hours 0, 24, 48, and 72. Measurement of gene expression was done with real-time PCR and apoptosis detection by the TUNEL method. The results showed that the novel isolate (SF-1603) from soursop leaves stimulate Fas optimum expressions to initiate apoptosis with 0.5×inhibitory concentration 50 (IC_{50}) dosage at observation hour 48. There was a strong correlation between Fas gene expression with the apoptosis level. It concluded that the novel isolate (SF-1603) from soursop leaves is a potent anticancer that affects FAS gene expression in apoptosis induction on the liver cancer cell. It can be used as a candidate for a new therapeutic agent for liver cancer treatment.

Key words: Apoptosis, Fas gene expression, liver cancer, soursop, targeted therapy

Reseptor Fas sebagai Sasaran Molekuler Novel Isolat Daun Sirsak pada Terapi Bertarget Kanker Hati

Abstrak

Dalam beberapa dekade terakhir, tidak ada modalitas terapi sistemik yang efektif untuk pengobatan kanker hati tahap lanjut sehingga prognosisnya buruk. Disregulasi apoptosis sel kanker melalui ekspresi gen *Fas* terkait dengan perkembangan, perkembangan tumor, dan resistensi terhadap pengobatan. Tanaman sirsak dipercaya memiliki aktivitas antikanker yang kuat. Senyawa aktif dalam daun sirsak secara hipotesis dapat menginduksi apoptosis dengan memengaruhi ekspresi gen *Fas* pada sel kanker hati. Tujuan penelitian adalah mengeksplorasi peran isolat daun sirsak terhadap ekspresi gen *Fas* pada sel kanker hati. Penelitian ini menggunakan kultur sel kanker HepG2 dan kelompok perlakuan diberi isolat baru (SF-1603) daun sirsak dengan 3 dosis berbeda yang dilakukan di Bandung pada tahun 2017. Pengamatan dinilai pada jam ke-0, 24, 48, dan 72. Pengukuran ekspresi gen dilakukan dengan PCR *real-time* dan deteksi apoptosis dengan metode TUNEL. Hasil penelitian menunjukkan bahwa novel isolat (SF-1603) daun sirsak menstimulasi ekspresi optimal Fas untuk inisiasi apoptosis dengan dosis 0,5×*inhibitory concentration 50* (IC_{50}) pada pengamatan 48 jam. Terdapat korelasi yang kuat antara ekspresi gen *Fas* dan tingkat apoptosis. Disimpulkan bahwa isolat baru (SF-1603) daun sirsak adalah antikanker kuat yang memengaruhi ekspresi gen *Fas* dalam induksi apoptosis pada sel kanker hati sehingga dapat digunakan sebagai kandidat agen terapi baru untuk pengobatan kanker hati.

Kata kunci: Apoptosis, ekspresi gen *Fas*, kanker hati, sirsak, terapi bertarget

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Correspondence: Maya Tejasari. Department of Histology, Faculty of Medicine, Universitas Islam Bandung. Jln. Tamansari No. 22, Bandung 40116, West Java, Indonesia E-mail: faisalheri8@gmail.com

Introduction

Cancer remains a global health problem that needs to encounter. Based on data from the World Health Organization (WHO) and the Global Burden of Cancer Study (GLOBOCAN), cancer is the most common cause of morbidity and mortality in the world.[1–3]

Hepatocellular carcinoma (HCC), or often called hepatoma is a type of cancer most commonly found in the liver,[4–10] reportedly caused half a million deaths each year.[1,6] The American Cancer Society in 2010 estimated that the incidence and mortality of HCC would continue to rise until 2020.

The high mortality rate in HCC occurs because patients come to health facilities in an unresectable stage is challenging to handle. Recommended therapy based on the classification of the Barcelona Clinic Liver Cancer (BCLC) for HCC with an advanced stage is to approach the provision of palliative systemic chemotherapy.[11–13] Another approach, such as curative resection and transplantation, can only be limited in patients with early-stage HCC. Chemotherapy is still the best option for patients with advanced HCC, the effectiveness of chemotherapy in patients with HCC remains in the debate instead of often considered to be relatively ineffective. The choice of therapy for patients with HCC who are still very limited is one of the causes of poor prognosis of liver cancer patient.[6–9,14–16]

Nowadays, many chemotherapeutic agents have been tested, but none that show a maximum response or provide a better life expectancy in patients with liver cancer. In addition to the relative effectiveness which is still lacking, chemotherapeutic agents that exist today can not separate from the high toxicity profile with severe side effects such as myelosuppression and neurotoxic effects and the emergence of resistance mechanisms.[14–16] New therapeutic strategies needed to increase the effectiveness of therapy.[14,15]

Therapeutic strategies based on the target molecular pathways through signal transmission intervention and regulation of apoptosis, offering new hope for more effective therapy options.[15,16]

One potential target for liver cancer therapy that has not widely studied is the path through the mechanism of apoptosis. The carcinogenesis of HCC occurs during apoptosis dysregulation, so this pathway is the potential to be developed. Apoptosis is a mechanism of programmed cell death induced by the intracellular controlled program. In the apoptosis process, cells that should die activates proteolytic enzymes.[11–13] Apoptosis plays in suppressing liver disease, either through the intrinsic and extrinsic pathway, as well as disorders of the mitochondria.[21,22]

Initiation extrinsic pathway involves the role of one of the death receptor Fas. The intrinsic pathway involving the antiapoptosis molecule, Bcl2, and IAP.[2] High Bcl-2 gene expression is known to be protective mechanisms to deal with various stimuli that cause cell death.[19,20] Apoptosis plays a role in suppressing liver disease progression through both intrinsic and extrinsic pathways.[21,22] Dysregulation of apoptotic cells influence the process of carcinogenesis, tumor progression, and the tumor radio-resistance to chemotherapy, therefore the development of anticancer agents by inducing apoptosis is a potential therapeutic target of HCC treatment.[23]

Dysregulation of apoptosis occurs in carcinogenesis of HCC; it causes inhibition of apoptosis in the initiation phase, both extrinsic and intrinsic pathways, that the cells do not die.[21,22] The incidence of HCC is associated with low expression of Fas, a cell death surface receptor that can inhibit the initiation of the extrinsic apoptosis pathway.[4,18,24] In the pathogenesis of HCC, there was also found increasing of the inhibitor of apoptosis protein (IAP) and high expression of Bcl-2, which is antiapoptosis proteins that inhibit apoptosis initiation through the intrinsic pathway.[17,25]

Receptor Fas, also known as apoptosis antigen 1 (APO1), cluster of differentiation 95 (CD95) or tumor necrosis factor receptor superfamily member 6 (TNFRSF6), is a protein that in humans is encoded by the gene TNFRSF6 or officially based on the HUGO Gene Nomenclature Committee (HGNC) known as Fas gene. Fas gene in humans is located at the locus in the long arm of chromosome 10 (10q24.1), with a length of 25,255 DNA base and has nine types of protein-coding exons.[24,26,27]

Fas receptor is a transmembrane surface protein that plays a role in the initiation of apoptosis. This protein consists of 319 amino acids with a molecular weight of 49 kiloDalton and consists of three domains: the extracellular domain, a transmembrane domain, and a cytoplasmic domain. The extracellular domain consists of 157 amino acids and rich in cysteine

residues, whereas the transmembrane domain consists of seven amino acids, and the cytoplasmic domain consists of 145 amino acids.[26,27]

Fas receptor formed death-inducing signaling complex (DISC) with its ligands, namely FasL resulting Fas receptor trimerization. This receptor complex is internalized and binds to adapter molecules with FADD death effector domain (DED) and facilitates bonding with FADD-like IL-1β-converting enzyme (FLICE) or better known as caspase-8. Caspase-8 is activated and then released into the cytoplasm, which then triggers the caspase cascade and ends with the degradation of DNA and other signs that are the hallmark of apoptosis.[24,26,27]

Natural materials are a source of potential therapeutic agents with many advantages; they are readily available, inexpensive, and have minimal side effects.[19] Many compounds derived from natural materials have anti-tumor properties. Indonesia is rich in natural content that the community trusted to prevent and even treat cancer, one of which is *Annona muricata* Linn generally known as soursop or guava.[16–19]

Almost all parts of the soursop plant reported to use in traditional medicine but have not done much scientific research to examine in detail what kind of substances exist in each part of the soursop plant that has an active property.[20–23] This study aims to explore the capabilities of the novel pure compound (SF-1603) isolated from the soursop leaves in apoptosis induction of HCC cell culture, so it is used as a candidate for new agent discovery to treat liver cancer patients.

Methods

This study was conducted in Bandung in 2017. Materials used in this study was the pure compound isolated from the soursop leaves code SF-1603 as a result from our previous study,[28] HepG2 cell line (HB-8065TM) from the American Type Culture Collection (ATCC), Dulbecco's Modified Eagle Medium (DMEM) containing 10% fetal bovine serum (FBS), penicillin, streptomycin and trypsin for cell culture, as well as in situ TUNEL Cell Death Detection Kit from Roche.

HepG2 cell line cultured in medium (DMEM/F12) containing 10% fetal bovine serum, previously release cells using trypsin 0.05%-EDTA 0.53 mm, then added to the growth medium into a cell suspension. The cells were counted using a hemocytometer and planted with a cell density of 25,000 cells/mL. The cells incubated, and the growth medium was changed every two days.

The method for detecting cells undergoing apoptosis based on apoptosis's characteristics that one of them is going on DNA fragmentation. A standard method used to detect DNA fragmentation enzymatically sings the TUNEL method. TUNEL reagent consisting of terminal transferase enzyme served to identify the ends 3'OH (nick-end) generated by DNA fragmentation and fluorescein-dUTP to visualize the end 3'OH observed using an inverted microscope.

This study using real-time PCR for quantitative analysis. The work of real-time PCR is similar to conventional RT-PCR. The fundamental difference of (1) analysis of amplicons using fluorescent reporters and not using conventional gel electrophoresis, (2) amplicon analyzed from each cycle, and not only when the endpoint. This study uses SsoFastTMEvaGreen SUPERMIX containing a mixture of ready-made for the qPCR reaction except for the primer and template, i.e., 2×reaction buffer with dNTPs, sso7d-fusion polymerase, MgCl2, EvaGreen dye, and stabilizers.

Fas gene primer used:

Forward 5'-TCC TCC AGG TGA AAG GAA AGC TAG G-3'

Reverse 5'-AGA TTG TGT GAT GAA GGA CAT GGC-3'

This study has obtained ethical approval from the Health Research Ethics Committee Faculty of Medicine Universitas Padjadjaran Bandung No. 988/UN6.C2.1.2/KEPK/PN/2017.

Results

The ability of the pure compound SF1603 in stimulating the expression of FAS can see from the Fas mRNA expression profile. It indicates the level of Fas expression over the control group in the group treated with doses $0.5\times IC_{50}$ and observed on 48th hour (Figure), reinforced with statistical calculations with a mean comparison test which indicates the optimum level expression of Fas by taking into account dose and time, showed similar results. The ANOVA statistical tests prove to strengthen significantly different Fas mRNA expression between each group at all doses and time of observation. The ANOVA test shows that the value of $F_{count}>F_{table}$ (0.05), it can conclude there was a significant difference in

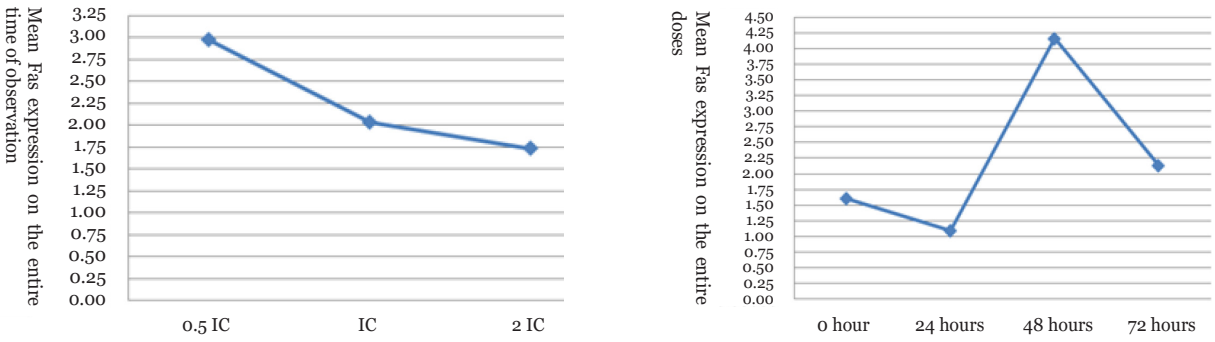

Figure Influence of Dose and Time of Observation against Fas Gene Expression after Administration of Soursop Leaves Pure Compounds SF-1603 in HepG2 Cell Line Culture Showed Fas Optimum Expressions to Initiate Apoptosis with 0.5×IC_{50} Dosage at Observation Hour 48

mRNA Fas expression between groups at all doses and observation times, in the HepG2 cell line cultured after administration of the compound SF-1603.

To measure the strength of the correlation between Fas mRNA expression and apoptosis level, then performed a simple correlation coefficient calculation using the Pearson formula. The calculation results conclude the presence correlation between Fas mRNA expression and the level of apoptosis with r=0.587, which means the strength of the correlation is strong enough. Level of apoptosis and inhibitory concentration (IC_{50}) of SF-1603 was a result of our previous study.[28]

Discussion

Apoptosis is a mechanism of programmed cell death induced by the intracellular controlled program. In the apoptosis process, cells that should die activates proteolytic enzymes.[11–13] Apoptosis plays in suppressing liver disease, either through the intrinsic and extrinsic pathway, as well as disorders of the mitochondria.[21–22]

In the pathogenesis of hepatocellular carcinoma, dysregulation of apoptosis occurs in low expression of the Fas receptor. It inhibits the activation of caspase-8 and caspase-3. Thus, it inhibits apoptosis.

Based on the soursop leaves pure compound SF-1603 ability to stimulate Fas gene expression, thereby increasing the expression of the death receptor Fas. The compound can be used as a candidate therapeutic agent of HCC. As the molecular target therapy, the Fas gene initiates the induction of apoptosis in liver cancer cells.

Fas receptor formed death-inducing signaling complex (DISC) with its ligands, namely FasL resulting Fas receptor trimerization. This receptor complex is internalized and binds to adapter molecules with the FADD death effector domain (DED) and facilitates bonding with FADD-like IL-1β-converting enzyme (FLICE) or better known as caspase-8. Caspase-8 is activated and then released into the cytoplasm, which then triggers the caspase cascade and ends with the degradation of DNA and other signs that are the hallmark of apoptosis.[24,26,27]

Based on the analysis of gene expression, it means that the study proves the ability of the soursop leaves pure compound SF-1603 to induce the expression of Fas through the mechanism of stimulation of Fas gene expression in HCC cancer cells so that it can initiate the process of apoptosis. Proof of this is very supportive of making the soursop leaves pure compound SF-1603 as a candidate for liver cancer therapeutic agent with the Fas gene as a molecular target therapy through the mechanism of apoptosis induction.

The pathway involving Fas is selective; it does not cause normal cell death, so that it is very good to be the target of therapy for cancer.

Conclusion

It concluded that the soursop leaves pure compound SF-1603 have a potent anticancer activity that affects Fas gene expression as a

molecular target. It can use as a candidate for a new therapeutic agent for liver cancer treatment.

