Development of Module for Prenatal Class Program and Its Impact to Knowledge Pregnant Women at The Community Health Center

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Abstract— **Maternal and infant mortality rates are still high in developing countries. Health promotion efforts are needed to reduce the mortality rate, by increasing the knowledge of pregnant women through a prenatal class program. In fact, there is no learning media that is suitable for these needs. Research objective is to develop a module can be used in prenatal class program and find out the effects on learning outcomes in the form of maternal knowledge. The type of research used is research and development of learning materials in the form of prenatal class program modules. Research was carried out in two stages. The first phase of the development of the learning module is carried out by: (1) field and literature studies to compile draft module; (2) due diligence by validating material and design experts, and practitioners. The second stage was testing the small groups and large groups in the community health center with t test statistical tests. Results of the development concluded that the module was declared feasible to use. Test results of small and large groups that found a significant increase knowledge of pregnant women. Conclusion required modules in implementation of a prenatal class program at the community health center.**

Keywords— *Prenatal class program, learning module, community health center*

I. INTRODUCTION

Maternal and infant mortality rate can be reduced by increasing the knowledge of the mother and family about pregnancy, childbirth and postpartum including the care of newborns. Titilayo, Pramasanthi & Omisakin [32] found that the lack of effort by pregnant women in seeking health services was caused by poor knowledge.

This knowledge was mostly obtained by pregnant women during antenatal care.

The researchers agree on the need for good antenatal care for pregnant women, because various studies show that antenatal care is significantly associated with the death of the mother and her baby [2, 21, 34]. Antenatal care aims to educate women in recognizing signs of complications and detect early signs of pain, which can help save the lives of pregnant women and promote birth readiness [7, 24].

The implementation of prenatal care in Indonesia is carried out in the form of a class program for pregnant women. Pregnant women class program is a shared learning tool that needs to be followed by pregnant women in order to obtain sufficient knowledge so as to prevent complications and increase coverage of pregnancy visits at least 4 times during pregnancy [3]. This program is a non-formal health education program aimed at preparing pregnant women to be prepared to face birth safely through prevention of complications and birth complications as well as preparing for newborn care. As a health effort, the class of pregnant women has been shown to increase the knowledge and attitudes of pregnant women in adopting health behaviors related to pregnancy [17, 23. 30].

As a health education effort, the class of pregnant women walks with incomplete facilities [26] and still needs adequate learning media so that the health education process runs well and is effective in increasing the knowledge of pregnant women. In fact, not all facilities and infrastructure are fully available, flipcharts as teaching materials and can only be owned by health workers. As for the reading source for pregnant women, only maternal and child health books are not designed as learning modules.

The module as a learning medium is very important as a source of literacy and increasing understanding of health messages for pregnant women [16]. Previous research also found changes in the form of increasing knowledge, attitudes and behavior of mothers in the care of pregnancies in the group of pregnant women using modules [4, 11, 15]. For this reason, it is necessary to develop a teaching material for the benefit of the pregnant mother's class program in the form of prenatal class module for pregnant women.

Modules used in learning must be designed in accordance with learning rules so that the results are effective. According to Purwanto, Rahardi & Lasmono [27]; Suparman [33], and Sudjana and Rivai, [31] modules are designed systematically based on a particular curriculum and allow it to be studied independently in a certain time unit, so learning becomes more effective. The researcher developed the learning module of pregnant women with the ADDIE model which included Analysis, design, development, implementation and evaluation [5,18].

This ADDIE model was chosen because the model is one of the most commonly used models in the field of instructional design as a guide for producing effective designs [1, 25]. This model is suitable for the development of material in various educational fields [4], such as continuous learning, training, courses and informal education as well as classes for pregnant women. In addition, this model can produce learning materials that are simple and easy to learn [25].

The resulting model will be applied in the implementation of the prenatal class program for pregnant women, who previously only armed with flipcharts and KIA books from the Ministry of Health. Related to these conditions, the results of previous studies found that the effectiveness of antenatal education in small classes is still questionable [3], there is no correlation between the use of KIA handbooks and the level of knowledge and attitudes of pregnant women about pregnancy signs [10, 14]. With the development of this module it is hoped that it can be a solution in increasing the knowledge of mothers who take classes in pregnant women.

