

ORIGINAL ARTICLE

The effect of health education in improving the knowledge and attitudes of integrated service post cadres about early detection of high-risk pregnancies in the working area of the Mamajang health center, Makassar city, Indonesia

AYU BELLA FAUZIAH¹, APIK INDARTY MOEDJIONO², MASNI²,
ARIFIN SEWENG², SUKRI³ and HEALTHY HIDAYANTY⁴

¹Student Reproductive Health Concentration of Faculty of Public Health, Hasanuddin University, Makassar;

²Reproductive Health Concentration, Master in Public Health Study Program Faculty of Public Health, Hasanuddin University, Makassar; ³Department of Health Policy Analysis, Faculty of Public Health, Hasanuddin University, Makassar; ⁴Department of Nutrition, Faculty of Public Health, Hasanuddin University, Makassar, Indonesia

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Abstract. Maternal mortality can be reduced by strengthening the process of early detection of high-risk pregnancies. However, the lack of knowledge related to high-risk pregnancy is still an obstacle. This study aims to analyze the effect of health education on the knowledge and attitudes of cadres about early detection of high-risk pregnancy in the working area of Health Centre Mamajang Makassar City. Experimental research with a pretest posttest design with a control group, involving 80 cadres spread across 20 Integrated Service Posts who were divided into four treatment groups. There was an increase in mean knowledge between the intervention group ($P=0.000$) and the control group ($P=0.002$). There was also an increase in attitude between the intervention group ($P=0.000$). However, there was no improvement in attitude ($P=0.475$) in the control group. The intervention group through combined video+booklet had the highest mean knowledge score (6.65-13.90) than the groups that received intervention through video (6.60-12.69) or booklet alone (6.75-12.07), respectively. On attitude, the highest average attitude score in the intervention group was the combined video+booklet group (22.0-35.8), video (21.22-34.65) and booklet alone (22.25-34.55). While the average score of the control group on knowledge (6.00-6.95) and attitude (22.60-23.05). The role of health education by

involving a combination of both video and booklet media is appropriate as an effort to influence Integrated Service Post cadres in increasing knowledge and attitudes about the early detection of high-risk pregnancies.

Introduction

World Health Organization [1] has reported that nearly 810 women die every day from complications that occur during pregnancy and childbirth. In 2017 alone, there were 295,000 maternal deaths that occurred during pregnancy and after delivery, with approximately 94% of all maternal deaths occurring in middle- and low-income countries (1). Based on data from the *Gates Foundation* in 2021, the estimated global maternal mortality rate is 158.8 per 100,000 live births, an increase from 157.1 deaths per 100,000 live births in 2020 (2). According to a joint report from several international organizations, the maternal mortality rate from 2000 to 2017 continued to decline by 38%, from 342 deaths to 211 deaths per 100,000 live births. This means that there is an average decrease of about 2.9% per year, which is still insufficient to achieve the *Sustainable Development Goals* target in 2030 to 70 per 100,000 live births. Maternal mortality is a common health problem in low-resource countries and is largely preventable. Sub-Saharan Africa and Southern Asia alone accounted for 86% or about 254,000 of the total estimated global MMR in 2017, with about two-thirds of maternal deaths occurring in Sub-Saharan Africa and one-fifth in Southern Asia (3).

In Southeast Asia, the maternal mortality rate is 109 per 100,000 live births, with Laos, Myanmar and Indonesia topping the list with 183, 170 and 166 per 100,000 live births respectively (4). Data from the Indonesian Health Profile in 2020, the maternal mortality rate has fluctuated from 1991 to 2015. The number of maternal deaths collected based on the Ministry of Health's documentation in 2020 shows 4627 deaths. This shows

Correspondence to: Ayu Bella Fauziah, Student Reproductive Health Concentration of Faculty of Public Health, Hasanuddin University, Makassar, Indonesia
E-mail: ayubellafauziah@gmail.com

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that there was an increase of 406 deaths from 2019. MMR in South Sulawesi Province was recorded at 144/100,000 KH in 2019, decreasing to 133/100,000 in 2020 (5).