Conflict of Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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RESEARCH ARTICLE

The Relation of Acid Fast Bacilli with Ziehl Neelsen Staining and Histopathologic Examination of Biopsy Specimens in Extrapulmonary TB Suspected Patients

Yani Triyani,[1] Maya Tejasari,[2] Wida Purbaningsih,[2] Sadeli Masria,[3] Titik Respati[4]
[1]Department of Clinical Pathology, [2]Department of Histology, [3]Department of Microbiology,
[4]Department of Public Health, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

Abstract

Case finding and diagnosis of extrapulmonary tuberculosis (EPTB) infection are difficult to enforce in the field because not all primary services can do it. The 2016 TB Health Guidelines, the diagnosis of EPTB, is made by clinical, bacteriological, and or histopathological examination from the biopsy. This study analyzed tissue biopsy histopathologically and bacterial of acid-fast bacilli (AFB) slide stained (by Ziehl Neelsen method) associated with histopathological features in patients diagnosed with EPTB. The study conducted in the laboratory of Al Islam Hospital Bandung from November to December 2017. Histopathological diagnosis collected from 1,304 patients, with 760 noninfectious disease patients (58%), 461 infectious disease patients (35%), and 83 (7%) infectious and non-infectious patients. EPTB found in 10% of infectious disease patients. EPTB was mostly originating in neck lymph nodes (18 of 37 patients). The histopathological diagnosis of EPTB infection found that 36 of 37 patients showed granulomas (+), but AFB stained (+) found only in 6 of 37 slides. It is possible because of granulomas is a collection of several inflammatory cells. The lesions develop granulomatous defined by necrosis. There are fewer organisms that usually exist on the periphery both inside and outside the site of infection. This important immune reaction provides the body with protection from antigen recognition, very important in the case of mycobacterial infections. In conclusion, there is no relation between AFB and histopathological examination in patients with EPTB.

Key words: AFB slide Ziehl Neelsen stained, extrapulmonary tuberculosis, granulomas

Hubungan antara Basil Tahan Asam Pewarnaan Ziehl Neelsen dan Hasil Pemeriksaan Histopatologi pada Preparat Jaringan Biopsi Pasien Tuberkulosis Ekstraparu

Abstrak

Penemuan kasus dan diagnosis infeksi tuberkulosis ekstraparu (TBEP) sulit ditegakkan di lapangan karena tidak semua layanan primer dapat melakukannya. Berdasar atas Pedoman Kesehatan TB 2016 untuk Pengendalian TB, diagnosis TBEP dapat dilakukan dengan pemeriksaan klinis, bakteriologis, dan atau histopatologis dari biopsi. Penelitian ini menganalisis semua sediaan histopatologis dari biopsi jaringan dan menganalisis pemeriksaan bakteriologis pewarnaan basil tahan asam (BTA) (dengan metode Ziehl Neelsen) terkait dengan gambaran histopatologis pada pasien yang didiagnosis TBEP. Penelitian dilaksanakan di Laboratorium RS Al Islam Bandung dari November hingga Desember 2017. Diperoleh 1.304 pasien dengan sediaan histopatologis, diagnosis penyakit noninfeksi 760 pasien (58%), penyakit infeksi 461 pasien (35%), penyakit gabungan (infeksi dan noninfeksi) 83 pasien (7%), serta TBEP 10% dari seluruh penyakit infeksi. Sebagian besar TBEP berasal dari kelenjar getah bening leher (18 dari 37 pasien). Hasil diagnosis infeksi TBEP 36 dari 37 pasien ditemukan gambaran histopatologisnya dengan granuloma (+), tetapi dengan pewarnaan BTA (+) hanya 6 dari 37 sediaan. Hal ini mungkin karena granuloma adalah kumpulan beberapa sel inflamasi yang berkembang menjadi nekrosis sehingga lebih sedikit organisme yang biasanya terdapat di dalam maupun di luar lesi. Pembentukan granuloma merupakan reaksi kekebalan yang memberi perlindungan tubuh dari serangan antigen dalam kasus infeksi mikobakterium. Simpulan, tidak terdapat hubungan hasil pewarnaan BTA dengan pemeriksaan histopatologis pada pasien TBEP.

Kata kunci: Granuloma, sediaan BTA pewarnaan Ziehl Neelsen, tuberkulosis ekstraparu

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Correspondence: Yani Triyani. Department of Clinical Pathology, Faculty of Medicine, Universitas Islam Bandung. Jln. Tamansari No. 22, Bandung 40116, West Java, Indonesia. E-mail: y3yani78@gmail.com

Introduction

Based on the report of the World Health Organization (WHO) in 2019 reported about 7 million cases of tuberculosis (TB) had received treatment in the world each year, with a mortality rate of 1.5 million in 2018. Tuberculosis remains an infectious disease as the highest killer globally.[1] Indonesia is in the list of 30 countries with the highest tuberculosis burden and ranks third highest in the world in terms of tuberculosis incidence. The incidence of tuberculosis in Indonesia in 2018 is 316 per 100,000 population, with an estimated TB case of 845,000 cases per year and notification of TB cases of 570,289 cases, so there are still around 32% of cases that have not been verified either unreached, undetected or unreported. It is necessary to change the TB patient discovery strategy from passive to active. Intensive and massive family-based and community-based discovery recommended while still paying attention and maintaining the quality of the TB program.[2] The TB case finding programs have carried out for the problem of pulmonary TB. However, it should be noted that in addition to the pulmonary TB mentioned above, TB does not only attack the lungs, but it can also attack other organs besides the lungs. Extrapulmonary tuberculosis (EPTB) occurs in about 15% of the 6.3 million cases based on WHO data in 2016. The incidence of EPTB varies in various regions ranging from 8–34% of all TB cases. Of these, 16% are children under the age of 15 years. EPTB rates vary significantly according to the country's socioeconomic level and the resources specific to the TB program.[3,4] Many risk factors can influence the occurrence of a person suffering from EPTB including host immunological response factors, socio-demographic, comorbidity, genetic factors, lymph node pathogenesis, lifestyle behaviors, previous history of pulmonary TB, non-compliance with taking anti-TB drugs, failure of therapy either due to drug resistance or incorrect diagnosis.[3,5,6]

Based on several studies to help establish the diagnosis of EPTB found from fine-needle aspiration biopsy (FNAB) biopsy or tissue biopsy, the researcher can use a simple examination with Ziehl Neelsen's (ZN) staining method.[7,8] This examination is an effective and simple technique with a high degree of accuracy in diagnosing EPTB, such as TB lymphadenitis. Despite various limitations, the ZN staining method can be used as the first choice in cases with EPTB in developing countries with a high prevalence of tuberculosis. Acid-fast bacilli (AFB) stain ZN method despite low sensitivity, but this method must be carried out routinely in patients suspected of EPTB, especially in developing countries, because sophisticated laboratory equipment is not available.[8–14]

The amount of AFB in the Ziehl Neelsen's BTA examination derived from sputum material to establish a diagnosis of pulmonary TB reported using the scale of the international union against tuberculosis and lung disease (IUATLD), with degrees of positivity +1, +2, and +3 according to the number of AFB found each field of a light microscope with magnification 1,000 times. BTA examination of tissue is different from BTA examination originating from sputum, there is no standard scale used to assess the degree of positivity, so it still requires further research.[8–10] Tuberculin test or interferon-gamma release assay (IGRAs) tests determine exposure to MTB, but cannot distinguish between active and latent TB. Culture remains the gold standard, but it takes 8-10 weeks to obtain results, and its sensitivity depends on the host and source of the specimen.[15–19]

This study aims to analyze the use of AFB stain with the Ziehl Neelsen's method of tissue biopsy specimens (paraffin blocks) in patients suspected of EPTB by the results histopathologic exam and assess the relationship of clinical symptoms to help establish the diagnosis of EPTB.

Methods

This research conducted in the laboratory of Al Islam Hospital Bandung from November to December 2017. This research was conducted through 4 phases which are phase 1 of the study aimed to identify the characteristics of sex and age and the diagnosis of histopathological interpretation of patients from all paraffin blocks examined during 2017, by analyzing the proportion of infectious, non-infectious and non-infectious diseases. Furthermore, histopathological analysis of infection is identified with TB (specific process) or non-specific process.

Phase 2 of this study made three new preparations from the paraffin block diagnosed with TB infection. Two slides stained with Ziehl Neelsen's AFB staining method and one slide kept as an archive.

Phase 3 of this study reads slides that are stained with smear using a 1,000× microscope using

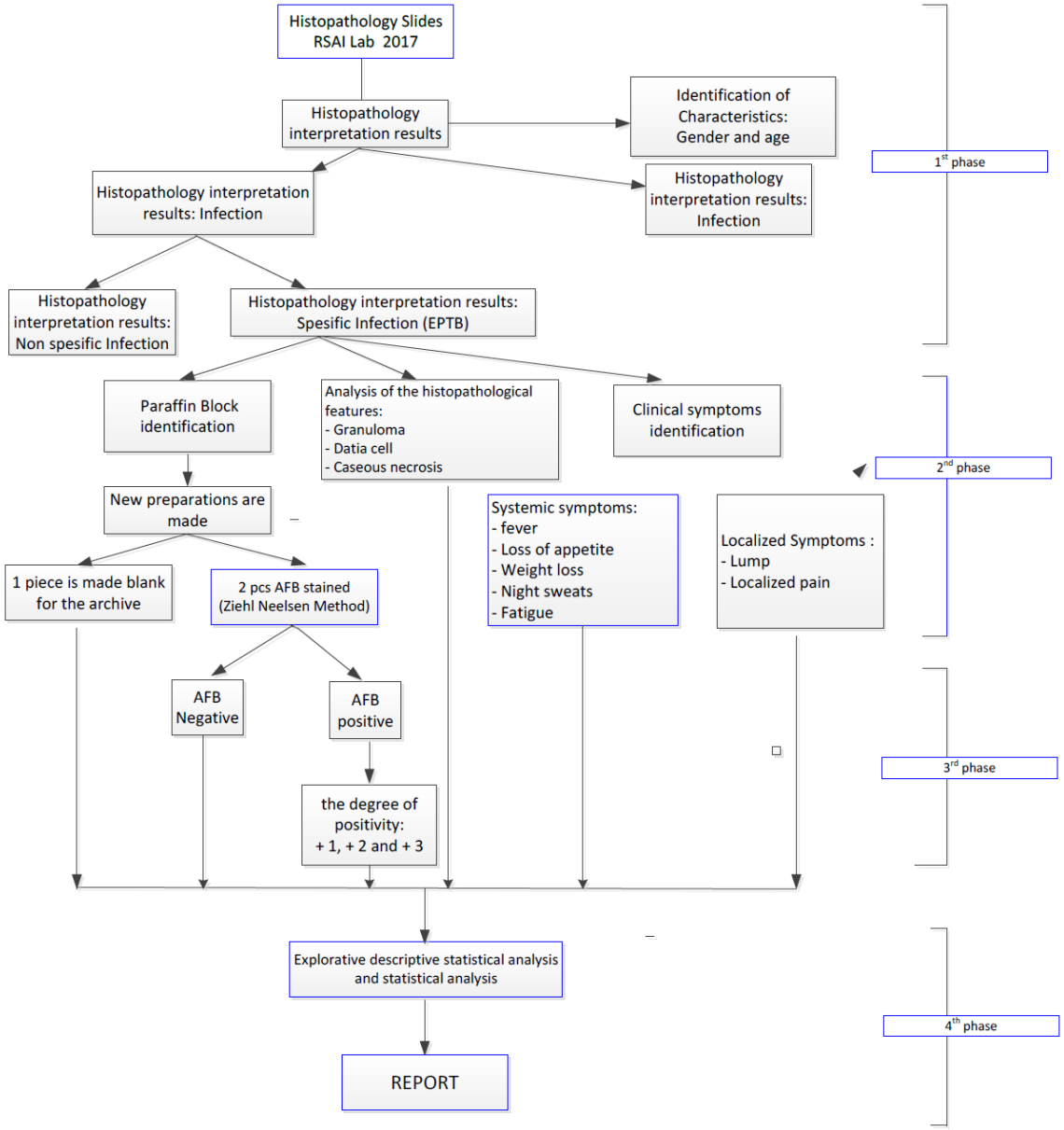

Figure 1 Research Procedure

emersion oil and documented using a microscope camera (Optilab) with the international union's calculation against tuberculosis and lung disease (IUATLD) scale modification.

Phase 4 of this study collected and processed statistics from medical record data to assess patient characteristics, related to the degree of positivity of tissue biopsy preparations, the clinical symptoms of both localized and systemic patients from all patients with histopathological diagnosis of infection with specific processes (EPTB). The research procedure can be seen schematically in the chart in Figure 1.

This study was approved by the Health Research Ethics Committee of the Faculty of Medicine, Universitas Islam Bandung, Indonesia No. 362/Ethics Committee.FK/XII/2017.

Results

This paper will only present and analyze phases 1–3 of the entire study. The results of phase 1 were histopathological diagnoses collected from 1,304 patients. The measured variables are gender

Table 1 Biopsied Patients Characteristic

Age (Year)	Female (n=813)	Male (n=491)	Total (n=1,304)	%
0–4	12	14	26	2
5–10	8	11	19	1
10–14	22	14	36	3
15–19	80	24	104	8
20–4	100	32	132	10
25–29	76	20	96	7
30–34	93	32	125	10
35–39	102	31	133	10
40–44	80	27	107	8
45–49	83	36	119	9
50–54	64	40	104	8
55–59	27	40	67	5
60–64	30	44	74	6
65–70	12	39	51	4
70–75	15	39	54	4
>75	9	48	57	5

(female and male), disease diagnosis (infectious, non-infectious, and combined), and age group (adjusted for age grouping used for population pyramid). Data processing carried out with SPSS 24, and the results obtained were more female patients, namely 813 (62%) people compared to 491 (38%) male patients. Based on the gender of women in the two age groups, namely 20–24 years and 35–39 years, each of which was 101 patients (Table 1).

From Table 1, it can be seen that females had a higher percentage of having infectious diseases and are non-infectious. In females, 267 patients diagnosed with infectious diseases, 291 patients diagnosed with non-infectious diseases, and 55 patients diagnosed with infectious and non-infectious diseases. On the other hand, in men diagnosed with infectious, non-infectious diseases, and a combined of 194 patients, 269 patients, and 28 patients, this can be seen in the picture above. Based on the proportion of age groups at each disease diagnosis (infectious, non-infectious, and combined). In patients diagnosed with infectious diseases, the largest age group was the 35–39-year group, and the least was the 0–4-year group with five patients. Furthermore, in the group of patients diagnosed with non-infectious diseases, the age group of 20–24 years occupies the first position with 76 patients, while the 5–9 years age group occupies the last position with a total of eight patients. Complicated or

Table 2 Characteristics of EPTB Patients at Al Islam Hospital 2017

EPTB Patients	n=37
Age (years)	
<20	3
20–29	7
30–39	14
40–49	4
50–59	5
60–69	3
≥70	1
TB history	
No data	14
Negative	18
Positive	5
Organ	
Axilla lymph node	2
Neck lymph node	18
Mesenteric lymph node	1
Inguinal lymph node	1
Submandibular lymph node	1
Supraclavicular lymph node	1
Axilla and mammae lymph node	1
Mammae	2
Peritoneum	1
Renal	1
Muscle	1
Bone	1
Joint	2
Bladder	2
Testis	2
AFB results	
No data	5
(–)	26
(+)	6
Histopathologic feature	
No granuloma	1
Positive granuloma	36
Systemic clinical manifestations fever	
Yes	7
No	30
Night sweat	
Yes	2
No	35
Fatique	
Yes	2
No	35
Weight loss	
Yes	2
No	35
Local manifestation (lump/pain)	
Yes	37
No	37

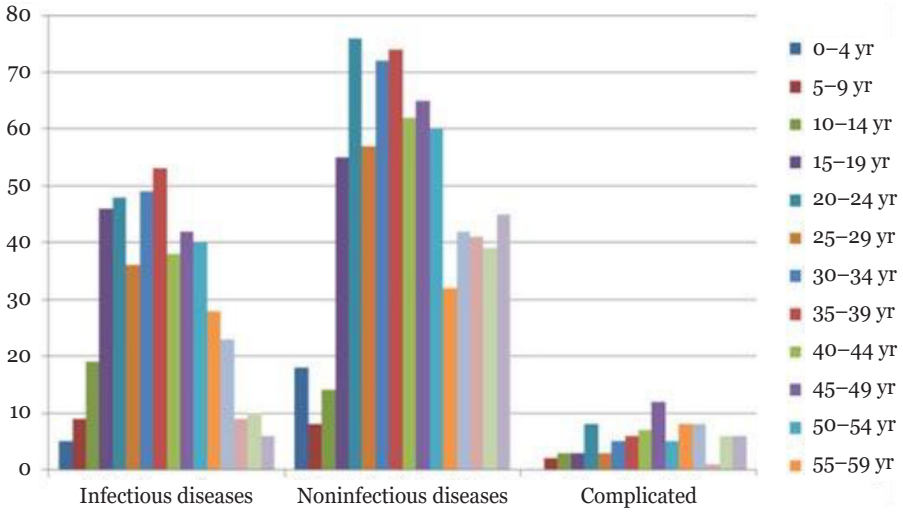

Figure 2 Patients Diagnosed based on Biopsies

patients diagnosed with both infectious and non-infectious diseases, the diagnosis is mostly in the age group 45–49 years as many as 12 people and at least one person in the age group 65–69 years, this can be seen in the graph as follows Figure 2.