Based on this background, this study aims to develop modules for prenatal class of pregnant women and find out their effects on increasing knowledge of pregnant women. The study was conducted in small and large groups.

II. METHODS

The research method used in this study is the research and development method. This study is divided into three phases, with the development model based on the ADDIE model which includes: The first phase of the preliminary study (pilot study). (1) analysis, carried out by recognizing potential problems related to the pregnant mother's class program, followed by field studies and literature studies, the second phase of module development (2) design, formulating learning objectives and designing modules for classes of pregnant women; (3) development, the existing module design is validated

twice by material experts, design experts and practitioners. The results of the first validation are used as a benchmark for revision of content and design. After the revision was completed the second validation was carried out by the same experts and practitioners. At this stage the first plagiarism test or similarity test is carried out using the Turnitin program. Improvements are made again to the results of the first plagiarism test until the results are less than or equal to 25%. After the target of less than 25% is achieved, it means that the level of similarity with the internet data is small, module production with a limited number is only done to be tested in a limited group of 10 respondents (pregnant women).

The third phase, testing the effectiveness of the module. Enter the fourth stage of the ADDIE model, namely (4) implementation. After the module is declared feasible by the expert and the results of the group test are limited, the module is produced in large quantities and implemented in class learning for pregnant women with a group of 60 respondents, consisting of 30 trial groups and 30 control groups. The final stage (5) evaluation, carried out to evaluate the effectiveness of the module and the decision whether or not the need to use the module in the class program of pregnant women. Compared the value of the use of modules in the trial group and the control group using the independent t test. More details can be seen in scheme 1 below.

Figure 1. Steps of Module Development

In Evaluation phase, we using Quasi Experiment Research method (quasi-experimental research). The sample used amounted to 60 mothers who participated in the prenatal class, where 30 people were treated and 30

were in the control group. Learning in the control group uses conventional teaching materials, namely the MCH books and flipcharts. The treatment group uses modules that have been developed in this study. The sampling technique used was purposive sampling. The variables tested were knowledge of pregnant women before and after taking prenatal classes. Data collection uses tests (pretest and posttest) and data analysis using t-test or t test.

Table 1. RESEARCH DESIGN

Group	Pretest	Treatment (independent varibale)	Postets (dependent variable)
A	O1	X1	O2
B	O3	X0	O4

Information:
A and B: Treatment class
O1 and O3: Pretest
X1: The treatment class uses learning with a scientific approach combined with Inquiry learning models
X0: The control class uses conventional learning
O2 and O4: knowledge of pregnant women (posttest)

III. RESULT AND DISCUSSION

Development of modules

This module was developed by researchers by first conducting literature studies and field studies. The results are stated in the initial design of the module, which is then analyzed and validated by three groups namely material experts, design experts and practitioners. The results can be seen as follows:

    a. Validation of material experts

There are 50 questions in the material expert validation sheet. Validation by material experts was conducted twice. Based on the calculation of the quality criteria according to the assessment table, the average final score obtained from the material expert validation is 4 in the range Xt + 0.60 Sbi <X X Xt + 1.80 Sbi with a mean of 4 or the category "good". Based on these results, it can be seen that the module learning classes of pregnant women developed are feasible to use in the field.

    b. Validation of Module Designers

There are 31 questions in the design expert's validation sheet. Validation by design experts is done twice. Based on the calculation of the quality criteria according to the assessment table, it was found that the average final score of design expert validation of 4.6 was in the range X> Xt + 1.80 Sbi <X with an average of 4.6 or the "very good" category. Based on these results, it can be seen that the module learning classes of pregnant women developed are feasible to use in the field.

    c. Practitioner Validation

Number of questions in the practitioner validation sheet (facilitator midwife) there are 31 items done to three facilitator midwives, and done twice. Based on the calculation of the quality criteria according to the assessment table, it was found that the average final score of the validation of 3 practitioners was 4.7 in the range X> Xt + 1.80 Sbi <X with an average of 4.7 or the "very good" category. Based on these results, it can be seen that

the module learning classes of pregnant women developed are feasible to use in the field.

