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Developmental Trial of Maternity Education Control Cards

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ABSTRACT

Background: The behavior of a pregnant woman in maintaining her health during pregnancy is influenced by her knowledge of pregnancy. The greater the knowledge of pregnant women about pregnancy, the better the attitude of pregnant women in maintaining their pregnancy. Consequently, a primary care physician who is a health manager of pregnant women needs to pay attention to this knowledge aspect. Primary care physicians should be able to quickly identify the level of knowledge of pregnant women about pregnancy and determine whether that knowledge is sufficient. For that purpose, primary care physicians need to have the right measurement instruments. **Objectives:** This study aimed to develop, validate and test the instruments that primary care physicians can use to identify and add to pregnant women's level of knowledge about pregnancy. **Methods:** This study involved research and development of a validated instrument that consisted of several stages, namely development, validation and testing. Validation was done through two stages, specifically content validation by experts and face validation by 7 doctors. The experimental phase was a quasi-experimental research with 35 pregnant women who presented for antenatal examination at the Puskesmas Banguntapan I (Community and Primary Health Care Center). T-tests were used to determine whether there was a significant difference between the knowledge of pregnant women before and after using the Maternity Education Control Cards. **Results:** The validated instrument called the Maternity Education Control Card developed by primary care physicians can be used to identify and increase the level of knowledge of pregnant women about pregnancy. The Maternity Education Control Card was validated by several experts, including communication experts, obstetricians and the Maternal and Child Health Program Coordinator at Bantul Regency. Layout, style, accessibility, and feasibility were assessed by a team of validators at the Puskesmas Banguntapan I (7 doctors and 1 midwife coordinator). The data analysis showed that there was a significant difference between pre-test and post-test scores ($p = 0.000$). This value was not influenced by age variables, educational level, number of pregnancies nor previous antenatal care frequency, but the level of education did affect the post-test value. The duration required for education was between 9 - 20 minutes, with an average of 14.63 minutes (± 2.61). The duration required for education related to the delta of pre and post-test values. The greater the delta, the longer time required for education. **Conclusions:** Maternity Education Control Card has been successfully established, validated and proven to significantly increase pregnant women's knowledge about pregnancy.

Keywords: education, pregnant women, knowledge, natal knowledge instruments, family doctors.

BACKGROUND

A pregnant woman's knowledge about pregnancy is an important aspect that should be considered in the management of integrated antenatal care. Several studies have shown that antenatal care with educational goal attainment improves maternal knowledge about pregnancy^{1,2}. The greater the knowledge of pregnant women about pregnancy the better the the attitude and behavior of pregnant women in maintaining their pregnancy^{3,4,5}.

Primary care physicians may serve as first contact health managers, and thus⁶ are one of the cornerstones needed to achieve the success of this integrated maternity education program. Programs integrated with this antenatal care are numerous, and consequently, an effective instrument is needed to improve the comprehension of pregnant women. The existence of this instrument is expected to provide more opportunity for pregnant women to get the right health information about their pregnancy. Renkert and Nutbeam mentioned that, considering the large amount of information that needs to be delivered to pregnant women, an appropriate instrument relevant to local conditions is more effective and efficient⁷.

This study was conducted with the aim of developing, validating and testing an instrument, called the Maternity Education Control Card which primary care physicians can use to identify and improve pregnant women's knowledge about pregnancy.

RESEARCH METHODS

The research method used is the research and development method, which develops instruments that can be used by primary care physicians to identify and increase the knowledge of pregnant women about pregnancy. This instrument is called the Maternity Education Control Card. This research had several stages, namely, developmental phase, validation and product trial. The developmental phase began by collecting data through group discussion between physicians and midwives at *Puskesmas* Banguntapan I. Discussions resulted in qualitative analyses to be used as the basis for the development of the instrument. Further instrument specifications and a prototype draft of the educational control card were completed based on the specified analyses.

The draft was validated by an expert with an assessment of the content validation index of relevancy, clarity, and simplicity. After passing the expert validation, the draft was assessed for face validation on the layout, style, accessibility and feasibility elements by the validation team at *Puskesmas* Banguntapan I. The validation team consisted of 6 doctors and 1 midwife coordinator, led by the author.

