The Development of Anemia Risk Detection Module in Pregnancy

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Abstract--The purpose of this research was to develop a module detecting risk of anemia in pregnancy as an educational media. This research used R & D method (Research and Development) bay adopting model with stages of Analysis, Design, Development, Implementation, and Evaluation (ADDIE). This research began with a needs analysis through Focus Group Discussion involving the medical doctors, coordinating midwives, village midwives, nutrition officers, health promotion officers, and cadres of health center. Module validation was carried out by two material experts and two media experts and conducted a small sample test involving 10 pregnat women as module users to determine the response of pregnant women to the detection of anemia risk of pregnancy. The results showed that the validation by two material experts showed an average value of 3,75 with a very good category. The two media experts showed an average value of 3,57 with a very good category and at the time of testing a small sample showed an average value of 3,7 with a very good category. Based on the results, it can be concluded that module for detecting risk of anemia in pregnancy is proper to use.

Keywords--Development of Module, ADDIE, detecting risk of anemia in pregnancy.

I. INTRODUCTION

The high risk pregnancy is a case of the pregnancy which accompanied by the obstetric complications that can effectthe condition of the mother and her baby (Bukit, 2019). To identify the risks of the pregnant mothers, they can do the preliminary medical check-up, so it can be prevented or treated earlier(Khadijah danArneti, 2018). The preliminary detection act and the treatment towards the obstetric complications must be increased in both of health facilities for mother and children (KIA) or society (The Profile of Health Care Subdivision in South Sulawesi Province, 2017). One of the risk factors on the pregnancy is anemia (*hemoglobin* amount<11 gr/dl) (Otzukr*et al.,* 2017). This case is considered as the global problem which can increase the morbidity of the mother or her baby (Achebe and Gvili, 2017). The change of increasing blood volume on the mother and blood plasma which unbalanced, it describes the decreasing hemoglobin amount (Jahan*et al.*, 2017). The factors that influence the anemia disease on the pregnancy are the level of education, economy status, the routine of tablet Fe consumption (Yanti*et al.*, 2015), parity, mother's age (Astriana, 2017), pregnancy age, variety of food scoreand worm infection (Lebso*et al*., 2017). Anemia in pregnancy can be effected by knowledge, when the level of knowledge is higher, the risk of anemia will be lower (Maskey*et al.*, 2014).

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Anemia on the pregnancy can effect abortus, premarture childbirth, premature rupture of membrane (PurbadanTanjung, 2018). Anemia can increase the risk in obstructing the growth and the low weight birth (Srour*et al.*, 2018; Figueiredo*et al.*, 2019). Anemia also effect the premature birth, perinatal death, and the drop of body defense which create the infection towards the mother and her baby (Destarina, 2018). The act of preventing anemia needs to be conducted by doing the early detection and treatment before childbirth to avoid various complications on the mother and her baby (Bhargavi*et al.*, 2014). Indonesian Government has provided the treatment for preventing anemia by giving ninety tablets for adding the blood amount for the pregnant women. The lack of knowledge about the anemia case on the pregnant mother will be influenced to her behaviour which has effect to the decrease of the optimization of the prevention towards anemia (Sulistiyanti, 2015). The research has recorded that 67,6 % of most knowledge from the mothers about anemia is still low (Maulidanitadan Raja, 2018).

The strategy for increasing the knowledge for the pregnant mother is by promoting the health education including doing routinely antenatal check up, especially Hb check up on all pregnant mothers (Argaw e*t al.,* 2015). As the consequence, the health officer can give the education or recommendation intensively for the pregnant mother in order to prevent and treat the anemia on the pregnancy (Sukmawati*et al.,* 2019). The success of an advisor in transferring materials on his task is decided by many cases, one of them is the effective media (SyafrianidanIndrawati, 2017).