Biopsy data from Al Islam Hospital Bandung in 2017 found that 461 patients diagnosed with infections. The variables measured were gender (female and male), age group, and organ origin. Figure 2 shows the gender distribution of patients from the biopsy results showing female patients (58%) more than male patients (42%). Based on the age group diagnosed with an infectious disease, both men and women in the age group 30–39 years were 43 people and 59, respectively.

The results of data collection phase 1 on the diagnose of infectious diseases based on the histopathological interpretation of tissue biopsy from 461 people. A classification of diagnoses between non-specific and specific infections (EPTB) was from the total number of the histopathological interpretation. Forty-four people (10%) of the total samples were diagnosed with infectious diseases with specific infections (EPTB).

The phase of this study aims to describe the characteristics of patients with diagnosis based on histopathological interpretation of EPTB infection according to age, gender, previous history of TB, clinical manifestations of the systemic and localized nodule, AFB results, and the histopathology.

A total of 44 patients diagnosed as EPTB sufferers based on diagnostic supporting data such as medical records, AFB results, and ascertaining the histopathological picture. After collecting the supporting data, only 37 patients data were valid and can be used for further analysis. The results of 37 data are as follows.

General description based on sex in patients diagnosed with EPTB or process-specific infections found the proportion of female patients diagnosed with EPTB was higher (62%) than male patients (38%). General characteristics of EPTB patients at Al Islam Hospital in 2017, obtained data that EPTB patients have the most age in the age group 30–39 years with only 5 of 37 patients who have a history of previous TB. Most of the EPTB occurred originating in neck lymph nodes (18 of 37 patients), while other organs' origin was quite balanced in only one or two events.

Phase 3 research results: this research stage reads preparations that have been stained with BTA staining using a 1,000× microscope using emersion oil and documented using a microscope camera (Optilab) to calculate the IUATLD scale modification.

After judging from the results of AFB slides from the patient's tissue biopsy, only five people diagnosed positive were AFB. Details of three patients having AFB 10–100/100 visual fields, two people with 1–10 per visual field, and one person saw BTA is more than 10 per one field of view. Judging from the histopathological picture, almost all TEBP patients showed granulomas (36 of 37 patients). The explanation of the characteristics and clinical symptoms of EPTB patients can be seen in Table 2.

The degree of smear positivity of the paraffin block slides AFB stain uses a modified international union against tuberculosis and lung disease (IUATLD) scale on the sputum smear. However, no literature explains, because it is different from smear from sputum smear test material can be homogeneous. At the same time, slides stained from the paraffin block cannot be homogenized because the slides come from tissue that is not possible to homogenize beforehand. So that the data presented is positive or negative.

Discussion

Based on data from all interpretations of the histopathological diagnosis treated as many as 1,304 patients, the female sex characteristics variable is more than 813 patients (62%) compared to male patients (491 patients) 38%. While based on the characteristics of age, the most occurred in 20–39 years. It is different from the Riskesdas data, which states that women are usually at the age of 40–60 years of age, is a crisis period for women, is reaching a career peak, and precisely at that time they will experience menopause (ages 45–55 years). Menopausal conditions can reduce the production of female hormones (estrogen and progesterone). With the decline, the distribution of body fat begins disrupted. The accumulation of fat that is not well distributed will affect the body's metabolism. If this process followed by a prolonged diet, lifestyle, and unhealthy activities, then the highest age of malignancy is 55–64 years. Individuals will be vulnerable to degenerative diseases. The histopathological diagnosis found in a shift in the incidence of non-infectious diseases more than infectious diseases. It follows the Indonesia Health Profile 2018 data, which states that non-infectious diseases are now beginning to increase. The ten prominent diseases causing the highest death being stroke, and cardiovascular disease, while malignancy is ranked seventh. The highest cause of death from Infectious disease is tuberculosis (TB). However, it is still ranked 4th from the cause of death in general. The eradication of TB is still experiencing obstacles because TB infection, besides attacking the lung, can also attack all organs in the human body, especially in lymph nodes. Case finding and treatment of TB that attacks the pulmonary organ have progressed, although the threat of multi-drug and extensive drug-resistant is still challenging to solve.[21,22]

The discovery of TB diagnosis and therapy outside the pulmonary organ is still an obstacle at this time; the study results obtained 5 of 37 patients with a history of TB before experiencing EPTB infection. A diagnostic grouping makes between specific infections (EPTB) and non-specific non-EPTB infections from the total diagnosis of the histopathological interpretation results. This study found that 10% of the total diagnoses of infectious diseases were diagnoses of infection with a specific process (EPTB).

Most of the EPTB occurred originating in neck lymph nodes 18 of 37 patients while the rest evenly spread from other organs, including bones, breasts, perianal, ileum. It is consistent with studies in other developing countries that previously reported the most common location of EPTB is in lymph nodes.[3,8,14,21,22]

Based on the Regulation of the Minister of Health Republic of Indonesia (*Permenkes)* No. 67 the Year 2016, the diagnosis of extrapulmonary TB (EPTB) includes history taking, physical examination, histopathological and bacterial examination. The result found the histopathological diagnosis of EPTB in 36 of 37 patients with granulomas (+). However, smear (+) found only in 6 out of 37 patients. It is possible because granulomas are a collection of several inflammatory cells, especially mature macrophages that form aggregates in response to an antigen. Antigens can come from a bacterium, fungus, foreign body, and from the immune complex. The purpose of granuloma formation is to isolate the antigen from the host body and facilitate the eradication of the antigen. Granuloma formation, antigen-presenting cells express a variety of pro-inflammatory and chemo-practical cytokines. Recruitment of neutrophils from circulation to the site of infection and an increase in cytokines invokes and activates monocytes. Under normal circumstances, neurophilic recruitment alone eliminates infectious agents, through phagocytosis and digestion in vacuoles. During the initial infection, when only one infection, there is an organism in the mononuclear cell. Granulomas defined by necrosis. There are fewer organisms that usually exist on the periphery both inside and outside the body. This critical immune reaction provides the body with protection from antigen recognition, very important in the case of mycobacterial infections.[23–25]

Immune disorders, especially the innate immune system (innate immunity), cause the granuloma not correctly formed (poor

granulomas). Poor granulomas also occur in TNF-α deficiency, Interleukin-12 (IL-12), or gamma Interferon (IFN-γ). The role of cytokine relates to systemic clinical manifestations, such as fever, night sweats, fatigue, and weight loss. They are not very meaningful for EPTB because the incidence is only 2–7 out of 37 patients. It is different from local manifestations complained by all patients with a diagnosis of EPTB based on histopathology. The histopathological examination of EPTB is almost entirely with (+) granulomas. Previous research explains that the granuloma picture is typical in TB-infected tissue,[8,9,23] and the others research found the sensitivity of bacterial smear microscopy (AFB tissue biopsy staining) found in 51% reported by Vadwai et al.,[26] 33.3% reported by Al Ateah et al.,[27] and 28.6% reported by Malbruny et al.[28] Prospective research conducted to screen patients with systemic and local symptoms that led to the infection of specific processes from the start of the testing biopsy test material. In addition to histopathological examination, slide block paraffin AFB staining was also done with more accurate monitoring of clinical manifestations.

Conclusion

There is no relationship between the results of AFB (Ziehl Nielsen stained) and the histopathological examination in patients with extrapulmonary TB.

Conflict of Interest

There is no conflict of interest at all authors.

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RESEARCH ARTICLE

Comparison of Vitamin D_3 Serum and Method of Deliveries among Pregnant Women Who Did and Did not Performe Regular Outdoor Aerobic Activities

Setyorini Irianti,[1] Teuku Kyan Nuryasin,[1] Budi Handono,[1] Benny Hasan Purwara,[1] Zulvayanti,[1] Herman Susanto[1]

[1]Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital, Bandung, Indonesia

Abstract

The maternal mortality rate in Indonesia is still very high. One of the main factors is postpartum hemorrhage and an increase in cesarean section rate (CSR). The American College of Obstetrics and Gynecology has recommended aerobic exercise. We assumed that outdoor aerobic exercise could be useful for the advancement of labor and the reduction of CSR. This study aimed to assess whether regular exercise can have a good impact on reducing labor and CSR, which is likely to be affected by an increase in vitamin D_3 levels. It was an experimental study involving 40 patients at Al Islam Awibitung Hospital and Ibrahim Adjie Healthcare Center in Bandung in February–April 2018, who met the inclusion criteria and divided into two groups, who performed regular outdoor aerobic activity and those who did not. Patient characteristics, work progress, and vitamin D_3 levels recorded. The data collected was then tested and compared between pre-and post-treatment, a paired t test was done. There was a relationship between the increase in-vitamin D_3 and the ease of childbirth in the treatment group ($p<0.05$). The comparison of vitamin D_3 levels among the two groups was –18.8% vs –26.8%, respectively ($p<0.05$). Method of delivery were spontaneous delivery 80% vs 25%, vacuum extraction 15% vs 55%, and cesarean section 5% vs 20% respectively ($p<0.05$). In conclusion that regular outdoor aerobic exercise in a pregnant woman could increase vitamin D_3 levels, ease labor, and reduce CSR.

Key words: Method of deliveries, regular aerobic activity, vitamin D_3 level

Perbandingan Kadar Vitamin D_3 Serum dan Metode Persalinan antara Ibu Hamil yang Menjalankan dan tidak Menjalankan Aktivitas Aerobik di Ruang Terbuka secara Rutin

Abstrak

Saat ini angka kematian maternal di Indonesia masih sangat tinggi. Salah satu faktor penyebab utama adalah perdarahan pasca salin dan meningkatnya insidensi seksio sesarea. Aktivitas aerobik telah direkomendasikan oleh American College of Obstetrics and Gynecology (ACOG). Kami mempunyai hipotesis bahwa aktivitas aerobik rutin di udara terbuka dapat memengaruhi kadar vitamin D_3 serum ibu yang dapat meningkatkan kelancaran persalinan dan menurunkan risiko seksio sesarea. Penelitian ini bertujuan membuktikan hipotesis di atas. Metode penelitian adalah studi eksperimental terhadap 40 ibu hamil di RS Al Islam Awibitung dan Puskesmas Ibrahim Adjie Bandung pada bulan Februari–April 2018 yang memenuhi kriteria inklusi, serta dibagi dalam 2 grup, yaitu grup perlakuan yang melaksanakan aktivitas aerobik di udara terbuka secara rutin dan grup kontrol yang tidak melaksanakan aktivitas aerobik. Dilakukan pencatatan karakteristik pasien, kemajuan persalinan, metode persalinan, dan kadar vitamin D_3 sebelum dan setelah perlakuan, serta dilakukan analisis statistik dengan paired t test. Terdapat hubungan bermakna antara perubahan kadar vitamin D_3 dan metode persalinan ($p<0,05$). Perbandingan perubahan kadar vitamin D_3 antara kedua kelompok adalah –18,8% vs –26,8% ($p<0.05$). Metode persalinan adalah persalinan spontan 80% vs 25%, ekstraksi vakum 15% vs 55%, dan seksio sesarea 5% vs 20% ($p<0,05$). Simpulan, aktivitas aerobik rutin di udara terbuka pada ibu hamil berdampak terhadap kadar vitamin D_3 serum ibu dan dapat memperlancar proses persalinan serta menurunkan risiko seksio sesarea.

Kata kunci: Aktivitas aerobik rutin, kadar vitamin D_3, metode persalinan

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Correspondence: Setyorini Irianti. Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Padjadjaran/ Dr. Hasan Sadikin General Hospital. Jln. Pasteur No. 38, Bandung 40161, West Java, Indonesia. E-mail: dririantio901@gmail.com

Introduction

Labor progress is an essential requirement to reduce the occurrence of cesarean sections and artificial vaginal parturition. The uterus undergoes contractions that become stronger and more coordinated during childbirth. Calcium is an essential aspect of uterine contractions, and an increase in the concentration of calcium in the cells is essential for the contraction of the myometrium. Calcium enters the myometrium cells through calcium channels. It binds with calmodulin in the cytoplasm, which activates myosin light chain kinase until ATPase activity increases, and myosin binds with actin, resulting in the muscles' contraction. The 25-(OH)-vitamin D_3 molecule is an essential aspect in the absorption of calcium by the body and in maintaining calcium homeostasis.[1,2]

The most recent research indicates there is a correlation between 25-(OH)-vitamin D_3 deficiency and labor problems, including preeclampsia, gestational diabetes, decreased fetal size, and increased risk of cesarean section surgery.[3,4] Increased risk for cesarean section surgery is associated with the negative effect of 25-(OH)-vitamin D_3 deficiency on uterine muscle contraction.[5,6] This vitamin plays a role in maintaining calcium homeostasis, bone mineralization, and muscle strength. Maintaining normal calcium levels is essential for muscle contraction, growth, and function.

As recommended by ACOG, regular aerobic activities offer many benefits during childbirth and may reduce the occurrence of cesarean sections and artificial vaginal parturition. It may be due to the association between increased levels of 25-(OH)-vitamin D_3 in the blood serum and aerobic activity during pregnancy.[7,8]

Methods

This study is a randomized, non-randomized controlled sample of repeated observation at Al Islam Awibitung Hospital and Ibrahim Adjie Healthcare Center in Bandung in February–April 2018. Initial measurements of 25-(OH)-vitamin D_3 levels in the blood serum were taken before diagnosis, and final measurements were taken when pregnancy came to term. Such data were then subjected to statistical analysis.

Samples were collected from subjects that fulfilled the inclusion criteria. The amount collected was based on statistical calculations with a confidence interval of 95% ($z\alpha$=1.65, one-sided test) and a power of 80% ($z\beta$=0.84). The following sample size determination formula used to test the difference between the two averages,

$$n = \frac{2\sigma^2 (Z_\alpha + Z_\beta)^2}{d^2}$$

Description: n=sample size, σ=standard deviation, d=difference in average vitamin D levels between physically active women at a term and a control group

Based on the standard deviation obtained from Mihalache,[9] vitamin D_3's standard deviation was 18.7 nmol/L and was determined to be 15 nmol/L. Based on the above formula, n=20, the sample size was 20 subjects per group.

Aerobic activities carried out were physical activities, including walking at 4 km/hour from 9:00 am to 11:00 am. The duration recommended by ACOG is 30–60 minutes for 3–5 days per week.

Vitamin D (25-(OH)-vitamin D_3) levels, measured in ng/mL, were collected from the patient's blood serum and sent to the laboratory for examination. Levels of 25-(OH)-vitamin D_3 were assessed before treatment (34 weeks of pregnancy) and after treatment (37 weeks of pregnancy).

The ease of childbirth is assessed by the period from the opening of the active labor process in the first stage of labor before the cervix is completely dilated. It was anticipated that the subjects would come and stay in the hospital from the first stage of labor before delivery. The distribution method was recorded.

Ethical approval for this study has been obtained from the Health Research Ethics Committee of Dr. Hasan Sadikin General Hospital Bandung with the letter number: LB.04.01/A05/EC/349/XII/2017.

Results

At least 40 subjects who met the inclusion criteria were recruited as a study, 20 subjects in the control group and 20 subjects in the treatment group who conducted routine aerobic activity. Subjects were patients from the Al Islam Awibitung Hospital and Ibrahim Adjie Healthcare Center in Bandung.