The product trial was conducted on the respondents with nonprobability sampling using a consecutive sampling method at *Puskesmas* Banguntapan I, and was based on the antenatal care schedule. The minimum number of samples was 30 people. The inclusion criteria for the sample population were: 1) first trimester pregnant women; 2)

minimum age of 16 years; 3) able to read and write; and 4) willing to be a research subject. The sample's exclusion criteria were: 1) did not complete the questionnaire; and 2) did not complete all the research procedures.

Data analysis at the developmental and validation stages was done by a qualitative descriptive approach, followed by a limited trial and then we analyzed the data with a quantitative approach. Data analysis at the test phase was done descriptively and we conducted significance tests with t-test for pre-test and post-test.

RESULTS AND DISCUSSION

Product developmental stage

The product developmental stage began with determination of the specifications. The specifications of the Education Control Card were determined based on data collected from group discussions and assessments of the maternity education system that were done at *Puskesmas* Banguntapan I. The specifications of the Control Card were as follows: book form, printed separately from the MCH Book or Mother Card which is the basic instrument in integrated antenatal care. Inside this Card there is a section that can serve as a checklist that can help the doctor remember educational materials that must be given to the pregnant women. Additional sections include: 1) a section identifying the level of knowledge of the pregnant woman, 2) a section documenting the woman's increased knowledge, and 3) a section to record the educational process. The educational process section was made to be large enough to record all of the education received by the pregnant woman.

The Maternity Education Control Card is part of an integrated antenatal care recording system, therefore the design is made in such a way that it is integrated with the other instruments used in integrated antenatal care: the Mother and Child Health Book/MCH (KIA) and the Mother Card. In addition, it is designed to be used easily by doctors as a means to document the significant increase in knowledge of pregnant women.

The design of the Maternity Education Control Card draft was determined based on these specifications and the results of the appeal with the same concept instrument. It has been confirmed by the District and Provincial Health Program Coordinators that there are no comparable instruments. Instruments owned by other areas related to antenatal care are only Mother's Cards and MCH Books. An online web search found some medical records made for the purpose of recording antenatal services in other countries, including Canada (Ontario⁸, Vancouver⁹, Manitoba¹⁰, Nova Scotia¹¹) and the United States¹². Differences in medical records in some countries with MCH Books and Mother Cards are the list of educational materials. The concept of this checklist inspires the form of a checklist on the Education Control Card.

To identify the knowledge level of pregnant women, a questionnaire was prepared as part of the control card. The questionnaire was based on educational materials in the Integrated Antenatal Care Guide and MCH Book.

Questions were prepared and discussed with midwives and doctors at the *Puskesmas* Banguntapan I to confirm their suitability for the local population. The questionnaire was also validated by obstetricians, communication experts and the Maternal and Child Health Program Coordinator at the Bantul Regency level. The questionnaire's reliability was also assessed by using it on 30 pregnant women aged 16-40 years. The internal value of consistency is 0.71; which means that the questionnaire is reliable enough to be used. The questionnaire consisted of 65 questions consisting of 14 questions about routine antenatal examination, 25 questions about pregnant women's nutrition, 8 questions about pregnancy alert, 8 questions about labor preparation and 10 questions about stickers for birth planning and prevention of complications.

After considering the specifications and studies of other instruments with the same concept, the draft of the Maternity Education Control Card was established. It consists of maternity identity elements, questionnaires about pregnancy knowledge tests, education process note columns and follow-up plans. In order to integrate this Control Card with MCH and Mother Card Books, an additional instrument of stickers containing a list of educational material themes in the Pregnancy Knowledge Test Questionnaire was established. This sticker is stitched to both the MCH Book and Mom Card.

Validation stage

In the validation process by the experts, modifications were made to the draft of the control card according to the expert suggestions until all experts were in agreement with the final draft. After that, the control card was limited tested by

the validator team of *Puskesmas* Banguntapan I consisting of 6 doctors and 1 midwife, led by the author. Based on this limited trial, the team conducted face validation, i.e. assessing the layout, style, accessibility and feasibility. Various modifications were made based on the team's assessment until all members of the team were satisfied with the card's layout, style, accessibility and feasibility. One of the outcomes of the team's discussion was to make it a complementary instrument in the form of a booklet containing pregnancy information in the same order as the questions in the questionnaire. This booklet is used to help doctors to make the education process proceed faster. The information in the booklet is the same as the contents of the MCH Book with minor changes to the format and the addition of updated information.