Research conducted by Parmawati *et al* (6) showed that cadres can play a major role in improving maternal and child health by helping to monitor and conduct early detection of pregnancy complications (6). To maximize the role of cadres, it is necessary to increase the competence of cadres in detecting pregnancy complications, especially in high-risk pregnancies (7).

Seeing the significant role of Integrated Service Post cadres based on several previous studies, it is necessary to increase the knowledge of Integrated Service Post cadres regarding early detection of high-risk pregnancies which requires health education-based efforts. Research conducted by Suarayasa *et al* (7) shows that the household-based ANC monitoring model through assistance by students or cadres is quite effective in improving ANC standards and early detection of high-risk pregnancies. With the increase in ANC standards, early detection of high-risk pregnancies will increase along with maternal compliance to conduct ANC according to predetermined standards and the effective role of students or cadres in mentoring pregnant women is very positive (8). Other research shows that health education can increase the motivation of cadres in conducting early detection of high-risk pregnancies which in turn can reduce the risk of emergencies in mothers and fetuses. Education related to antenatal care is needed for pregnant women and cadres. Education accompanied by creative and innovative methods is directly proportional to increasing the awareness of cadres and the general public about the importance of ANC and early detection of high-risk pregnancies. Optimizing the role of cadres, involving various educational media, and comprehensive efforts from cadres and health workers are expected to encourage maximum early detection of high-risk pregnancies (8). Health education itself is inseparable from the way of delivery and the methods or props used (9).

Preliminary studies conducted at Health center Mamajang Makassar City on the knowledge of 21 Integrated Service Post cadres related to high risk pregnancy showed that 90% of cadres had insufficient knowledge. Knowledge of Integrated Service Post cadres regarding the danger signs of pregnancy also showed similar results, where 81% of cadres had poor knowledge. Most (81%) Integrated Service Post cadres did not know the functions and duties of cadres as partners of health center in detecting high-risk pregnancies. Regarding the use of health education media, 61.9% of Integrated Service Post cadres chose a combination of video and booklet media, 23.8% of cadres chose video media and 14.3% chose only booklet media.

Destination. This study aims to determine the effect of health education media on the knowledge and attitude of Integrated Service Post cadres towards early detection of high-risk pregnancies and to select the best health education media.

Materials and methods

The type of research used is pseudo-experimental research with a Nonequivalent pretest-posttest with control group design, where its application involves four groups, two

experimental groups and one control group. Determination of the sample size is based on the type of comparative analytic research, >2 unpaired groups, numerical scale, so using the following formula:

$$n = \frac{2\delta^2(Z\alpha + Z\beta)^2}{(\mu_1 - \mu_2)^2}$$

From the results of the above calculations, the number of samples is 20 subjects for each group, so that the total sample needed in this study is 80 respondents.

Research implementation. A total of 80 respondents divided into four groups participated in the pre-test assessment. A pre-test questionnaire was administered covering basic characteristics of the study population, with questions relating to knowledge and attitudes towards early detection of high-risk pregnancies.

Health education through video, booklet and combined video and booklet media were used as intervention materials for the four intervention groups. Each session lasted one hour and was conducted during the four weeks of the study. Topics covered included the definition of high-risk pregnancy, pregnancy danger signs, and complications in pregnancy in the first-third trimester.

The effect of the intervention was evaluated immediately after the second intervention in the fourth week using the same questionnaire as the pre-test questionnaire. To determine the effect of educational interventions on each group, the *Wilcoxon* test was used and to determine whether there was a difference between groups, the Kruskal-Wallis test was used.

Ethical considerations. Ethical clearance and approval to conduct this study was obtained through the Ethics Institute of the Faculty of Public Health, Hasanuddin University, Makassar with number: 1021/UN4.14.1/TP.01.02/2023. Ethical considerations take into account the personal and revealing nature of the research, which requires voluntary or informed consent, using a consent form designed for this study, needs to be obtained from participants. Prior to administration of the questionnaire, the aims and objectives and written informed consent were obtained.