Table 1 shows the subjects' characteristics, including age and body mass index (BMI). Based on the resulting p value (p=0.900, p>0.05), there was no significant difference in age between the

Table 1 Physical Characteristics of the Subjects

Characteristics	Groups		p Value
	Treatment (n=20)	Control (n=20)	
Age (years)			0.900*
Average (SD)	25.8 (3.8)	26.0 (6.0)	
Range	18–32	17–37	
BMI			0.461**
Average (SD)	23.4 (4.2)	22.1 (3.3)	
Median	23.1	21.4	
Range	18.5–35.1	16.3–27.5	

Note: *unpaired t test; **Mann-Whitney test; treatment group: engaged in regular aerobic activities; control group: did not engage in aerobic activities

Table 2 Comparison of 25-(OH)-vitamin D_3 Levels before and after Treatment

25-(OH)-vitamin D_3 (ng/mL)	Groups		p Value
	Treatment (n=20)	Control (n=20)	
Data before treatment			
Average (SD)	25.8 (3.8)	33.7 (11.9)	0.035*
Median	22.9	33	
Range	12.2–63.7	17.8–64.3	
Insufficient	7	2	0.127**
Sufficient	13	18	
Data after treatment			
Average (SD)	31.8 (15.1)	24.3 (8.5)	0.108*
Median	28.3	22.1	
Range	13.4–69.0	11.6–37.1	
Deficient	0	1	0.303**
Insufficient	4	7	
Sufficient	16	12	
Difference in vitamin D_3			<0.001***
Average (SD)	4.4 (3.6)	−9.4 (7.0)	
Median	4.6	−8.4	
Range	−2.2–10,2	−29.4–(−0.7)	
Percent increase in vitamin D_3 (average)	18.8%	−26.8%	<0.001***

Note: *Mann-Whitney test; **chi-square test; ***unpaired t test; significant if p<0.05

control group and the treatment group with an age range between 18–32 years old for the treatment group and 17–37 years old for the control group. There was also no significant difference in BMI (p=0.461, p>0.05) with a range of 18.5–35.1 for the treatment group and 16.3–27.5 for the control group.

Table 2 shows the level of 25-(OH)-vitamin D_3 before and after treatment. Based on the data, the 25-(OH)-vitamin D_3 level of the treatment group increased 4.4 ng/mL (18.8%) while the 25-(OH)-vitamin D_3 level of the control group decreased 9.4 ng/mL (26.8%). Based on an unpaired t test, the difference in 25-(OH)-vitamin D_3 levels is significant, with a p value of 0.001 (p<0.05). Based on the criteria for adequate 25-(OH)-vitamin D_3 levels, the treatment had 13 subjects with sufficient 25-(OH)-vitamin D_3 levels, which increased to 16 after treatment. Compare this to the control group, where 18 subjects had adequate 25-(OH)-vitamin D_3 levels, which decreased to 12 at the end of pregnancy.

The delivery methods can be seen in Table 3, which indicates that 16 of 20 subjects in the treatment group had spontaneous vaginal delivery compared to only 5 of 20 in the control group. Based on statistical analysis, there was a significant difference in the delivery method

Table 3 Comparison of Delivery Method between Two Groups

Delivery Method	Groups		p Value*
	Treatment (n=20)	Control (n=20)	
Spontaneous delivery	16	5	0.002
Cesarean section	1	4	
Vacuum extraction	3	11	

Note: *chi-square test, significant if p<0.05

Table 4 Ease of Labor based on the Duration of the Active Labor Phase in the First Stage of Labor

Duration of Active Labor Phase (Hours)	Groups		p Value*
	Treatment (n=20)	Control (n=20)	
x (SD)	6.9 (1.4)	8.2 (1.6)	0.012
Median	7	9	
Range	5–9	6–10	

Note: *Mann-Whitney test

Table 5 Relationship between 25-(OH)-vitamin D_3 Levels and Ease of Labor

Vitamin D_3 Levels(ng/mL)	Delivery Method			p Value*
	Spontaneous Delivery	Cesarean Section	Vacuum Extraction	
Treatment group	(n=16)	(n=1)	(n=3)	
Before treatment				
Average (SD)	29.4 (15.1)	22.4	18.4 (3.0)	0.138
Median	24.5		17.1	
Range	12.2–63.7		16.3–21.8	
After treatment				
Average (SD)	34.8 (15.4)	20.6	19.5 (1.6)	0.112
Median	31.2		19.6	
Range	13.4–69.0		17.8–21.1	
Increase in vitamin D_3				
Average (SD)	5.4 (3.0)	−1.8	1.1 (3.5)	0.039
Percent increase (average)	22.5%	−8.0%	7.8%	0.174
Control group	(n=5)	(n=4)	(n=11)	
Before treatment	43.3 (16.6)	24.6 (8.0)	32.6 (7.7)	0.049
Average (SD)	47.7	22.6	35.6	
Median	22.8–64.3	17.8–35.4	20.6–44.8	
Range				
After treatment	2.6 (8.2)	16.0 (2.5)	24.9 (8.2)	0.046
Average (SD)	34.3	16.6	24.5	
Median	19.1–37.1	12.5–18.2	11.6–36.0	
Range				
Increase in vitamin D_3	−13.7 (9.9)	−8.6 (9.2)	−7.8 (3.8)	0.289
Average (SD)				
Percent increase (average)	−28.7%	−29.0%	−25.1%	0.872

Note: *F-test (variance analysis), significant if p<0.05

(p=0.002, p<0.05). Besides, the ease of delivery measured by the length of the active labor period was in Table 4.

Based on the data, the length of the active labor period for the treatment group was, on average, 7 hours, with a standard deviation of 1.4 hours and a mean of 7 hours. The control group experienced an active labor period of 8 hours on average, with a standard deviation of 1.6 hours and a mean of 9 hours. Subsequent statistical analysis showed a significant difference between the length of time of the two groups (p=0.012, p<0.05). The subsequent statistical study revealed a substantial difference in length of time.

The data analyzed to determine the relationship between an increase in 25-(OH)-vitamin D_3 levels and the delivery process between the two groups. The analysis was in Table 5.

Based on the results, there was a significant relationship between the increase in 25-(OH)-vitamin D_3 levels and the ease of childbirth in the treatment group (p=0.039, p<0.05). It can be seen in the increase in 25-(OH)-vitamin D_3 levels compared to the relatively low occurrence of cesarean sections and vacuum extractions seen in the treatment group. However, the 25-(OH)-vitamin D_3 levels in the control group decreased, and there was no significant relationship between it and the ease of childbirth (p=0.289, p>0.05).

Discussion

To observe the effects of regular aerobic activities for this study, a level of uniformity has to be maintained among the subjects chosen. It includes matching subjects with similar age, BMI, and gestational age at the start of the study. It must be proven that there were no significant differences between the subjects given the treatment and subjects in the control group.

The average age of the subjects from the treatment group and the control group was 25.8 (3.8) years old and 25.6 (3.6) years old. Analysis from a subsequent t-test showed no significant difference in age between the two groups (p=0.900, p>0.05). The average BMI of the subjects from the treatment and control groups was 23.3 (4.2) and 22.1 (3.3). Subsequent Mann-Whitney test also showed no significant difference in BMI between the two groups (p=0.461, p>0.05). The similarity in age and BMI between the two groups showed that the subjects could be used to compare childbirth and differences in 25-(OH)-vitamin D_3 levels.

Low levels of 25-(OH)-vitamin D_3 levels during pregnancy have been associated with poor health conditions in mothers, such as preeclampsia, gestational diabetes, intrahepatic cholestasis during pregnancy, periodontal diseases, cesarean sections, and the development and mortality from HIV.[9,10]

Low 25-(OH)-vitamin D_3 levels during the first trimester were associated with poor pregnancy outcomes and neonates.[9,11] Article 2019 states that the results support the role played by 25-(OH)-vitamin D_3 in regulating the risk of complications during pregnancy and in maintaining fetal and bone development and immune maturation, particularly early in pregnancy.[12,13] Even though there is little and often contradictory evidence for the role maternal 25-(OH)-vitamin D_3 plays in pregnancy outcomes, neonate, and the health

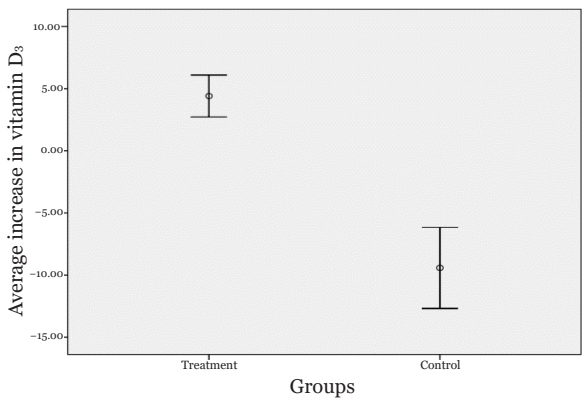

Figure 1 Increase in 25-(OH)-vitamin D_3 Levels of the Two Groups

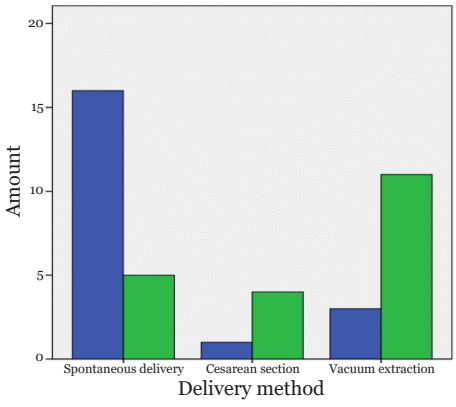

Figure 2 Delivery Method of the Two Groups

of the child, it does show that maternal vitamin D supplements are needed to prevent poor health outcomes for the mother, baby, and child.[14,15]

Previous studies have shown that there is a 25-(OH)-vitamin D_3 deficiency in pregnant women during the first trimester.[16] However, in normal pregnancy, 25-(OH)-vitamin D_3 rates will double after the third trimester.[17–20] This improves bone metabolism, immunomodulation, blood pressure control, and maintenance of insulin secretion by pancreatic beta cells.[21,22]

Initial examination of the subject's blood samples showed normal levels of 25-(OH)-vitamin D_3 in both the treatment and control groups. The average 25-(OH)-vitamin D_3 levels in the treatment and control groups were 27.4 ng/mL and 33.7 ng/mL. Table 2 shows the treatment group increase in 25-(OH)-vitamin D_3 by 4.4 ng/mL on average, which was an increase of 18.8%. However, the control group had a decrease in 25-(OH)-vitamin D_3 by as much as 9.4 ng/mL, which was a decrease of 26.8%. According to subsequent unpaired t test, the changes in 25-(OH)-vitamin D_3 levels were significant ($p=0.001$, $p<0.05$).

Labor begins with the first stage until the cervix is fully dilated. For primiparae, this first stage lasts for 8–12 hours on average and lasts 6–8 hours for multiparae. During the active labor phase, the rate of cervical dilation is 1.2 cm/hour for primiparae and 1.5 cm/hour for multiparae.[23] A rate of 1 cm/hour is usually used as an indicator of normal and abnormal labor.[24]

Dystocia is usually diagnosed if the rate of cervical dilation is lower than 0.5 cm/hour after 2 hours. Friedman stated that prolonged cervical dilation defined by a rate lower than 1.2 cm/hour for primiparae and 1.5 cm/hour for multiparae. Dystocia defines if there was no change in cervical dilation after 2 hours or if there was no fetal descent after 1 hour of observation.[25,26]

The ease of labor is determined by the method of childbirth undergone and the length of the first stage of labor. The onset of dystocia during labor typically involves more intervention, such as increased oxytocin, artificial vaginal parturition, and cesarean section.[27,28]

Researches showed a significant relationship between regular physical activities during the third trimester of pregnancy and an increase in spontaneous vaginal delivery and a decrease in the occurrence of cesarean sections.[8,29] Among pregnant women who underwent regular aerobic activities, there was a decrease in obstetric operations and an increase in spontaneous vaginal delivery compared to women who did not undergo regular aerobic activities.[30–32] That research further supported by research done by Domenjoz et al.[33] concluded that there was a decrease in the occurrence of cesarean sections among pregnant women who performed regular aerobic activities.

Table 3 shows that of the 20 subjects in the treatment group who performed regular aerobic activities, 16 had a spontaneous vaginal delivery, 3 had vacuum extractions, and 1 had a cesarean section. It was significantly better compared to 20 subjects in the control group, where only 5 had a spontaneous vaginal delivery, 11 vacuum extractions, and 4 cesarean sections. Furthermore, statistical analysis showed a significant difference between the two groups ($p=0.002$, $p<0.05$).

The results showed a general positive effect of regular aerobic activities on childbirth in pregnant women. The higher percentage of spontaneous vaginal delivery was significant in suppressing the incidence of operative vaginal or abdominal delivery.

Research conducted in the Dr. Hasan Sadikin General Hospital showed that the highest indicator for cesarean section was oxytocin drip failure, which had a 53.6% rate. Table 3 shows that among pregnant women who did not perform regular physical activities, 4 of 20 subjects had cesarean sections because of oxytocin drip failure. Oxytocin augmentation was given to these four subjects due to an indication of hypotonic uterine inertia. The data illustrated the poor condition of this group that oxytocin required as a uterotonic. Of those given the uterotonic, some failed and had to undergo cesarean sections. However, subjects who performed regular aerobic activities had a normal vaginal delivery without surgery. The benefits of aerobic activities could be used by health agencies in an applicative program to promote spontaneous vaginal delivery.

Table 4 showed that the treatment group experienced an active labor phase of 7 hours on average with a standard deviation of 1.4 hours and a median of 7 hours. However, the control group experienced an active labor phase of 8 hours on average, with a standard deviation of 1.6 hours and a median of 9 hours. Statistical analysis showed that the difference between the two groups was significant ($p=0.012$, $p<0.05$).

Table 4 showed that the group who performed regular aerobic activities endured a faster active labor phase than the control group. This study

indicated that regular physical activities had a positive effect on pregnant women. It was similar to previous studies which also showed that pregnant women who engaged in regular physical activities experienced a faster active labor phase compared to a control sample.[34]

Table 5 showed that in the treatment group, there was a significant relationship between the increase in 25-(OH)-vitamin D_3 levels and the ease of labor ($p=0.039$, $p<0.05$). Subjects who underwent normal labor had a percentage increase in 25-(OH)-vitamin D_3 levels higher than subjects who underwent vacuum extractions or cesarean sections. In the control group, there was a decrease in 25-(OH)-vitamin D_3 levels and no significant relationship with the ease of labor ($p=0.289$; $p>0.05$).

This study showed that increased 25-(OH)-vitamin D_3 levels positively affected the ease of labor among pregnant women through regular aerobic activities. The increase in spontaneous vaginal delivery was significant and suppressed the occurrence of operative vaginal and abdominal delivery.

Conclusion

In conclusion, there was an increase in 25-(OH)-vitamin D_3 levels in pregnant women who performed regular aerobic activities and had a better progression of labor than pregnant women who did not. Also, there was a positive relationship between increased levels of 25-(OH)-vitamin D_3 and the progress of labor.

Conflict of Interest

There is no conflict of interest at all authors.

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RESEARCH ARTICLE

Probability of Hypertension in Advancing Ages of Women

Fajar Awalia Yulianto,[1] Nurul Romadhona,[1] Febyana Rosarianto,[2] Vihannis Rahmanda,[3] Salman Barlian,[3] Tresya Anggi Tania,[3] Romy Reynaldi Gunawan,[3] Sumayya Nuri Fuadana Aulia Ul Haque,[3] Rifa Nataputri,[3] Aulia Nur Amalia,[3] Paulina Maresta,[3] Haris Nugroho[3]

[1]Department of Public Health, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia,
[2]UPTD Pelayanan Kesehatan Kecamatan Pasirjambu, Bandung, Indonesia,
[3]Medical Undergraduate Study Program, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

Abstract

Hypertension is a problem in Indonesia, with 34.1% prevalence. The number reflected the number of hypertensive patients in the 2016 clinic report of Pasirjambu Public Health Center as the most prominent non-communicable disease. This research aimed to discover the specific age of onset and risk factors of hypertension in the village where the health center located. A rapid survey collected the data in May 2017, where 210 women (representing their household) were chosen by randomization inside their respective clusters. Risk factors were analyzed by a robust and parsimonious logistic regression model along with probability count on age as the final prediction. The prevalence of hypertension was 59.5% (95%CI=52.9, 66.2%). Risk factors for hypertension were age (OR=1.06, p=0.00), stress (OR=1.74, p=0.09) and family history (OR=1.99, p=0.03) but the protective factor was consumption frequency of salty food (OR=0.64, p=0.10). In conclusion, a woman would have a 42.9% chance (95%CI=33.7, 52.1%) for having hypertension at 40 years old of age after adjusted by other risk factors. Despite only two modifiable risk factors that can be intervened with, it would be worth trying to decrease the pace of onset in hypertension and the prevalence.