Trial stage

The trials began in June 2016 on Tuesdays and Fridays according to the antenatal care schedule at *Puskesmas* Banguntapan I. The trials were continued until the minimum sample size was attained. In the end, 37 respondents were included in the trial. Two respondents did not complete the process (did not do the post-test), so there were 35 samples in the final assessment.

Characteristics of the sample of pregnant women were in the age range 18 - 42 years, with over half (57.1%) aged 20-30 years. The sample education level was mostly (57.1%) at the moderate level (senior high school and the equivalent). Half of the respondents were pregnant for the first time (48.6%) and most of them had performed antenatal care at other health facilities (Table 1).

Table 1. Characteristics of trial respondents of the education control card based on age, education level, number of pregnancy and previous frequency of ANC

No	Variables	Category	Quantity	Percentage (%)
1	Age	< 20 years old	2	5.7
		20 – 30 years old	20	57.1
		30 – 40 years old	12	34.3
		> 40 years old	1	2.9
2	Level of education	Low: junior high school) / Equal	7	20
		Medium: senior high school / Equal	20	57.1
		High: Diploma / Bachelor	8	22.9
3	Number of pregnancies	First pregnancy	17	48.6
		Second / third pregnancy	14	40
		Pregnant > three times	4	11.4
4	Frequency of previous antenatal care	0	8	22.9
		1 time	5	14.3
		More than 1 time	22	62.8

The sample pre-test values ranged from 28 - 57 with an average value of 44.91 (Table 2).

Based on bivariate analysis with Spearman correlation test, it was shown that the sample characteristics did not significantly influence the pre-test values (Table 3).

The sample post-test values ranged from 58 to 65 with an average value of 62.89 (Table 2). Based on bivariate analysis with Spearman correlation test, it was shown that only respondents' education level characteristic influenced post-test value with positive correlation ($p = 0.427$). This

Table 2. Description of the frequency of pre test and post test values

No	Variables	N	Mean	Standard deviation	Modus	Min	Max
1	Pre-test	35	44.91	7.147	42	28	57
2	Post-test	35	62.89	2.083	64	58	65

Table 3. Results of bivariate analysis test (spearman correlation) between education background variables, number of pregnancy and previous ANC frequency with pre-test score

No	Variables	Correlation coefficient	p-value	Significance
Pre-test				
1	Level of education	0.145	0.406	Not related
2	Number of pregnancies	0.226	0.192	Not related
3	Frequency of pregnancy	0.176	0.312	Not related
Post-test				
1	Age	-0.022	0.899	Not related
2	Level of education	0.427	0.011	Related
3	Number of pregnancies	-0.11	0.531	Not related
4	Frequency of previous antenatal check	-0.041	0.817	Not related

statistic means that pregnant women with higher levels of education are able to understand the information provided by doctors more easily resulting in higher post-test scores.

If the pre and post-test values are shown in the graph, it appears that there is a wide difference in values (Chart 1). To determine whether this difference is significant, we then tested the significance. The significance test using the t-test



Figure 1. The pre-test, post-test score of each respondent, along with average and modus

could not be performed because the data was not normally distributed (p value for pre-test 0.462). The Wilcoxon test showed differences in pre- and non-parametric values which were significant in the post-test ($p = 0.000$). This result means that the use of the Educational Control Card has been shown to significantly improve the mother’s knowledge.

In this study we also measured the time required to use the instrument. The time was calculated since the doctor began to give education until signing the statement that education had been given about the health of pregnant women. The time measurement was needed to demonstrate the efficient

use of the Maternity Education Control Card.

The time needed to educate ranged from 9 to 20 minutes (Table 4). The average education time was 14.63 minutes (± 2.613).

Bivariate analysis using Spearman correlation test showed that the length of education time did not correlate with sample characteristics which are: age variable, education level and number of pregnancy, but were related to antenatal frequency variable previously with medium significance level (Table 5). The existence of the association between antenatal frequency with the duration

Table 4. The time taken to perform the education process

<i>The time required for education</i>	<i>Minute</i>
Mean	14.63 (± 2.613)
The most time	20
The least time	9

Table 5. Relationship between the length of time required for education with age variables, education level, number of pregnancy and frequency of ANC.