Confidentiality and anonymity were ensured throughout the conduct of the study as participants were not required to disclose personal information on the questionnaires. Provisions were made for participants' concerns relating to the study to be addressed and misunderstandings corrected. participants were informed that their participation was voluntary and that they could withdraw from the study at any time if they wished to do so.

Results

Characteristics respondents. Most respondents in all four groups were in the age range of 31-40 years, up to 80% of respondents had a high school education and more than 80% were unemployed. Similarly, in the characteristics of the length of time being a cadre, no respondent has been a cadre for less than 1 year, about 60% of respondents have been a cadre for at least 2 years. The distribution of respondents who actively participated

Table I. Distribution of respondents based on socio-demographic characteristics in intervention and control groups.

Characteristics	Category	Respondent Group							
		Intervention I (Video+Booklet)		Intervention II (Video)		Intervention III (Booklet)		No Intervention	
		N	%	N	%	N	%	N	%
Age (year)	31-40	8	40	4	20	5	25	6	30
	41-50	11	55	14	70	13	65	12	60
	>50	1	5	2	10	2	10	2	10
Total		20	100	20	100	20	100	20	100
Education	Elementary (SD-SMP)	3	15	4	20	3	15	6	30
	Intermediate (SMA)	17	85	16	80	17	85	14	70
Total		20	100	20	100	20	100	20	100
Employment Status	Not Working	18	90	18	90	19	95	16	80
	Work	2	10	2	10	1	5	4	20
Total		20	100	20	100	20	100	20	100
Length of time as a cadre	1 year	2	10	6	30	0	0	8	40
	2 years	13	65	10	50	16	80	11	55
	>3 years	5	25	4	20	4	20	1	5
Total		20	100	20	100	20	100	20	100

Source: Primary Data, 2022.

in Integrated Service Post activities varied, with intervention groups I and II having 100% active participation, while group III and group IV had 90 and 95% of cadres active in Integrated Service Post activities, respectively. None of the respondents in the four intervention groups had received or attended training or counseling related to early detection of high-risk pregnancies.

Effect of health education intervention on respondents' knowledge. Table I shows that the average knowledge score increased, where the highest increase was in intervention group I (video + booklet) (Pretest 6.65 to 13.90 at Posttest) with a difference in increase (Δ) of 7.25 (12.9%) and the lowest in intervention group III (Booklet) (Pretest 6.75 to 12.07 at Posttest) with a difference in increase (Δ) of 4.32 (11.07%). The results of the *Kruskal Wallis* Test explained that there were significant differences between the treatment groups before and after being given health education interventions $p < 0.05$ in groups I (Video + Booklet), II (Video), and III (Booklet), which means that there is an effect of providing health education interventions on increasing cadres' knowledge about early detection of high-risk pregnancies.

Table II also shows an increase in the pretest score of 6.00 to 6.95 in the posttest of the control group with a difference in improvement (Δ) of 0.95 (5.95%). The results of the *Kruskal Wallis* test explain that there is a significant difference between the control group at *pretest* and *posttest* $p < 0.05$, which means that there is an increase in the knowledge of Integrated Service Post cadres even though they are not given health education interventions on early detection of high-risk pregnancies.

In the results of further tests (Wilcoxon Test) showed a significant difference in each group, namely $\rho_1 = 0.000$ in the Booklet + Video and Video groups, $\rho_2 = 0.000$ in

the Booklet + Video and Booklet groups, $\rho_3 = 0.002$ in the Booklet + Video and Control group, $\rho_4 = 0.000$ in the Video and Booklet group, $\rho = 0.002_5$ in the Video and Control group, $\rho_6 = 0.002$ in the Booklet and Control group.