Key words: Age, hypertension, probability, risk factors, women

Kemungkinan Hipertensi berdasar atas Usia pada Wanita

Abstrak

Hipertensi merupakan sebuah masalah di Indonesia dengan prevalensi sebesar 34,1%, angka tersebut terlihat dalam laporan tahunan Puskesmas Pasirjambu sebagai penyakit tidak menular terbanyak di wilayah kerjanya. Tujuan penelitian ini adalah mengetahui usia munculnya hipertensi dan faktor risikonya. Pengumpulan data dilakukan melalui survei cepat di bulan Mei 2017, melibatkan 210 wanita yang mewakili rumah tangganya dipilih secara random. Faktor risiko dianalisis menggunakan regresi logistik dengan hasil akhir berupa prediksi kemungkinan. Hasil penelitian menunjukkan prevalensi hipertensi sebesar 59,5% (IK95%=52,9; 66,2%). Usia (OR=1,06; p=0,00), stres (OR=1,74; p=0,09) dan riwayat hipertensi dalam keluarga (OR=1,99; p=0,03) menjadi faktor risiko, sedangkan frekuensi konsumsi makanan asin (OR=0,64; p=0,10) menjadi faktor protektif. Setelah *adjusted* terhadap variabel lain, kemungkinan untuk hipertensi seorang wanita usia 40 tahun sebesar 42,9% (IK95%=33,7; 52,1%). Pencegahan untuk menurunkan prevalensi dan laju insidensi dapat dilakukan pada usia tersebut walaupun hanya ada dua faktor risiko yang dapat dimodifikasi.

Kata kunci: Faktor risiko, hipertensi, kemungkinan, usia, wanita

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Correspondence: Fajar Awalia Yulianto, dr., M.Epid. Department of Public Health, Faculty of Medicine, Universitas Islam Bandung. Jln. Tamansari No. 22, Bandung 40116, West Java, Indonesia. E-mail: awaliayulianto@gmail.com

Introduction

Hypertension is currently the most significant prevalence of non-communicable disease (NCDs) in Indonesia, which was 34.1% according to the Basic Health Research (*Riskesdas*) 2018.[1] In 2014, 15 million people of Indonesia was hypertension, but only 4% of them have controlled hypertension and sadly 50% of them never been aware that they had hypertension due to its asymptomatic property until the illness started to make complications.[2]

From the 2016 annual report of the most frequent diseases in Pasirjambu Public Health Center (*Puskesmas*), hypertension was the most prominent NCD (Table 1). Pasirjambu is a village located in West Java province of Indonesia that was selected to assessed in community health assessment (CHA) due to its public health problem.

There are several risk factors for hypertension, including nonmodifiable risk factors; gender, age, family history, and modifiable risk factors; lack of physical activity, and other preventive measures.[3] However, no previous research identified specific age in which hypertension occurs and which factors contribute the most notably in a rural area.

Hypertension is known as the primary causation for following organ damages such as stroke, heart attack, heart failure, kidney failure, etc. With the prevalence of hypertension soaring in the village, it is essential to figure out the specific risk factors that prevent further damage. This research aimed to assess the risk factors for hypertension in the community in Pasirjambu village.

Methods

This study's population was family members in Pasirjambu village Bandung regency of West Java province in Indonesia, divided into 30 clusters, and seven households have randomly taken on each cluster (rapid survey method).[4] One individual was representing their respective family. There were 210 respondents in total data from each of the subjects collected during May 2017. The hypertension status assessed by trained medical students in a standardized method on each respondent's house. Blood pressure was measured twice by calibrated sphygmomanometer after five minutes of introduction, and the results were written in a form.[5] The data were collected by nine enumerators using questions that originated from Indonesia Basic Health Research (*Riskesdas*). The questionnaire consisted of knowledge about hypertension risk factors from consumer behavior, risky foods, smoking habits, activity, family history with hypertension, body mass index, and stress.[1] Enumerators read questions and choices of answers. Statistical analysis consisted of univariate, bivariate, and multivariate analyses. Difference analysis, such as the two groups t test and chi-square, conducted in bivariate analysis. All variables correlation was analyzed by Pearson's correlation to prove no multiple colinearities before entered to a multivariate analysis by logistic regression. Studied risk factors were age, salty food (such as salty fish), processed food, home-produced noodles, kidney disease, and stress levels. All of them were categorized.[6]

Individual data of respondents not published in this article, their identity are safe. Published results contain the conclusion of the total data in the area that able to generalized to a larger population.

This study was approved by the Health Research Ethics Committee of the Faculty of Medicine, Universitas Islam Bandung, Indonesia No. 032/Ethics Committee.FK/VII/2017.

Results

Due to the incomparable group size, subjects who had kidney disease excluded, so the total respondents eligible in this study were 210 females. They are representing their household, particularly in family consumption patterns.

Table 1 Top Ten Diseases in Pasirjambu *Puskesmas*

No.	Disease	n
1	Febrile observation	4,241
2	Hypertension	3,992
3	Acute respiratory tract infection	3,131
4	Dental infection	2,838
5	Fibromyalgia	2,613
6	Dyspeptic syndrome	2,512
7	Dermatitis	1,939
8	Pharyngitis	1,211
9	Diarrhea	950
10	Common cold	893

Table 2 Number of Respondents with Hypertension based on Age in Pasirjambu Village in 2017

Current Hypertension	n	Age	p*
		Mean (SD)	
Non-hypertension	85	46.4 (13.9)	0.00
Hypertension	125	57.3 (13.4)	
Total	210	52.9 (14.6)	

Note: *t test, significant if p<0.05; SD=standard deviation

There were 125 or 59.5% (95%CI=52.9, 66.2%) people with hypertension out of 210 respondents. The mean age in the hypertension group was 57.3 years old, significantly older than the opposite group (p<0.05).

The significant difference showed age was an essential explanatory variable to predict hypertension, thus from analysis on each group; we found that the youngest age who had hypertension was 27 years old. Table 2 illustrates the mean age of the hypertension group was 10.9 years older (95%CI=7.1, 14.6%) than the mean age of the non-hypertension group.

Statistically, there was a significant proportionate difference in salty food consumption frequency in hypertension in Table 2, where percentages who had hypertension decreased. In contrast, the frequency of eating salty food was the opposite. Generally, respondents in this

Table 3 Risk Factors of Hypertension in Pasirjambu Village

Variables	Hypertension		Total	p Value*
	No n=85 (%)	Yes n=125 (%)		
Salty food				
<3× a month	4 (16.7)	20 (83.3)	24	
1–6× a week	56 (43.1)	74 (56.9)	130	0.04
>1× a day	25 (44.6)	31 (55.4)	56	
Processed food				
Never	10 (31.2)	22 (68.7)	32	
<3× a month	39 (36.8)	67 (63.2)	106	0.11
1×/week–>1×/ day	36 (50)	36 (50)	72	
Home made noodle				
Never	11 (50)	11 (50)	22	
<3× a month	30 (39)	47 (61)	77	0.63
1×/week–>1×/ day	44 (39.6)	67 (60.4)	111	
Stress				
Eustress	57 (46)	67 (54)	124	0.05
Distress	28 (32.6)	58 (67.4)	86	
Instant noodle				
Never	8 (44.4)	10 (55.6)	18	
<3× a month	19 (35.8)	34 (64.1)	53	0.67
1–6× a week	51 (40.5)	75 (59.5)	126	
>1× a day	7 (53.8)	6 (46.1)	13	
Monosodium glutamate				
<3× a month	6 (54.5)	5 (45.4)	11	
1–6× a week	15 (28.8)	37 (71.2)	52	0.11
>1× a day	64 (43.5)	83 (56.5)	147	
Family history				
No	50 (46.7)	57 (53.3)	107	0.06
Yes	35 (34)	68 (66)	103	
Cigarette smoking				
Never smoker	67 (41.1)	96 (58.9)	163	0.73
Ever smoker	18 (38.3)	29 (61.7)	47	

Note: *chi-square test, significant if p<0.05

Table 4 Final Multivariate Analysisiof Hypertension

Hypertension	Coefficient	p (z)	p (Chi-squared)	Pseudo R-squared
Age	0.06	0.00		
Salty food	−0.45	0.10		
Stress	0.55	0.09	0.00	0.14
Family history	0.69	0.03		
Honstant	−2.27	0.01		

study were all had contact with salty food but in different intensities.

The proportion of hypertension people was higher than the eustress group, which had positive hypertension familial history compared to the other group. Unfortunately, most of the respondents had routinely consumed processed food and monosodium glutamate (MSG). The proportion of hypertension subjects in processed food categories declined each time the frequency increased, with the number of processed food consumptions the largest in <3 times a month while that pattern did not appear in MSG's consumption.

Interesting parts found in other variables that consistently played as risk factors in hypertension, such as all kinds of noodles and smoking, which did not have a significant association with hypertension in this study. In order to have better reliability of the model, those variables excluded in multivariate analysis.

Stress and family history were factors that contribute to hypertension and p values near significant numbers (0.05). Although p values of processed food and MSG were more than designated alpha, those variables included in the subsequent analysis (multivariate analysis) due to their p values of less than 0.30. Multicollinearity between variables not found in correlation analysis, therefore those variables were included in logistic regression.

Age, salty food consumption, stress, and family history significantly were the risk factors for hypertension (p chi-squared 0.00), where 14% of hypertension variance accounted for them. The probability of getting hypertension generally 59.5% (95%CI=53.5, 65.5%) in that population, but stratified result by age describes other things (Figure). The ages classified into age categories ranging from five years to a minimum of 20 old (the youngest respondent's age).

The probability of getting hypertension was increasing overages linearly. The cut-off probability point was in 50% (0.5) and visible in 40 years old group (mean probability 42.9%, 95%CI=33.7, 52.1%). Over that age group, the probability of contracting hypertension was higher than not contracting hypertension.

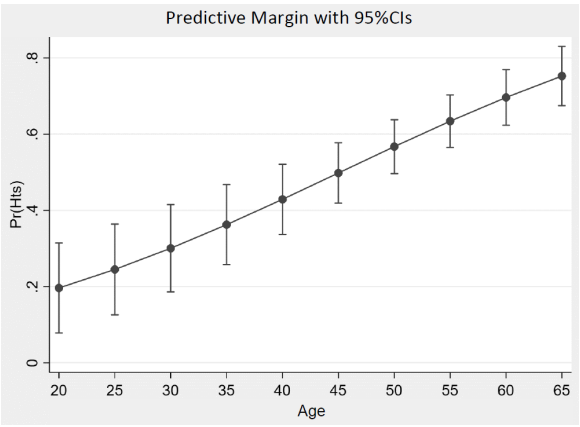

Figure Probability of Hypertension by Age Adjusted to Other Factors

Discussion

Although age has been consistently proven as a risk factor in hypertension in the world, the age's cut-off is varied, and many still unknown, especially in a big archipelago country like Indonesia. The Ministry of Health finding where the most significant proportion of hypertension in the young was found in 18 years old.[1] Until today, the prevention of hypertension complication still be aimed at elderly (above 50 years old) in *pos pembinaan terpadu* (*posbindu*), a contrast to the previous finding. Therefore, the blood pressure monitoring must be conducted not only in *posbindu* but also in *pos pelayanan terpadu* (*posyandu*). *Posbindu* and *posyandu* are extended programs from *pusat kesehatan masyarakat* (*puskesmas*), primary health services in Indonesia, that reach communities.[7]

Certain *posyandu* have a blood pressure monitoring program that not limited only to the elderly. There are no specific rules for everyone who wants to check their blood pressure. Thus the screening would not be sufficient to reach all members of the population at risk. Although the programs in *posyandu* were for children, in particular, adults could come to certain *posyandu* for checking their health, including their blood pressure.

Other programs that always held in this national health insurance coverage, in every primary health services including the private sector, named *program pengendalian penyakit kronis* (*Prolanis*), which is not limited to certain ages because aimed to every chronic disease including hypertension.[8] This program was launched by national health insurance of Indonesia to control the complication of hypertension, as one of the chronic diseases, but not intended to detect early high-risk groups.

The prevalence of hypertension is high in Indonesia, especially West Java, one of the three prominent provinces of hypertension. This province has a salty cooking habit in almost every kind of food, from *sambal* until *sayur lodeh*.[1] However, the result for the consumption of salty food illustrates interesting results where the frequency of hypertension people was getting lesser on every increasing frequency of consumption. The ratio between three groups of consumption was 1:5:2, the biologic gradient between exposure and outcome not yet established. However, the result describes consistency that the hypertension proportion is more significant in every group coherent with the theory that salt (NaCl) as a cause for hypertension.

Salt is the most common food preservatives used in processed food.[9] Sodium as a molecule of salt. It retains fluid as an antidiuretic. Consequently, large amounts of water enter the blood vessel and create a rise in blood pressure. Thus, hypertension occurred.[10]

Other than salt, MSG also has sodium property and becoming a common food additive in Indonesia. Their "umami" property adds the depth of taste besides four regular tastes (sweet, sour, bitter, and spicy).[11] They are known as seasoning ingredients in instant noodles, a favorite food that famous by their low price, their cooking simplicity, and their delicious taste. Only with 2,000 IDR (0.14 USD) individual will have a serving packed with 490 kcal energy with 53% of daily sodium needs fulfilling. By their advantages, no wonder the percentage of people who eat instant noodles is the most significant one to six times a week. Homemade noodle was also studied because the researchers want to know the frequency of unstandardized salt and MSG in that kind of noodle. It was including dried-noodle that seasoned with specific personalized dosage. However, there was no significant association between the frequency of eating instant noodles or homemade noodles with hypertension.

On the contrary, this study showed no significant association between cigarette smoking and hypertension. With subjects were all women, there might be modifying the effect between sex and smoking habit. Further study of adjusted risk factors must be included. From the previous study, some of the results show lower blood pressure in the group who smoke compared to never and ex-smoker, particularly in men.[12,13] Against the coherent theory of endothelial damage by smoking,[14–16] this finding must be studied further with extended regression to see interactions in sex stratum or unobserved confounders.

Blood pressure in the elderly will tend to be high so that older people are at greater risk of developing hypertension. Increasing age results in increased blood pressure because arterial walls thickened as a result of the accumulation of collagen in the muscle layer, thus the blood vessels will become gradually narrower and stiffer. Eventually, an older person is at risk of getting hypertension due to the bloodstream that passing the narrow and stiff vessels.[17,18]

As a developed country, Indonesia has to advance in many aspects, including food consumption. Citizens of Indonesia barely have a problem to access every kind of food, including salt-excess delicacies. Therefore, the exposure of salt in Indonesia in general. Salt, as the taste intensifier, is a common ingredient in nearly all kinds of food in Indonesia, particularly in West Java province, where the study conducted. There is a custom in Sundanese, the tribe that dominantly resides in West Java; it was not tasty if it was not salty.

Eating with a high sodium content can affect blood pressure in the body, causing hypertension.[10] Effect of sodium intake on hypertension through increased blood volume, cardiac output, and blood pressure. An increase follows this situation in excess salt's excretion,

so that returns to a normal hemodynamic state. This mechanism disrupted in hypertension with unknown causes, and other factors affect it. Hypertension rarely found with minimal salt intake. Recommended salt intake for an adult is less than 2,000 mg of sodium or 5 g of salt.[19]

Seasoning and ingredients in noodles use monosodium glutamate (MSG) or *vetsin*. *Vetsin* is an organic salt between sodium and glutamate.[11] Besides, the weakness of consuming noodles is the high sodium content. Sodium contained in noodles comes from salt (NaCl) and the ingredients of the developer. The commonly used development material is sodium tripolyphosphate, reaching 1% of the total weight of noodles per serving. Sodium harms hypertensive patients.[20]

High blood pressure caused by various factors, one of which is stress. Stress is a nonspecific response from the body to any pressure or demand that may arise from pleasant and unpleasant conditions. Stress can lead to hypertension through the sympathetic nervous system's activation, which results in increased blood pressure intermittently.[21] When a person experiences stress, adrenaline will be released and then increase blood pressure through an arterial contraction (vasoconstriction) and increased heart rate. If stress continues, blood pressure will remain high so that the person will experience hypertension.