Conclusions from the results of the validation of experts and practitioners with the calculation of quality criteria totaled: 4 + 4.6 + 4.7 = 13.3. Average = 13.3: 3 = 4.43. This average is in the range of 1 to 5. So if it is multiplied by (4.43 / 5) x 100% = 88.67%. According to the percentage agreement this value is good and there is no need for improvement. Based on these results, it can be seen that the module learning classes of pregnant women developed are feasible to use in the field.

Test the feasibility of the module

The test results in a limited group can be seen in the following tables 1 and 2:

Table 2. Characteristics of small groups (limited)

No	Characteristics of respondents	Frekuensi (F)	Prosentage (%)
1.	Age		
	< 20 years old	0	00,00
	20 – 35 years old	9	90,00
	> 35 years old	1	10,00
2.	Education		
	Junior high school	1	10,00
	Senior high school	8	80,00
	Bachelor	1	10, 00
3.	Parity (number of births)		
	First child	6	60,00
	Second child	2	20,00
	Third child	1	10,00
	Fourth child	1	10,00
	Total	**10**	**100,00**

Table 1 above shows that the majority of pregnant women in the limited group are in the reproductive age of 20-35 years (90%), the education of the majority of senior high school groups (80%) and most primiparous mothers (60%).

Table 3. Results of the due diligence in groups are limited

No	Group	Mean	Standard deviation	Standard Error	p Value	N
1	Pre test	65,00	5,27	1,27	0,000	10
2	Post test	87,00	8,23	2,60		

Table 2 above shows that the average value before using the module is 65.00 with a standard deviation of 5.27 and a standard error of 1.27, it can be concluded that the level of knowledge is in the sufficient category. In the trial after the use of the module obtained an average value of 87.00 with a standard deviation of 8.23 and a standard error of 2.60, it can be concluded that the level of knowledge is in the good category. Conclusions from the results of the pre and post trials without the control group there were significant differences (p value 0,000). There is a difference in the level of knowledge of pregnant women before and after using a module in class learning for pregnant women.

Module effectiveness testing

Module effectiveness testing was carried out in a large group of pregnant women. The results of table 3 above are both the trial and control groups, based on age dominated

by pregnant women of reproductive age. Based on education, it is dominated by high school graduates and based on group parity, the testing of most of the first children and control groups is almost evenly distributed. More complete can be seen in table 3.

Table 4. Characteristics of large groups

No	characteristics of respondents	Treatment Group		Control Group	
		F	%	F	%
1.	Age				
	< 20 years old	2	6,7	4	13,3
	20 – 35 years old	26	86,6	19	63,3
	> 35 years old	2	6,7	7	23,3
2.	Education				
	Junior High School	5	16,7	7	23,3
	Senior High School	21	70,0	17	56,7
	Bachelor	3	10,0	6	20,0
	Postgraduate	1	3,3	0	0,0
3.	Parity (number of births)				
	The first child	16	53,3	8	26,7
	Second child	7	23,3	9	30
	The third child	4	13,3	7	23,3
	Fourth child	2	6,7	4	13,3
	Total	30	100	30	100

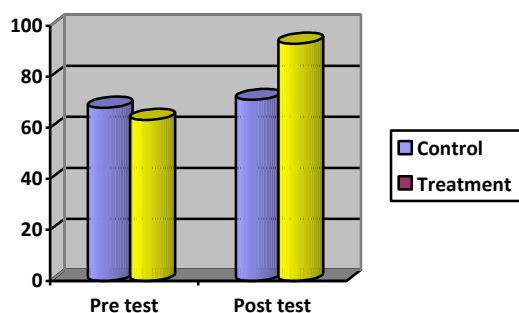The average increase in mastery of knowledge about perinatal care can be seen in figure 1 below

Figure 2: Pregnant women knowledge diagram

Figure 1 above describes the mastery of knowledge about perinatal care during pregnancy. There was an increase in knowledge in the treatment group by 29.88 points, while the control group only increased by 3.12 points.