One of the effective media used is module, as appropriate with several research such as giving intervention through education with using effective modul in order to increase the level of knowledge, motivation, and behavior skill (Balami*et al.,* 2019). The research of the pregnant mother guiding module with preventing anemia can improve the knowledge by mean11,49 (Aminin*et al.,* 2019). Then, giving module on the cadre in case of exclusive breastfeeding can improve the knowledge in average score 9,63 than the mothers who are not given the module treat are 3,27 (Jumiyati*et al.,* 2014). Module as one of media that used to be material in form of printing can be utilized to independent learning because the module provides the learning direction which can be got by the users (Susilo*et al.,* 2016). Module is also called by mini learning package because it is designed to reach the person with various characteristics that they owned.

Based on the background above, the researcher is interested to present the development of educational media namely the anemiarisk detection module on the pregnancy.

II. METHOD

This research is categorized in the developmental study or Research & Development (R & D).The development of the media in this study uses the design Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model.

This research began with a needs analysis through Focus Group Discussion (FGD). Module validation was carried out by two material experts and two media experts and conducted a small sample test involving 10 pregnat women as module users to determine the response of pregnant women to the detection of anemia risk of pregnancy. The range and scale of values as a basic for assessment and decision making of the module (Nurhayati, 2019),

namely: (1) a value of 3.26 – 4.00 show very good category; (2) values 2.51 – 3.25 show good category; (3) values 1.76 – 2.50 show enough category; value of 1.00 – 1.75 show enough category; value of 1.00 – 1.75 show not good category.

III. RESULTS

There is several developing model in this research which refer to the research design and ADDIE development that will be elaborated as following:

A. Analysis

In this step, the literature review and field survey are conducted by researcher. The literature review is applied by collecting the literature sources related to media and material that will be developed. While, field survey is applied by early knowledge survey and Focus Group Discussion activity by involving the medical doctor, coordinating midwife, village midwife, nutritional officer, and health promoting officer and cadre participation. From the result of FGD, it can be seen that the information about the anemia risk detection on the pregnancy has not been found yet especially. On the risk factor discussion by society or the pregnant mother class, it uses the feedback sheet and KIA book as the media in transferring message. Then, the specific media that discussing the anemia risk detection on the pregnancy has not been found yet, as the consequence, the knowledge of the pregnant mother about the anemia risk detection on the pregnancy is still less. It can be proved by the result of early knowledge that applied by the researcher which describes the result of the knowledge of the pregnant woman about anemia risk detection is still less. Thus, it needs to provide the media module about the anemia risk detection on the pregnancy.

B. Design

This step is a module desain which purposed to formulate the goal of the anemia risk detection module on the pregnancy. After understanding this module, the pregnant mothers are expected to be able know the risk of anemia on the pregnancy at early time. The materials that must be known are as following:

1. The definition of anemia on the pregnant mother
2. The indication of anemia on the pregnant mother
3. The factor that influences anemia on pregnant mother
4. The effect of anemia on the pregnancy
5. The prevention of anemia on the pregnancy

Then, the designer can collect the content of the module and developing each test item or questions to measure the growth level of user and the achievement of the goal that has been formulated.

C. Development

In this development step, there are several things that should be applied as follows:

1. Creating the module media

The media that designed by the researcher is developed by arranging module draft. The content of the module consists of some materials which obtained from several literature sources.

Then, the module consists of cover, acknowledgement, table of content, introduction, material description, conclusion, evaluation questions, and its answer key, screening of the anemia risk factors, bibliography, and the writer's biography.