Effect of health education intervention on respondents' attitudes. Table III explains that the average attitude score increased, where the highest increase was in intervention group I (Video + Booklet) (Pretest 22.0 to 35.85 at Posttest) with a difference in increase (Δ) of 13.85 (34.85%) and the lowest in intervention group III (Booklet) (Pretest 22.25 to 34.55 at Posttest) with a difference in increase (Δ) of 12.3 (33.55%). The results of the *Kruskal Wallis* test explain that there is a significant difference between the treatment groups before and after being given a health education intervention $p < 0.05$ in groups I, II, and III, which means that there is a difference in the attitude of Integrated Service Post cadres between groups before and after being given a health education intervention on early detection of high risk pregnancy.

Table III also explains the increase in the average score on the pretest, which is 22.60 to 23.05 on the posttest of the control group with a difference in improvement (Δ) of 0.45 (22.05%). The results of the *Kruskal Wallis* test explain that there is no significant difference in attitude between the control group at *pretest* and *posttest* $p > 0.05$, which means that there is no difference in the attitude of Integrated Service Post cadres in the control group who are not given health education interventions on early detection of high risk pregnancy.

In the results of further tests (Wilcoxon Test) showed a significant difference in each group, namely $\rho_1 = 0.000$ in the Booklet + Video and Video groups, $\rho_2 = 0.000$ in the Booklet + Video and Booklet groups, $\rho_3 = 0.475$ in the

Table II. Effect of health education intervention on knowledge of integrated service post cadres in the intervention group and control group at Mamajang Health Center in 2022.

Variables	Group								ρ ^a
	Video+Booklet		Video		Booklet		Control		
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	
Knowledge									0,000
Min	5	12	4	10	5	10	4	6	
Max	8	15	8	14	8	14	7	8	
Mean ± SD	6,65±0,813	13,90±0,852	6,60±1,095	12,69±0,988	6,75±0,851	12,07±3,203	6,00±2,303	6,95±2,502	
Difference	7,25 (12,9)		6,09 (11,69)		4,32 (11,07)		0,95 (5,95)		
in Increase									
(Δ) (%Δ)									
ρ ^b	0,000		0,000		0,000		0,002		
			ρ ₁ =0.000		ρ ₂ =0.000		ρ ₃ =0.002		
					ρ ₄ =0.000		ρ ₅ =0.002		
							ρ ₆ =0.002		

^aKruskal Wallis test; ^bWilcoxon test. Source: Primary Data, 2022.

Table III. Effect of health education intervention on the attitude of integrated service post cadres in the intervention group and control group at Mamajang Health Center in 2022.

Variables	Group								ρ ^a
	Video+Booklet		Video		Booklet		Control		
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	
Attitude									0,000
Min	15	30	15	28	17	28	16	18	
Max	25	39	26	38	26	39	25	29	
Mean ± SD	22,0±2,734	35,85±2,519	21,22±3,066	34,65±2,834	22,25±2,33	34,55±3,203	22,60±2,303	23,05±2,502	
Difference	13,85 (34,85)		13,43 (33,65)		12,3 (33,55)		0,45 (22,05)		
in Increase									
(Δ) (%Δ)									
ρ ^b	0,000		0,000		0,000		0,475		
		ρ ₁ =0.000							
					ρ ₂ =0.000		ρ ₃ =0.475		
					ρ ₄ =0.000		ρ ₅ =0.475		
							ρ ₆ =0.475		

^aKruskal Wallis test; ^bWilcoxon test; Source: Primary Data, 2022.

Booklet+Video and Control group, $\rho_4=0.000$ in the Video and Booklet group, $\rho_5=0.475$ in the Video and Control group, $\rho_6=0.475$ in the Booklet and Control group.

Discussion

Knowledge. Changes in knowledge occur due to stimulus through health education involving media and methods

developed according to the needs of respondents. In this case, the video media used contains information related to early detection of high-risk pregnancies that can be used as a guide to answer the questions asked in the test. Audiovisual media such as videos are media that combine the ability of the senses of hearing and vision simultaneously, so that when the senses are involved in the process of receiving information, the individual's opportunity to receive and digest information (10).