One of the interesting findings in this study is how the frequency of salty food consumption affecting hypertension. There was a negative correlation on the proportion of hypertensive people in the increasing frequency of consumption, which is a contradiction to theory that more exposure accompanied by more outcome (positive dose-response relationship in Hill's criteria for causal relationship).[22] There is a theory that can support the result of this research about how salt sensitivity of blood pressure (SSBP) controls blood pressure variability. For the salt-sensitive (SS) group, the positive dose-response relationship will occur, but this result will not seem in the salt-resistant (SR) group.[23] However, further study must be conducted in the Pasirjambu area to conclude the SSBP of the population.

Conclusion

The probability of hypertension is increasing following ages, with risk factors such as stress, frequency of salty food consumption, and family history of hypertension.

Conflict of Interest

The author declares that there is no conflict of interest in this study.

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RESEARCH ARTICLE

The Need for Adolescent Mental Health Intervention in Primary Health Care

Susan Fitriyana,[1] Hilmi Sulaiman Rathomi,[1] Sara Shafira[2]
[1]Department of Public Health, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia,
[2]Medical Undergraduate Study Program, Faculty of Medicine, Universitas Islam Bandung, Bandung

Abstract

Mental health problems in adolescents became a global concern. About 10–20% of children and adolescents worldwide experience mental health problems, but only about 10% get medical attention. This study aims to perform an initial screening of adolescent mental health in Bandung, especially adolescents at school age, to get the magnitude of the problem of mental health in adolescents. This research was a cross-sectional study conducted in Bandung. Data collected in December 2018. The study used consecutive sampling to recruit 140 students from junior and senior high schools. The instrument used was the strength and difficulties questionnaire (SDQ) YR1 version, which was filled independently by respondents. Data were analyzed using STATA 13. The results of this study were that the prevalence of mental health problems in adolescents was 21%. The highest aspect was emotional (28%) and conducted problems (21%). There was a significant different male versus female in emotional and conduction problems. In conclusion, the magnitude of the adolescent's mental health problems in Bandung was enormous; thus, interventions at the primary care level and partnership with another sector needed.

Key words: Adolescent, mental health, primary health care

Perlu Intervensi Kesehatan Mental Remaja di Pelayanan Kesehatan Primer

Abstrak

Masalah kesehatan mental pada remaja telah menjadi perhatian dunia. Sekitar 10–20% anak dan remaja di seluruh dunia mengalami masalah kesehatan mental, tetapi hanya 10% yang mendapatkan pelayanan kesehatan. Tujuan penelitian ini melakukan penapisan awal besaran masalah kesehatan mental pada remaja usia sekolah di Kabupaten Bandung. Penelitian ini merupakan penelitian potong lintang yang dilakukan di Kabupaten Bandung. Data dikumpulkan pada bulan Desember 2018 menggunakan *consecutive sampling* dengan melibatkan 140 siswa SMP dan SMA. Instrumen yang digunakan adalah *strength and difficulties questionaire* (SDQ) *YR1 version* yang diisi oleh responden. Data dianalisis menggunakan STATA 13. Hasil penelitian didapatkan prevalensi masalah kesehatan mental pada remaja adalah 21%. Aspek penilaian tertinggi berada pada masalah emosional (28%) dan *conducting problem* (21%). Terdapat perbedaan nilai yang siginifikan untuk aspek emosinal dan *conduct problem* antara kelompok laki-laki dan perempuan. Simpulan, masalah kesehatan mental remaja di Kabupaten Bandung sangat besar sehingga dibutuhkan penanganan kesehatan mental remaja di tingkat pelayanan kesehatan primer dan kerja sama dengan sektor lain.

Kata kunci: Kesehatan mental, pelayanan kesehatan primer, remaja

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Correspondence: Susan Fitriyana, dr., M.M.R.S. Department of Public Health, Faculty of Medicine, Universitas Islam Bandung. Jln. Tamansari No. 22, Bandung 40116, West Java, Indonesia. E-mail: susanfitriyananugraha@gmail.com

Introduction

Mental health problems in adolescents became a global concern. The World Health Organization (WHO) estimates that 150 million people worldwide suffered from depression, 25 million people have schizophrenia, and around 20% occurred in adolescents. Globally, suicide ranks number three among causes of death during adolescence, and depression is the top cause of illness and disability.[1,2]

About 10–20% of children and adolescents worldwide experience mental health problems, but only about 10% get medical attention. Lack of health services for children and adolescents mainly occurs in low-income and middle-income countries (LMIC) due to lack of government policy, lack of funding and death of trained medical personnel.[3]

According to the Basic Health Research (*Riskesdas*) 2018, 15–24 years experienced depression as much as 6.4% and mental-emotional disorders as much as 10%. From all the total depressed only about 9% get medical treatment.[4]

World Health Organization defined mental health as a state of well-being in which every individual realizes his or her potential, can cope with the normal stresses of life, can work productively and helpfully, and can contribute community.[5] Mental health disorder is a term that covers a broad range of diseases that can affect personality, thought processes, or social interactions. At a young age, mental health problems can result in health-related disability and have long-term adverse effects on personal life, social, and productivity. Mental health problems at an early age can interfere with educational and career performance in adulthood. If the problem not handled correctly, it will make the problem even more prominent. Early recognizing mental health problems can prevent health problems in adolescents.[3,6]

This study aimed to perform an initial screening of adolescents in Bandung regency, especially in adolescents at school age, to get the magnitude of the problem. The results of this study had presented at the 5th Asean Regional Primary Care Conference in Malaysia.

Methods

This research is a cross-sectional study conducted in Bandung regency. Data collected in December 2018. The sample of this study used consecutive sampling involving 140 students of junior high schools and senior high schools. This study has used a questionnaire (paper-based) distributed to all respondents.

The instrument used in this study was the strength and difficulties questionnaire (SDQ) YR1 version, which filled by respondents independently. SDQ is a rating scale to screen emotional and behavioral problems in children and adolescents aged 4–16 years. SDQ is also a tool to measure the risk of mental disorders in children and adolescents. SDQ assesses five aspects: emotional problems, conduct problems, hyperactivity, peer problems, and prosocial behavior. Prosocial behavior determines the strength of the respondent. Each aspect represented by five questions that distributed randomly.[7–10] Table 1 used to yield of the assessment on SDQ.

The results of the questionnaire were given scoring and divided into normal and abnormal (if the score of each aspect was high, except the prosocial behavior score must be low) categories. The calculation of normal and abnormal proportions made and compared between male and female sexes. Data is processed and analyzed using STATA 13.

The study protocol had approved by the Health Research Ethics Committee of the Faculty of Medicine, Universitas Islam Bandung.

Results

Respondents are junior and senior high school students in Bandung regency, ranging from 11 to 17 years old, amounting to 140 students. Table 2 showed the characteristics of respondents in this study.

In Table 2, respondents were mostly female, with an age range of 15 to 17 years olds. The age of respondents is in the adolescent category.

The five aspects of SDQ divided into two categories, normal and abnormal, as shown in Figure 1. Assessments of at least one aspect of SDQ indicate that 50% experience emotional and behavioral problems, while evaluations of all aspects of SDQ suggest that 21% experience emotional and behavioral issues.

Figure 2 showed the proportions of the assessment in each aspect of SDQ which the highest proportion of assessment is emotional

Table 1 Strength and Difficulties Questionnaire

Self-completed Versions	Close to Average Score*	Slightly Raised Score**	High Score***
Total difficulties score	0–15	16–19	20–40
Emotional symptoms score	0–5	6	7–10
Conduct problem score	0–3	4	5–10
Hyperactivity score	0–5	6	7–10
Peer problem score	0–3	4–5	6–10
Prosocial behavior score	6–10	5	0–4

Note: *this score is close to average—clinically significant problems in this area are unlikely; **this score is slightly raised, which may reflect clinically significant problems; ***this score is high—there is a substantial risk of clinically significant problems in this area

(28%) and conduct problem (21%).

Each aspect of SDQ compared by gender. Figure 3 showed the distribution of each element of SDQ by gender. This study revealed significantly different than the highest SDQ aspect in the female gender is the emotional problem (37%), while the conducting problem in the male gender (30%, $p<0.05$).

Discussion

Knowledge about the prevalence of mental health problems in adolescents is the first step to determine the magnitude of the problem. The prevalence of adolescent mental health problems in this study was 21%. This value is higher than the global prevalence (Kieling et al.,[3] 10–20%) and Malaysia (Gomez and Suhaimi,[11] 5% with 10% in borderline) and in previous studies (Atilola et al.,[12] 7.9%).

Research in Kieling et al.[3] mentions that the majority of mental health problems in adolescents are in low-income and middle-income countries (LMIC). Based on this research the life-long risk factors that cause mental health problems in adolescents at LMIC consist of genetic background, physical health problems and nutritional status in children, physical and psychological health of parents, loss of parents or being orphaned, raised in institutions, deficiency psychosocial environment and educated, exposed to dangerous substances and poisons, violence or being in a conflict or war zone, being in a disaster area and experiencing abuse or neglect.[3,13]

Table 2 Characteristics of Respondents

Characteristics	n=140	%
Gender		
Male	57	41
Female	83	59
Age (years)		
11–14	109	78
15–17	31	22

Risk factors for mental health problems in children and adolescents are multifactorial and run chronically to cause clinical manifestations. Risk factors can arise in every phase of a child's life. During the preconception period, risk factors consist of teenage pregnancy, unwanted pregnancy, inadequate birth spacing, and parenteral consanguinity.[3,13] During perinatal risk factors that arise are insufficient prenatal care, high-risk pregnancy, adaptation to pregnancy or the birth of an inadequate baby and maternal death after giving birth.[3]

Risk factors that arise during infancy or early childhood are that children cannot achieve optimal brain and emotional development in this phase. Stunting, inadequate stimulation, poor care, and home stimulation, iodine and iron deficiency, exposure to violence, HIV/AIDS, malaria, intrauterine growth retardation, or exposure to heavy metals causes inadequate brain and emotional development.[3,14–16] Risk factors that arise at school age (from 5 years to 18 years) are obesity, academic difficulties, school bullying, family dysfunction, physical and sexual abuse, smoking, drinking alcohol and drug use, pathological internet use, and pregnancy in adolescence.[3,17–19]

The highest proportion of scores in this study were in the emotional aspects (28%) and peer problems (21%), while the most top scores in the Gomez study were peer problems and in

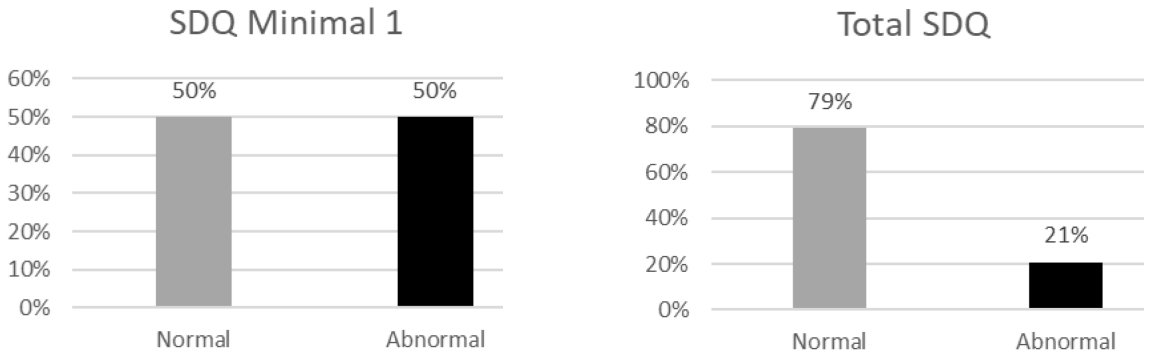

Figure 1 Substantial Risk-based SDQ Total Score versus Minimal 1 Aspect

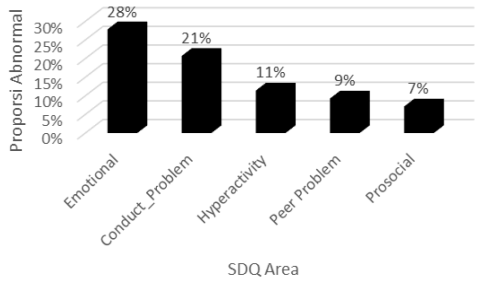

Figure 2 Proportion of Respondent with Substantial Risk per Area

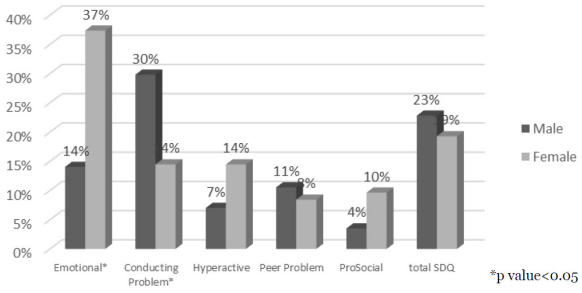

Figure 3 Distribution of SDQ based on Gender

the Arshat research were peer problems and prosocial aspects.[11,20]

Arshat[20] states that family strength influences emotional and behavioral. Teenagers who live in a family environment with open communication have better mental health research conducted in South Africa[21] shows that family disadvantage (caregiver AIDS illness and poverty) has an indirect effect on adolescent mental health. In family, disadvantage increases abusive parenting and mental health distress caregiver, which increases the risk of mental health in adolescents. Research at Atilola et al.[12] states that adolescents who have mental health problems are teenagers who live with single parents or other non-parent caregivers and come from families with lower family affluence scale (FAS) scores. FAS is a self-report questionnaire that provides information about familial wealth indicators using four parameters, including family car ownership, adolescent's bedroom, family ownership of a computer, and family holiday in the previous 12 months.

The United Nations International Children's Fund (UNICEF) defines the family as an essential component to form a residential environment that ensures that the children living in it protected from all forms of adverse social conditions. The family had the most significant influence on children's welfare so that all factors affecting the family could disrupt the welfare of children. Problems that are in the family can cause health problems in adolescents.[12]

Significant value differences between the sexes of male and female are in the emotional aspects and conduct problems. The highest issue in males is the conduction problem, and the most upper item in females is an emotional problem. Women tend to experience more emotional issues because several factors such as genes, hormones (estrogen and progesterone) and also brain structure.[22] This research is in line with previous research conducted by Atilola et al.[12] and other studies that emotional and conduct problems are the most significant burden of mental health among children.

Mental health problems at a young age can result in health-related disability and have long-term adverse effects on personal life, social, and productivity. Early treatment and prevention in primary health care facilities can prevent mental health problems later in life and improve individual well-being and productivity.[3]

Islam believes that health, including mental health, is a fundamental human right. From an Islamic perspective, health determinants consist of faith and worship, behavior, environment, social, genetic, and health services. Islam views the efforts of health services can help prevent disease and restore health conditions.[23]

Primary health care can help prevent mental health problems in every phase of a child's life. Primary health care has a program of antenatal care during the preconception period, giving birth to trained health workers and postnatal care to maintain maternal health during pregnancy, during childbirth, and after delivery. Family planning programs in primary health services can control birth spacing.

During the early childhood, primary health care can prevent mental health problems by optimizing the role of *pos pelayanan terpadu* (*posyandu*) by involving cadres to deal with the causes of mental health problems in the early phase of children's lives. *Posyandu* is a form of community-based health unit formed by the community and has the primary function to help the community, especially mothers and children under five years of age, to maintain and improve their health.[24]

Mental health problems are related to malnutrition in early childhood. One of the posyandu programs that can be adapted to prevent mental health problems in adolescents is by improving nutrition through the administration of Fe tablets. The provision of vitamin Fe to prevent iron-deficiency anemia improves behavior and temperament for children aged 12 months. Children from 6 months to 2 years are susceptible to nutritional deficiencies, especially iron, iodine, folic acid, vitamin A, and zinc. The provision of complementary foods at *posyandu* can help to prevent nutrient deficiencies in children.[3,24]

During the school-aged period, primary health services play a role in screening mental health problems using standardized instruments. This screening program can be carried out periodically by involving the roles of parents and schools. Early diagnosis and prompt treatment prevent the emergence of long-term adverse effects on adolescent life. Many adolescents with mental disorders do not get adequate medical treatment because of a lack of funds, lack of family knowledge about mental illness symptoms, and unfortunate community stigma about people with mental disorders.[5] Optimizing the role of cadres is needed to educate the public so able to increase public knowledge and eliminate the unfortunate stigma of people with mental disorders. Education intervention improved a positive impact on understanding so that it can stimulate perception change and behavior change.[5,24] This change is expected to eliminate barriers for people, especially adolescent, with mental disorders to get the right treatment.