No	Variables	Spearman Correlation	p-value	Significance
1	Age	-0.094	0.593	Not related
2	Level of education	0.003	0.987	Not related
3	Number of pregnancies	-0.326	0.056	Not related
4	Frequency of ANC	0.368	0.030	Correlated, with medium correlation strength, positive correlation direction

of the educational process may be due to the possibility that pregnant women who often perform antenatal examination are more concerned with the pregnancy and have more curiosity about pregnancy, so they are likely to discuss more with the doctor. Another possibility is they had a complication in pregnancy so that pregnant women often do the examination of pregnancy, and when given the opportunity to discuss, pregnant women ask many things about these complications. However, further research is needed to prove this point.

To find out whether this educational time can be shorter if the pre-test value is higher, a bivariate analysis was performed using Pearson correlation test. The test results show that the duration of this educational process is related to the pre-test value with negative correlation ($p = 0.011$). This result means the lower the pre-test value, the longer it takes to educate. The value of pre-test shows the level of early knowledge of pregnant women. The level of early knowledge of pregnant women can be improved by providing education by midwives or other health workers. This process is quite possible because before meeting a doctor, most pregnant women have been in contact with midwives or other health workers. If this process works well, midwives, other health workers and primary care physicians can work together synergistically in providing education to pregnant women. There will be no repetition of education by doctors, because doctors will only need to add information that has not yet been understood.

After the trial was done, discussions were held between the team validators. This discussion is to discuss whether the Control Card is eligible for widespread use. From the discussion we can conclude that there are still two questions on the pregnancy knowledge test questionnaire that can cause ambiguity if pregnant women are not careful and we needed to change the sentences. This area of misunderstanding is evidenced by the number of pregnant women who responded incorrectly to the post-test for these questions. Therefore, we made a few sentence changes.

The second conclusion was there was need to add information about ultrasound in the booklet, because 7 pregnant women asked about ultrasound and there were still 5 pregnant women who answered incorrectly on post-test related questions about ultrasound.

The third conclusion was the need for additional information about abstinence in pregnancy, especially related to eating durian food, pineapple and herbs such as beras kencur and turmeric acid. Five pregnant women still incorrectly answered post-test questions regarding abstinence from eating durian and pineapple. Three pregnant women asked

about whether pregnant women should drink turmeric and “beras kencur”, a traditional Javanese herbal beverage.

This instrument is formed with the adjusted conditions of the local population, in this case the antenatal care system, the number of health personnel as well as the characteristics of local individuals. For use with different populations, characteristics would require further validation and retesting. This approach is in accordance with research conducted by Renkert and Nutbeam⁷, they mentioned that the development of such instruments needs to be developed in accordance with local conditions.

This study has several limitations. They mostly occurred during data collection, i.e. group discussions conducted between groups of doctors and midwife groups. In this process, bias is possible, i.e. each profession feels uncomfortable expressing perceived shortcomings in the proficiency in other professions. Another limitation is the small sample population size, so that, to see the relationship tendency of each characteristic of the respondent with the level of knowledge there is not strong enough data. More studies with more samples are needed to determine whether respondent characteristics (age, education level, number of pregnancy and frequency of ANC) are associated with maternal education and prenatal knowledge levels.

Although this instrument has been validated and proven to significantly increase pregnant women’s knowledge, it still needs regular evaluation for its use. The format of the Maternity Education Control Card can be made more efficient and feasible. Further research is needed to: a) know the satisfaction of pregnant women if prenatal education is done with the Maternity Education Control Card; b) identify physician difficulty during education by using the Maternity Education Control Card; and c) improve the educational handbook so that it can accommodate various questions of pregnant women.

CONCLUSION

A draft instrument has been established that can be used by primary care physicians to identify and improve the knowledge of pregnant women about pregnancy. This instrument is called the Maternity Education Control Card. It has been demonstrated that the use of the Maternity Education Control Card can improve maternal knowledge about pregnancy.

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Ethical Approval and Informed Consent

This research has been approved by The Medical and Health Research Ethical Committee (MHREC) from Faculty of Medicine, Universitas Gadjah Mada, Yogyakarta with reference number KE/FK/21/EC/2016.

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Availability of Data and Material

Data and material can be accessed via corresponding author.

Conflict of Interest

None.

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