While the effectiveness test can be seen in table 4

Table 5 Results of large group

No	Group	Mean	Standard Deviation	Standard Error	p *value*	n
	Pre test					
1	Treatment	63,12	14,62	2,67	0,487	
2	Control	67,88	34,19	6,24		60
	Post test					
1	Treatment	93,00	7,60	1,39	0,000	
2	Control	71,00	7,99	1,46		

The results of the module effectiveness testing in large groups as in table 4 above show the average value of the trial group 63.12 with a standard deviation of 14.62 and a standard error of 2.67, it can be concluded that the level of

knowledge is categorized as "sufficient". The average value of the control group is 67.88 with a standard deviation of 34.19 and a standard error of 6.24, it can be concluded that the level of knowledge is categorized as "sufficient". The average value of the pre-test group and the control group had no significant difference (p value 0.487) so that the assumption of the early knowledge of pregnant women was not different.

Furthermore, different trials were carried out in both groups. The trial class is given learning using modules and the control class is given learning with the same material but without using modules. The results of the post test different test obtained an average value of the trial group 93.00 with a standard deviation of 7.60 and a standard error of 1.39, it can be concluded that the level of knowledge is categorized as "good". The average value of the control group is 71.00 with a standard deviation of 7.99 and a standard error of 1.46, it can be concluded that the level of knowledge is categorized as "sufficient". The mean value of the post test of the trial group and the control group had significant differences (p value 0,000) so the assumption was that there was a difference in the level of knowledge of pregnant women after using the module in classroom learning for pregnant women who did not use the module.

Module development

The absence of modules as learning media or as teaching material in the class of pregnant women requires that health practitioners related to this health education program try to find a way out, so that health promotion carried out runs effectively. One of the efforts is to develop a classroom module for pregnant women that is made systematically and scientifically. This development must also suit the needs and situation and conditions of the learner.

This module has been developed systematically and scientifically with the ADDIE Model approach. This model was chosen because the model is one of the most common models and can produce effective designs [1], producing learning materials that are simple and easy to learn, used in adult learning, dynamic and support the performance of the training itself [25], suitable for the development of material in various educational fields [5], such as continuous learning, training, courses and informal education as well as classes for pregnant women. The ASSURE model is not chosen because it is more likely for the classical class with almost homogeneous learners, while the pregnant women class is a learning group together with different and heterogeneous backgrounds of knowledge and education. Other models such as The systematic Design of Intruction from Dick, Carey, and Carey [9] and Designing Instruction from Morrison, Ross, Kalman and Kemp [20] according to researchers are too complicated and more complex in designing learning.

The development of this module begins with needs analysis. The study of the existing curriculum was first carried out, which was developed by the Departemen Kesehatan (Ministry of Health of the Republic of

Indonesia) [8]. The weakness of the curriculum that has been developed lies in the learning media, which only uses conventional learning systems or classifications teaching in the form of flipcharts and KIA books. The weakness of this flipchart learning media is that it is only owned by the facilitator, the training participants do not have and cannot read again at home. Learning participants only depend on their sense of hearing and concentration while studying. The *buku KIA* (Maternal Children Health/ MCH Handbook) is only a visiting logbook and information media between health workers and pregnant women. Although there is information about pregnancy and birth, but it is not specifically designed for teaching materials. In the book there are no learning goals, competencies that must be achieved by pregnant women and evaluation of learning. Previous research also proved the existence of MCH books not related to the knowledge and attitudes of pregnant women about the danger signs of pregnancy [15]. For this reason, it was time to design learning modules for pregnant women. These modules have been adjusted to existing guidelines.

Second, an analysis of the class facilitators of pregnant women was carried out. Not all facilitators have participated in training in this class of pregnant women. This facilitator should have been trained, at least on the job training. The hope is that the facilitator can act as a provider of advice or input in the learning process, connecting resources, providing solutions and monitoring and evaluating [8]. With the existence of the module, it is hoped that it can help the facilitator's role in creating participatory learning in the class of pregnant women.

The third is an analysis of the environment and characteristics of students. The learning environment is generally carried out in the *puskesmas* (community health center) meeting room, where the conditions of one *puskesmas* with other *puskesmas* are different. If learning is done in a classical manner also gives a different effect too. The participants of the pregnant women class program have heterogeneous knowledge and level of education. On the one hand, they have good knowledge and high education, on the other hand they have poor knowledge and low education. This condition will add to the burden of the facilitator, if it is not supported by adequate teaching materials.