Mental health risk factors consist of various aspects such as family conditions, informal education from parents, and formal education from schools, nutritional status. So, the handling and prevention of mental health need to involve other sectors such as education and social. Early stimulation interventions, integrating nutrition, health, and stimulation programs, attendance at high quality pre-school, and conditional transfers to families have proven to be beneficial for improving children's mental health.[3]

Support from family and school environment is essential to prevent mental health in adolescents. Research conducted by Stadler et al.[25] on students who experienced peer victimization in the school environment stated that adolescents, both boys, and girls, who received support from parents and good schools, had a lower risk of experiencing mental health problems.

A limitation of this study is that the sample was taken in one area and only looked at age and sex factors. We recommend conducting screening in a larger area by including socio-economic aspects, the nutritional status of children, demographic conditions of parents or caregivers, and family functions.

Conclusion

This study concludes that the magnitude of the adolescents' mental health problems in Bandung was enormous. We recommend further screening with broader coverage. Intervention at the primary care level and partnership with another sector (education, social) are needed.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgments

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RESEARCH ARTICLE

Effect of Zilgrei Method and Lumbal Massage Combination on Labor Progress During Latent Phase of First Stage of Labor in Primigravida

Melati Yuliandari,[1] Leri Septiani,[1,2] Roni Rowawi,[1,3] Sri Komalaningsih,[1] Herry Garna[1,4]

[1]Applied Midwifery Master Study Program, STIKes Dharma Husada, Bandung, Indonesia, [2]RSIA Grha Bunda, Bandung, Indonesia, [3]RS Immanuel, Bandung, Indonesia, [4]Department of Child Health, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

Abstract

The first stage of labor starts from the onset of cervical dilatation and divided into latent and active phases. The latent phase is a more prolonged phase of labor, which allows various interventions performed. Interventions and the latent phase's length may lead to anxiety and restlessness, which might contribute to prolonged labor when experienced by women in labor. A combination of the Zilgrei method and lumbar massage used to reduce labor pain. This method combines movement, change of position, breathing exercise, and the light massage performed since the first stage of labor. It expected that the work of interrelated pelvic muscles becomes harmonized; hence, the cervix will be softer, and the uterine muscles may push the fetus towards the birth canal. This study aimed to determine the effect of the Zilgrei method and lumbar massage combination on the latent phase of the first stage of labor progress in primigravida. It is a quantitative quasi-experimental study on 66 women who underwent the latent phase of the first stage of labor in independent practice of midwife the work area of Citarip Public Health Center during May–July 2019, who were divided equally into control and intervention groups. The statistical analysis used was univariate and bivariate analyses with an independent t test. The mean duration of labor in the latent phase of the first stage of labor in the control group and intervention group was 368 minutes and 307 minutes, respectively, with a difference of 61 minutes (p=0.002). Therefore, the Zilgrei method and lumbar massage combination significantly affect labor progress in the latent phase of the first stage of labor in primigravida.

Key words: First stage of labor, latent phase, lumbar massage, Zilgrei method

Pengaruh Kombinasi Metode Zilgrei dan Pemijatan Lumbal terhadap Proses Kemajuan Persalinan pada Primigravida

Abstrak

Kala I persalinan merupakan tahap serviks terbuka yang terdiri atas fase laten dan fase aktif. Fase laten mempunyai durasi persalinan lebih panjang sehingga memungkinkan banyak intervensi. Intervensi dan lama fase laten dapat menimbulkan kecemasan dan kegelisahan, apabila dialami ibu *in partu* dapat menjadi faktor persalinan lama. Kombinasi Metode Zilgrei dan pemijatan lumbal menjadi metode mengurangi rasa nyeri persalinan yang menggabungkan gerakan, perubahan posisi, latihan pernapasan, dan pijatan ringan yang dipersiapkan sejak kala I persalinan. Diharapkan kerja otot panggul saling berkaitan menjadi selaras sehingga serviks tidak kaku dan terdapat potensi otot rahim mendorong janin menuju jalan lahir. Tujuan penelitian ini mengetahui pengaruh kombinasi Metode Zilgrei dan pemijatan lumbal terhadap kemajuan proses persalinan kala I fase laten pada primigravida. Penelitian ini merupakan penelitian kuasi eksperimental kuantitatif pada 66 wanita yang menjalani fase laten persalinan kala I di bidan praktik mandiri (BPM) wilayah kerja Puskesmas Citarip periode Mei–Juli 2019 yang dibagi rata menjadi kelompok kontrol dan intervensi. Analisis statistik menggunakan analisis univariat dan bivariat dengan uji t independen. Durasi persalinan kala I fase laten rerata kelompok kontrol dan intervensi adalah 368 menit dan 307 menit masing-masing dengan selisih waktu 61 menit (p=0.002). Simpulan. kombinasi Metode Zilgrei dan pemijatan lumbal berpengaruh terhadap kemajuan proses persalinan kala I fase laten pada primigravida.

Kata kunci: Fase laten, kala I persalinan, Metode Zilgrei, pemijatan lumbal

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Correspondence: Melati Yuliandari. Applied Midwifery Master Study Program, STIKes Dharma Husada. Jln. Terusan Jakarta No. 71–75, Bandung 40282, West Java, Indonesia. Bumi Sehat Bahagia. Jln. Sukamulya, Bandung 40231, West Java, Indonesia. E-mail: melati.my@gmail.com

Introduction

Cases of prolonged labor, as reported in the Indonesia Demographic and Health Survey (IDHS), increase from 35% in 2012 to 41% in 2017.[1] The incidence of prolonged labor is higher during the early stage of labor that may be caused by, among others, maternal psychological factors such as anxiety, restlessness, fear, and lack of confidence.[2–8] These can increase catecholamine and steroid hormone levels and prevent endorphins' release to stimulate the release of oxytocin.[2,9] Another risk factor for prolonged labor is postpartum bleeding due to fatigue, which leads to less contraction of the uterine muscles.[2,9–13] Medical approaches, especially anesthesiological approaches, have been developed to reduce pain during labor. The method used was intrathecal lumbar analgesia (ILA), lumbar epidural analgesia (LEA), and transcutaneous electrical nerve stimulation (TENS).[4,14] However, there are also nonpharmacological therapies that can reduce labor pain during uterine contractions such as Zilgrei method and lumbar massage.[15–17] The Zilgrei method can be combined with lumbar massage to reduce pain by combining movement, change of position, breathing exercise.[18–22] The light massage performed since the first stage of labor to make the work of interrelated pelvic muscles become harmonized that the cervix will be softer.[23–28] The uterine muscles may push the fetus towards the birth canal.[29]

This study aimed to determine the effect of the Zilgrei method and lumbar massage combination on the latent phase of the first stage of labor progress in primigravida.

Methods

It was a quasi-experimental study using simple experimental design (post-test only control group design). This study conducted in Citarip Public Health Center Bandung from May to July 2019. Participants were randomly selected and assigned into two groups: intervention and control groups, where the participants received a different treatment depending on the group. The intervention group received Zilgrei method and lumbar massage combination and the standardized maternal care as required by the government. In contrast, the control group only received standardized maternal care as required by the government. Participants assigned to their group using the block permutation approach. The first woman visited the clinic who met the criteria was assigned to the intervention group, and the second woman visited the clinic who met the inclusion criteria was assigned to the control group and so on. For each woman in labor who become the respondents, the time needed from the latent phase to the active phase was measured to differentiate the mean duration of labor.[30] The inclusion criteria for this study were primigravida women, women in labor (presenting cervical maturity, regular uterine contractions, cervical depletion) at the latent phase of the first stage of labor with 1 cm cervical dilatation. Also, women at term gestational age (>37–40 weeks), single fetus, alive, intrauterine position, vertex presentation, and fetal heart rate within normal limits (120–160 DPM). The exclusion criteria were women with complications such as hypertension, preeclampsia, heart disease, asthma, diabetes, narrow pelvis, premature rupture of membranes. Also, the fetus with complications such as breech position, transverse lie presentation, fetal distress, hydrocephalus), and women who routinely did prenatal yoga during pregnancy. Drop out in this study was defined as respondent withdrawal from the study when the intervention in progress and the respondent experienced complications or incidents during the labor process (eclampsia, amniotic fluid embolism, fetal distress).

Ethical clearance for this study was obtained from the Health Ethics Committee of Applied Midwifery Master Study Program in STIKes Dharma Husada Bandung with the issuance of the ethical clearance No. 091/SDHB/SKet/PSKBS2/VI/2019.

Results

The characteristics of the two groups were similar that the groups were considered comparable (Table 1).

There was a difference in the mean duration of the first stage of labor between the control and intervention groups, with 368 minutes in the control group and 307 minutes in the intervention group (Table 2). In the intervention group, the mean duration of the latent phase of the first stage of labor was faster than in the control group. The statistical results showed that Zilgrei method and lumbar massage combination

Table 1 Respondent Characteristics

Characteristics	Groups		p Value*
	Intervention (n=33)	Control (n=33)	
Age (years)			0.302
<20	3	1	
20–35	30	32	
Education			0.741
<high school	6	5	
≥high school	27	28	
Occupation			0.084
Employed	12	19	
Unemployed	21	14	

Note: *chi-square test

Table 2 Effects of Zilgrei Method and Lumbar Massage Combination on Labor Progress in Latent Phase of Primigravida First Stage Labor

Groups	Duration of Labor First Stage Latent Phase (mean/minute)	Standard Deviation	p Value*
Control	368	91	0.002
Intervention	307	60	
Differences	61		

Note: *independent t test

affected the latent phase of the first stage of labor in primigravida in labor with a p value of 0.002.

Discussion

The novel aspect of this study was the Zilgrei method and lumbar massage combination of primigravida women in labor who underwent the latent phase of the first stage of labor. Other studies have been performed to see the effect of this combination, albeit for the active phase of the first stage of labor.[15,17,18] The latent phase is the initial stage of labor that can lead to many unnecessary interventions from health workers, especially in the field of obstetrics and gynecology.[19,24,28–30] Unnecessary interventions may create adverse risks to the mother and fetus. According to a study conducted by Kurniawati,[29] interventions performed and the duration of the latent phase of the first stage can cause discomfort and anxiety among women who are in labor and waiting for the labor to progress to the next phase.

The results of this study showed that there were differences in the average duration of labor between the control and intervention groups. The time needed to complete the latent phase and shift to the active phase in the intervention group was 307, while in the control group, it took 368 minutes. There were one hour and the one minute difference in this duration between the two groups. The statistical analysis presented that this difference was significant, meaning that Zilgrei method and lumbar massage combination has a positive effect on cervical dilatation, making it smoother and able to push the fetus into the ideal position by providing comfort to the mother through massaging.

Bolbol-Haghighi et al.[23] stated that massage is an old technique widely used in labor and can reduce pain during childbirth by reducing adrenaline and noradrenaline and increasing endorphins and oxytocin as reducing the duration of childbirth by increasing uterine contractions.

Factors that influence labor include the passage, passenger, power, maternal psychology, and birth attendance.[28,31] In this study, psychology is the part that the researchers focus on supporting the progress of labor. Primigravida women in

labor tend to experience anxiety and restlessness before and during labor. In the intervention group, the Zilgrei method and lumbar massage combination were performed continuously, especially during contraction. It was added with relaxation techniques to make the women in labor feel more relaxed and comfortable during labor.

The finding is consistent with the findings of Wildan et al.[32] that relaxation can increase the release of endorphins, which blocks the transmission of pain stimulus and also stimulates large diameter A-beta nerve fibers. They were reducing the transmission of pain nerve impulses through A-delta small fibers and C nerve fibers. Relaxation aims to reduce stress and provide practical pain relief effects by distracting the mother's attention into the stimulus and ignores the sensation of pain, which can ultimately reduce pain perception.[33]

The combination of the Zilgrei method and lumbar massage into one method to reduce the pain that combines movement, position change, breathing exercises, and light massage performed since the first stage of labor expected to affect the work of interrelated pelvic muscles.[18–22] They will work harmoniously to soften the cervix and creates a potential of the uterine muscles to push the fetus towards the birth canal.[23–29]

As shown in the study conducted by Nurrochmi et al.,[15] the average length of the first phase of labor among women receiving the Zilgrei method and endorphin massage was is much shorter (162.13 minutes). The administration of the Zilgrei method and endorphin massage combination intervention is effective in accelerating the first stage of labor.

The findings were similar to Puspitasari and Ernawati[20] on the benefits of strengthening abdominal muscles and lumbar massage to accelerate labor during the first stage of labor. It is because lumbar massage increases the oxytocin receptor, which causes the quality of uterine contractions to be adequate, impacting the speed of labor.[18] The average length of the first stage of labor before treatment and after treatment shows a difference of 18.74 minutes. The average time required for every cm cervix dilatation is faster after treatment.[20]

According to Bolbol-Haghighi et al.,[23] massage therapy during labor will shorten the duration of the first and second stages of labor and increase the Apgar score in the first and fifth minutes with a p value of 0.004. A study conducted by Hosseini et al.[18] stated that massage therapy increases labor and plasma cortisol levels that accelerate the progress of the initial labor process, as seen in 30 respondents.

Mother care approach is a form of care that focuses on the psychology of women in labor during the childbirth process.[34] It respects the wishes, nutritional needs, and freedom to determine the position and movement so that delivery can be smooth. A study conducted by Yani and Wulandari,[35] stated that the mother care approach affects labor duration because it supports women during labor.

A total of 33 respondents who received the Zilgrei method and lumbar massage combination felt comfortable, and the pain reduced when lumbar massage performed accompanied by the Zilgrei position. Zilgrei position and massage are beneficial in the early stage of the labor process to prevent health workers' unnecessary interventions.

Conclusion

Zilgrei method and lumbar massage combination affect the progress of labor in the latent phase of the first stage of labor in primigravida.

Conflict of Interest

There is no conflict of interest at all authors.

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RESEARCH ARTICLE

Decompression and Posterior Stabilization Spine Tuberculosis Surgical Treatment via Transpedicular Approach: a Retrospective Study

Agus Hadian Rahim,[1] Ahmad Ramdan,[1] Abdul Kadir Hadar,[1] Arnold David Pardamean,[1] Doddy Putra Pratama Sudjana[1]

[1]Department of Orthopaedics and Traumatology, Faculty of Medicine, Universitas Padjadjaran/ Dr. Hasan Sadikin General Hospital, Bandung, Indonesia

Abstract

Clinical intervention has a central role in the outcome of spondylitis tuberculosis cases. Surgical procedures indicate to prevent neurological collapse, preservation of stability, and early mobilization. The study aims to analyze the outcome of surgical intervention in spinal tuberculosis by using a transpedicular approach. This research was a retrospective study on the Department of Orthopaedics and Traumatology in Dr. Hasan Sadikin General Hospital, Bandung, Indonesia, during 2016–2018. There were 64 subjects in this study; 35 were male, and 29 were female, ages ranged 21–60 years with a follow-up period of 12 months to 18 months. A more common site of tubercular lesion was at the thoracal lesion (44%). In this research, the patients were preoperatively categorized by the American Spinal Injury Association (ASIA) Impairment Assessment. Among them four were ASIA-A, 10 were ASIA-B, 30 were ASIA-C, 15 were ASIA-D, and five were ASIA-E. After the operative procedure, two patients were ASIA-B, five patients were ASIA-C, 17 patients were ASIA-D, and 40 were ASIA-E. Maximum patients (62%) had bony fusion grade 1. Greater than 80% of subjects had a satisfactory result. In conclusion, posterior decompression and preservation of stability with transpedicular fusion are an excellent surgical way of posterior lumbar spinal tuberculosis treatment.