As a determining factor in the success of health education, media has an important role in presenting information that is interesting and fun. Various studies have shown that a series of pictures and words when combined will be more effective in retaining memories than using pictures or words alone, respondents' knowledge increased after being given health education using audio-visual media (11,12). A study in Nigeria, shows that without health education, maternal knowledge related to high-risk pregnancy is still low. So that health education using videos or booklets or both will be very helpful in increasing the knowledge of mothers and Integrated Service Post cadres related to high-risk pregnancy (13).

In line with other studies that concluded that there was an effect of counseling through booklet media on cadre skills and increased knowledge of pregnant women and husbands in early detection of high-risk pregnancies in pregnant women, where a P value=0.000 was obtained (14). Furthermore, cadre knowledge related to health information is also influenced by the level of cadre education, where cadres with adequate education will have a significant impact on ideal health decision making in line with a good level of cadre knowledge (15).

Attitude. Based on theory, attitude is a person's closed response to a certain stimulus or object, which already involves the opinion and emotion factors concerned. Newcomb, one of the social psychologists, stated that attitude is a readiness or willingness to act (16). Providing education to pregnant women is one way to increase the knowledge and understanding of pregnant women by instilling cognitive understanding so that it is expected that there will be a change in attitude towards a more positive direction in this case towards early detection of high-risk pregnancies which will ultimately lead to changes in health behavior.

This study is in line with previous research which shows that providing education using a combination of media (booklet & audiovisual) is proven to be influential in improving respondents' attitudes about reproductive health [11], [12]. Other studies have shown that good knowledge will have a positive impact on the attitudes of cadres and pregnant women related to high-risk pregnancies and other health problems [14], (17). Even so with research conducted in Libya, showing that 85.3% of mothers have good knowledge followed by the formation of a positive attitude (96.0%) shown by mothers about high-risk pregnancy (18).

A study in Palu showed that the knowledge and skills of cadres or health workers have a significant effect on readiness to deal with emergencies in the health sector, including high-risk pregnancy (19). Another study showed that the low implementation of ANC standards and compliance of pregnant women that affect efforts to early detection of high-risk pregnancies are influenced by internal and external factors, namely low maternal understanding, low family support and aspects of health services also influence the intensity of the activeness of cadres and midwives, and the implementation of health workers' actions that emphasize quantity rather than quality of ANC services (20).

The role of cadres in assisting pregnant women during ANC will have a positive impact on increasing ANC visits by pregnant women. Where pregnant women who routinely perform ANC allow for increased early detection of high-risk

pregnancies. Risks and complications in pregnancy can attack anyone, integrated antenatal care is an effort to reduce the risks and complications of pregnancy and shape the knowledge and attitudes of mothers (21,22).

Conclusions

The use of educational media in the form of videos and booklets together affects the knowledge and attitudes of cadres in early detection of high-risk pregnancies. Where the best intervention is used in an effort to increase the knowledge and attitudes of Integrated Service Post cadres about early detection of high-risk pregnancy is an intervention using video media and booklets. The combination of these two educational media can be an effective alternative.

To significantly improve cadres' knowledge and attitudes in conducting early detection of high-risk pregnancies. Combining the two educational methods can be done continuously for long-term cadre behavior change.

Limitations. The duration of the study was relatively short so that this researcher was only able to measure changes in knowledge and attitudes in providing treatment, so it could not see the results of behavioral actions as a whole. The cost of development and media capacity is a consideration for researchers to limit the duration of the video to 3 min, so this affects the information provided to be shorter and limited when compared to booklet media.

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Ethical approval and consent to participate

Ethical clearance and approval to conduct this study was obtained through the Ethics Institute of the Faculty of Public Health, Hasanuddin University, Makassar with number: 1021/UN4.14.1/TP.01.02/2023. Ethical considerations take into account the personal and revealing nature of the research, which requires voluntary or informed consent, using a consent form designed for this study, needs to be obtained from participants.

Informed consent

Prior to administration of the questionnaire, the aims and objectives were explained, and written informed consent was obtained.

Conflict of interest

The authors declare no potential conflict of interest.

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