The development phase begins with the study of learning needs, field studies and literature studies [18, 32], so that module design can be realized according to the needs of students. The modules used have been designed in accordance with learning rules so that the results are effective. According some expert [27, 31, 33] modules that are designed systematically based on a particular curriculum and allow them to be studied independently in a certain time unit, so that learning becomes more effective.

To see the feasibility of the modules that have been compiled, validity is carried out by material experts, design experts and practitioners. This validity test is conducted so that the strength of the research results can be accounted for both in quality and quantity [10]. The final results are in the form of average scores, which

reached 4.43 in the range of grades 1 to 5. This means that it has reached 88.67%, based on the percentage agreement it is categorized as very good [22, 29], so that It can be concluded that the module developed is feasible for use in the field.

Effectiveness of the module

After knowing the feasibility of the module through the stages of expert validation and limited revisions and trial groups, then the next step is to test the effectiveness of using the module in the class of pregnant women. Effective or not a learning method can be seen from the final value obtained by students in this case is pregnant women as participants in the prenatal class program. Evaluation of module effectiveness is carried out inferential analysis. The result has been concluded that there is a difference in the level of knowledge of pregnant women after using the module in learning in the class of pregnant women with the level of knowledge of pregnant women who do not use the module. The final results of learning for pregnant women using 100% module, namely 30 pregnant women in the treatment group received a value of 80-100. In accordance with the criteria for the level of knowledge, if the participant or pregnant woman is able to answer the question correctly with a score above 76%, it is stated that she has good knowledge.

Here, it can be seen that the results of the effectiveness test module use in class programs for pregnant women are very good, because there is an increase in knowledge of pregnant women after using modules in the learning process. It's just that the shortcomings of the modules made are the production costs which are quite expensive and less practical to carry around by pregnant women. In the future, module designs can be developed into applications that can be used through smart phones, making it easier for pregnant women to study anywhere and anytime. Especially in the current era of advanced technology, almost everyone has a gadget with a complete application.

Besides that, it is also necessary to look at the development of information technology today, so that teaching can adopt and use information technology that has developed in the community for the benefit of learning. In the future, educators need to develop teaching materials using the Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler [19]. The TPACK framework emphasizes how the relationship between educator's understanding of content, pedagogy, and technology interacts with each other to produce effective teaching. Therefore, the modules developed must be based on information technology so that students can easily access the teaching materials. The consideration is because nowadays more and more availability of digital devices and networks everywhere has the potential to fundamentally change the teaching and learning process [14], including informal learning to the wider community.

The implication of this study is that midwives in providing important antenatal education utilizing teaching materials in the form of classroom modules for pregnant

women can be used as learning materials in improving the quality of learning in maternal class programs organized by *puskesmas* in an effort to help reduce mothers and babies. The implications of the use of modules in class programs for pregnant women can increase knowledge, change attitudes and behavior of pregnant women to be motivated and responsive to adopt positive things and leave unhealthy habits in care during pregnancy, childbirth, postpartum and care for their babies.

IV. CONCLUSION

Based on the results and discussion above, it can be concluded as follows: (1) There have been developed modules for pregnant women developed through the ADDIE model so that they meet systematic and scientific requirements, (3) Modules for prenatal class programs have been tested for validity and have a good percentage agreement and can increase the knowledge of pregnant women, so that they are suitable for use in the field, and (3) This module of prenatal calss for pregnant women is effective both statistically and clinically, proven to be able to increase the knowledge of pregnant women who take classes in pregnant women.

Suggestions for the future are that health service facilities such as community health centers (puskesmas) should use modules for pregnant women when implementing prenatal class programs. This paper-based module (printed book) can be developed based on electronics that can be read in a smart phone so that it can be read at any time by pregnant women. Development of modules with Technological Pedagogical Content Knowledge (TPACK) Framework. For further researchers, it is necessary to study the effectiveness of electronic-based modules on outcomes in pregnant women in the form of: motivation to check into health facilities, delivery to health workers, effectiveness of breastfeeding their babies, and implementing a family planning program postpartum.

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