Key words: Kyphotic angle, transpedicular decompression, tuberculosis

Tindakan Operasi Dekompresi dan Stabilisasi Posterior Melalui Pendekatan Transpedikular pada Tuberkulosis Tulang Belakang: Studi Retrospektif

Abstrak

Tindakan medis berperan penting pada manajemen akhir kasus tuberkulosis tulang belakang. Prosedur operasi dilakukan untuk mencegah perburukan defisit neurologis, menjaga kestabilan tulang belakang, dan mobilisasi dini. Tujuan penelitian ini adalah menganalisis luaran hasil tindakan operatif pada tuberkulosis tulang belakang dengan pendekatan transpedikular. Penelitian ini merupakan studi retrospektif pada Departemen Orthopaedi dan Traumatologi RSUP Dr. Hasan Sadikin, Bandung, Indonesia, periode tahun 2016–2018. Terdapat 64 subjek dalam penelitian ini yang terdiri atas 35 laki-laki dan 29 perempuan, serta usia berkisar 21–60 tahun dengan masa tindak lanjut 12–18 bulan. Pada penelitian ini, lesi tuberkuler paling banyak terjadi di regio torakal (44%). Subjek penelitian dikategorikan menurut *Impairment Assessment* dari American Spinal Injury Association (ASIA). Preoperatif terdapat empat pasien ASIA-A, 10 pasien ASIA-B, 30 pasien ASIA-C, 15 pasien ASIA-D, dan lima pasien ASIA-E. Setelah tindakan operasi terdapat dua pasien ASIA-B, lima pasien ASIA-C, 17 pasien ASIA-D, dan 40 pasien ASIA-E. Mayoritas pasien memiliki fusi tulang grad 1 (62%). Lebih dari 80% subjek penelitian menyatakan puas setelah operasi dilakukan. Simpulan, tindakan operatif dekompresi dan stabilisasi dengan fusi transpedikular merupakan metode yang unggul dalam manajemen tuberkulosis tulang belakang.

Kata kunci: Dekompresi transpedikular, sudut kifotik, tuberkulosis

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Correspondence: Arnold David Pardamean, MD. Department of Orthopaedics and Traumatology, Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital. Jln. Pasteur No. 38, Bandung 40161, West Java, Indonesia. E-mail: arnolddavid17845@gmail.com

Introduction

Osseous tuberculosis (TB) comprise about 50% of all cases of skeletal tuberculosis.[1] Osseous tuberculosis rates approximately 15–38% of extrapulmonary tuberculosis and 1–5% of TB cases.[2]

Spinal tuberculosis was initially described by Sir Percival Pott (1779) as an aching gibbus accompanied by the paraplegic condition.[3] Any part of the spinal column may be affected by tuberculosis, but most cases are commonly found in the lower thoracic and thoracolumbar regions. The order of frequency has been dorsal (42%), lumbar (26%), dorso-lumbar (12%), cervical (12%), and sacral (3%).[1]

Anti-TB drugs promote the healing of patients.[4] They may succeed in treating spine TB if there is no disease complexity or limited to the vertebrae.[2] The most popular protocol for anti-TB chemotherapy is to use isoniazid (INH), rifampicin (R), pyrazinamide (Z), and ethambutol (E) oral drugs for the first two months followed by a maintenance phase of rifampicin and isoniazid for six, nine, twelve, or eighteen months.[5,6]

The essential surgical procedure is spinal cord decompression by eliminating the necrotic tissue, voiding of any pus, and followed by immobilization. The infected spine is susceptible to deformity so that we must preserve the stability.[6,7]

There are four indications in determining surgical intervention. Those are intractable pain with abscess formation and marked bone destruction, neurological deficit related to severe kyphosis, retropulsion bone, or disc, neurological deteriorate, and progression of kyphotic angle.[7,8] The study aims to analyze the outcome of surgical intervention in spinal tuberculosis by using a transpedicular approach.

Methods

It is a retrospective study at the Department of Orthopedics and Traumatology of Universitas Padjajaran, in Hasan Sadikin General Hospital, Bandung, Indonesia. The subjects were 64 having spondylitis TB in the thoracic and lumbar regions. They received decompression posteriorly and fusion by transpedicular screws and rods. Among them, 35 were male, and 29 were female, age ranged from 21–60 years with a follow-up period of 12 months to 18 months.

One surgeon operated all subjects—the posterior midline approach used in all cases. Pedicle screws set down by the C-arm fluoroscopic procedure, two levels beyond and beneath the lesion. If the superior part of the spinal column was excellent, the affected spinal column incorporated in the instrumentation. Temporary stabilization of the spine was done by connecting the pedicle screws on the left side to prevent collapse during debridement and permit a transpedicular procedure from the right one. Laminectomy was done on the affected level focusing on the infected tissues, pus, sequestrum, and disc through the transpedicular approach. All Screws connected with the connecting rods. After all, the wound was closed by suturing.

In this research, the subjects preoperatively categorized by the American Spinal Injury Association (ASIA) Impairment Assessment (Table 1).[9] Among them, four were ASIA-A, ten were ASIA-B, 30 were ASIA-C, 15 were ASIA-D, and 5 were ASIA-E. After the operative procedure, two patients were ASIA-B, five patients were

Table 1 American Spinal Injury Association (ASIA) Impairment Assessment Tools

Grade A	Complete. The function of motoric and sensory is not preserved in the sacral segments S4–S5.
Grade B	Incomplete. Sensory but not motoric is conserved below the neurologic level, including the sacral segments S4–S5.
Grade C	Incomplete. Motoric is conserved distal the neurologic level, and more than half of key muscles below the neurologic level have a muscle grade lower than 3.
Grade D	Incomplete. Motoric is conserved distal the neurologic level and at least half of key muscles below the neurologic level have a muscle grade of 3 or upper
Grade E	Normal. Functions of motor and sensory are normal.

Source: Roberts et al.[9]

ASIA-C, 17 patients were ASIA-D, and 40 patients were ASIA-E.

Inclusion criteria were 1) all patients were having spinal tuberculosis of the thoracic or lumbar region, 2) paraplegic vertebral spine, 3) instability of spinal TB, and 4) age between 21–60 years.

Exclusion criteria were 1) pre-destructive stage of spondylitis TB, 2) spinal TB, which response to anti-TB chemotherapy within 3–4 weeks, and 3) spondylitis TB took place in the cervical region.

Ethical approval for this study has obtained from the Health Research Ethics Committee of Dr. Hasan Sadikin General Hospital Bandung with the letter number: LB.04.01/A05/EC/365/XII/2016.

Results

Socio-demographic variables, including distribution of clinical presentation, lesion, and level of involvement, are presented in Table 2.

Modified Macnab criteria evaluated postoperative clinical outcome.[9] Among 64 patients, 48 (75%) cases were excellent, 9 (14%) cases were good, 6 (9%) case was fair, and 1 (2%) case was poor. The overall result was assessed by grading satisfactory (excellent and good) 57 (89%) cases and unsatisfactory 7 (11%) cases.

Discussion

Spondylitis TB usually occurs at first for three decades.[10] In this research, the subjects' age varied from 20–60 years, most within 21–30 years. Here 55% of cases were male, and 45% of cases were female.

This study showed that most of the clinical finding was a pain (31%) followed by gibbus (23%), weakness (14%), paraplegia (13%), spinal deformity (9%), the difficulty of walking (5%) and stiffness (2%). A study done by Polley and Dunn[11] revealed 53% of subjects had back pain, and Garg et al.[12] also reported that spinal TB's clinical features were localized pain, tenderness, stiffness, cold abscess, gibbus, and prominent spinal deformity. According to Issack and Boachie-Adjei,[13] surgery should be considered when a kyphotic angle is more than 500. In childhood, the vertebral destruction was more accentuated and progressive than in adults, where kyphosis is stable after healing.[14]

Regarding the distribution of lesion, 44% were thoracal, 37% were lumbar, and 19% were thoracolumbar. Research from Godlwana et al.[15] reveals that the thoracal region was involved in 42% of cases, the lumbar region in 30% of cases, and the dorso-lumbar in 10% cases. In this research, the preoperative kyphotic angle was compared with postoperative follow up. All patients showed a decrease in kyphotic angle in

Table 2 Distribution of Age, Sex, Occupation, Clinical Presentation, Lesion, and Level of Involvement

Variables	n=64	%
Age (years)		
<20	5	8
21–30	25	39
31–40	15	23
41–50	14	22
51–60	5	8
Sex		
Male	35	55
Female	29	45
Occupation		
Day laborer	20	31
Shopkeeper	3	5
Serviceman	5	8
Businessman	4	6
Housewife	15	23
Farmer	12	19
Jobless	5	8
Clinical presentation		
Weakness	9	14
Gibbus	15	23
Pain	20	31
Weight loss	2	3
Stiffness	1	2
Paraplegia	8	13
Kyphoscoliosis	6	9
Difficulty in walking	3	5
Lesion		
Thoracal	28	44
Lumbal	24	37
Thoracolumbar	12	19
Level of involvement		
Th9–Th10	6	9
Th10–Th11	2	3
Th11–Th12	20	31
Th12–L1	12	19
L1–L2	4	6
L2–L3	4	6
L3–L4	6	9
L4–L5	10	16

Table 3 Pre- and Postoperative Kyphotic Angle, Pre- and Postoperative ASIA Grade, Postoperative Complications, and Posterior Fusion Grades

Variables	n=64	%
Preoperative kyphotic angle		
≤10°	5	8
11–20°	15	23
21–30°	28	44
31–40°	10	16
≥40°	6	9
Postoperative kyphotic angle		
≤10°	50	78
11–20°	10	16
21–30°	4	6
31–40°	0	0
≥40°	0	0
Preoperative ASIA grade		
Grade A	4	6
Grade B	10	16
Grade C	30	47
Grade D	15	23
Grade E	5	8
Postoperative ASIA grade		
Grade A	0	0
Grade B	2	3
Grade C	5	8
Grade D	17	27
Grade E	40	62
Posterior fusion grade		
Grade 1	40	62
Grade 2	15	23
Grade 3	8	13
Grade 4	1	2

the final follows up.

At the time of the surgery should be done, accompanying medical drugs are essential.[16] The approach for the surgical procedure of tuberculosis TB has always been debatable. The approach for vertebral TB surgery may be anterior fusion, combined anterior-posterior approach, posterior approach, or extrapleural approach.[17] Instrumentation in spondylitis TB is the latest idea. Vanti et al.[18] analyzed the attachment function of *Mycobacterium tuberculosis* bacteria to stainless steel and supposed that attachment was insignificant. The application of implants in spondylitis TB patients may be safe.

In 1960, AR Hodgson said that the anterior approach had been considered the primary procedure for treating Pott's tetraplegia because it permits an excellent exposure to debride the infected tissue.[12,19–21] It also gives an excellent zone for fusion.[21] Empirical and rational thinking had long been used an anterior surgical approach to drain out an abscess. It is also used to excise the abnormal tissues, decompress the neural component, give a bone graft, get a rigid union, and reduce disease recurrence.[22] Many surgeons favor the anterior approach as it discerns the lesion and permits a sight for debridement. Many studies have demonstrated a high corrective rate of deformity and maintenance using anterior instrumentation in active thoracolumbar tuberculosis.[23–29] However, the anterior surgical procedure has many disadvantages, such as extended time immobilization, a progression of kyphotic angle, and graft failure.

The posterior transpedicular surgical procedure is an efficient way to preserve stability and promote healing.[20] This approach could prevent kyphotic angle worsening and graft problems.[12] The credible reason for this may be that pedicle screws inserted through the pedicle, the most substantial component of the vertebral body, giving three-dimensional build up and reinforcing the three Dennis column stability, which is more potent than anterior instrumentation.[17] The security provided by posterior fixation, particularly transpedicular fixation, protects the vertebral correction, and patients can return to normal activities within a brief interval of time.[30] Transpedicular screws could be set down at an affected vertebra if the superior part of the spinal column was in a good state, allowing lowering the surgical exposure and the area of fixation. Since the approach is extrapleural, this approach can also be used in patients with low lung reserve, which is a contraindication for the anterior approach. The posterior approach also has less bleeding as compared to the anterior approach.

The transpedicular fixation also decreases the morbidity and gives satisfactory clinical results by shorter operative duration, early mobilization, and perfect exposure for the decompression.[21,31] In this study, postoperative state 3% were ASIA grade B, 8% were ASIA grade C, 27% were ASIA grade D, and 62% were ASIA grade E. This variance was statistically remarkable. In respect to the posterior fusion, grade I fusion was found in 62%, grade II fusion in 23% and grade III fusion in 13%, and grade IV fusion in 2% case.

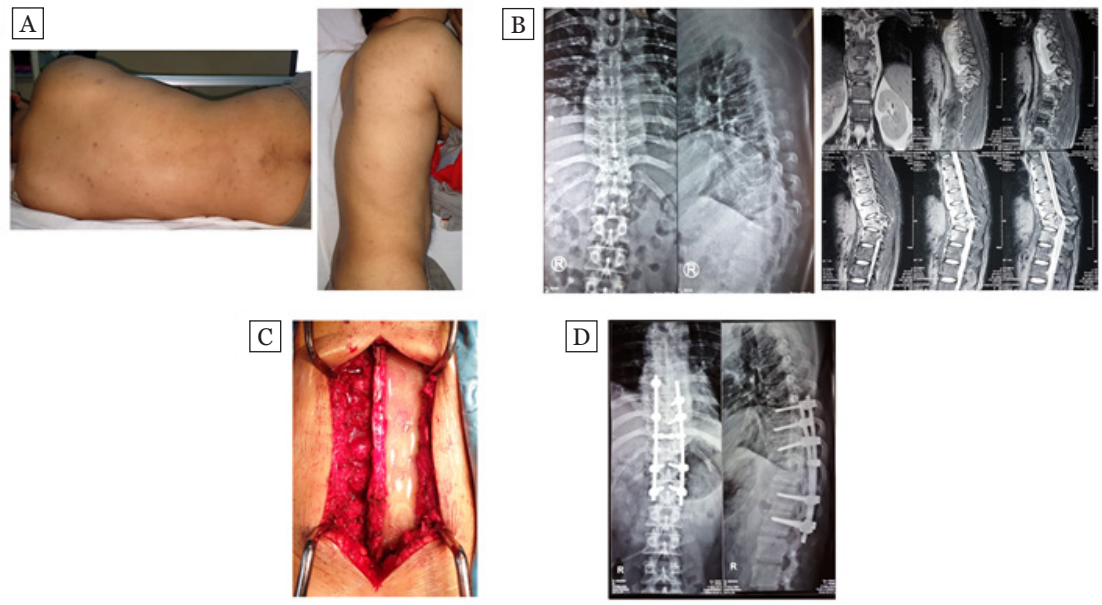

Figure A. A 32-years-old Labor with Gibbus Deformity. On Admission, He Had ASIA Scale Grade D. B. Radiologic View of Vertebral Th6–Th11 Showed a Paravertebral Mass with 48° Kyphotic Curve. C. Intraoperative: Abscess, Necrosed Tissue, and Cord Compression were Found. D. Kyphotic Angle Postoperatively was 21°

Our result is unvarying compared to Sahoo et al.[32] Posterior fusion was recorded in 55% of subjects, and neurological improvement happened in 94% of subjects. All subjects alleviated of pain, with the last VAS score ranging from 0 to 2. The disadvantage of the posterior approach is that debridement is not direct exposure. The posterior approach also requires the fixation of more vertebrae as compared to the anterior approach.[5]

Regarding the subjective assessment of this series, it was observed that (75%) patients had excellent functional outcome, 14% patients had good, 6 (9%) patients had fair, and 1 (2%) patients had a poor functional outcome. In this study, overall, a satisfactory (excellent and good) result was found in 57 (89%) patients and unsatisfactory (fair and poor) effect in 7 (11%) patients.

Conclusion

The operative procedure is the pillar of treatment along with chemotherapy for advanced cases. The posterior transpedicular approach gives long-term neurological improvement. Because the pathology is on anterior, excellent stability via the posterior elements could be achieved. It also gives excellent exposure for decompression and offers the surgery instrumentation to be extended for multiple levels beyond and beneath the lesion level. Furthermore, it corrects sagittal alignment and attains the goals for treating spondylitis TB.

Conflict of Interest

All authors have nothing to disclose.

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