2. Validating the properness of the module

After designing the media of anemia risk detection module on the pregnancy, its properness should be validated based on the instruments of validation which released by *BadanStandarNasionalPendidikan (BNSP).* The following validation of module media is conducted by the expert validation that consists of the material and the media experts.

a) Validation of the material expert

The material expert in the process of media validation of the anemia risk detection module on the pregnancy is totally two persons namely Dr. TheresiaLimbong, SKM.,M.Kes as the Midwifery Lecturer of PoliteknikKesehatanKementerianKesehatan Makassar positioned as the first material expert and Dr. Hj. Hasnah M. Noor, SKM.,M.Kes as the Midwifery Lecturer of PoliteknikKesehatanKementerianKesehatan Makassar positioned as the second material expert. The validation is executed by the material experts related to the aspects of material relevance. They do not only assess the properness, but they also give the comment and recommendation to reconstruct the media of the anemia risk detection module on the pregnancy. There is the result that executed by the material expert can be seen on the table 1.as following:
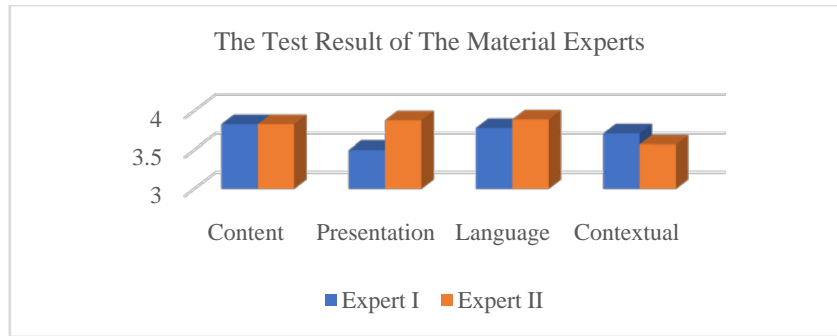
Table 1.the validation result by the material experts towards the anemia risk detection on the pregnancy reviewed from the content, presentation, language and contextual aspects.

The Properness aspects that assessed	Assessment		Average	Category
	Expert I	Expert II		
Content Aspects	3.83	3.83	3.83	Very good
Presentation Aspects	3.5	3.88	3.69	Very good
Language Aspects	3.78	3.89	3.84	Very good
Contextual Aspects	3.71	3.57	3.64	Very good
Average			3.75	Very good

Primary Data, 2019

Table I shows the result that the material relevance aspect reviewed from the content aspect has the average score 3.83 which classified into very good category, the presentation aspect has the average score 3.69 which classified into very good category, the language aspect has the average score 3.84 which classified into very good category, the contextual aspect has the average score 3.64 which classified into very good category. Overall, the assessed aspects have the average score 3.75 which also included into very good category.

The result on the graph can be seen as following:

The Test Result of The Material Experts

fig 1. The graph of the test result by the material experts towards the module of the anemia risk detection on the pregnancy

**b) Validation of the Media Expert**

The media expert in validating the module of the anemia risk detection on the pregnancy is totally two experts namely Prof. Dr. AndiAlimuddinUnde, M.Si as the chief of *LembagaPenelitiandanPengabdianMasyarakatUniversitasHasanuddin* positioned as the first media expert, and Prof. Dr.Ir. Hj. Sutinah Made, M.Si as the lecturer of UniversitasHasanuddin positioned as the second media expert. The validation is applied by the media experts related to the module cover aspect, beside they also assess the properness and give the comments or suggestions to repair the media. The validation result applied by the media expert can be seen as on the table below:

Table 2. The result of the material validation expert towards the anemia risk detection module on the pregnancy reviewed on the module size, cover design, and content module design aspects

The assessed aspect	Result		Average	Category
	Expert I	**Expert II**		
Modul size	4	3.5	3.75	Very good
Cover Design	3.4	3.6	3.5	Very good
Content Module Design	3.53	3.41	3.47	Very good
Average			3.57	Sangatbaik

Primary Data, 2019

Table 2 shows the result of media properness from the modul size has the average score 3.75 which classified into very good category, the cover design has the average score 3.5 which classified into very good category, and the content design has the average score 3.47 which classified into good category. Overall, the assessment aspect is 3.4 which included into very good category. Those cases can be seen on the graph below as following:
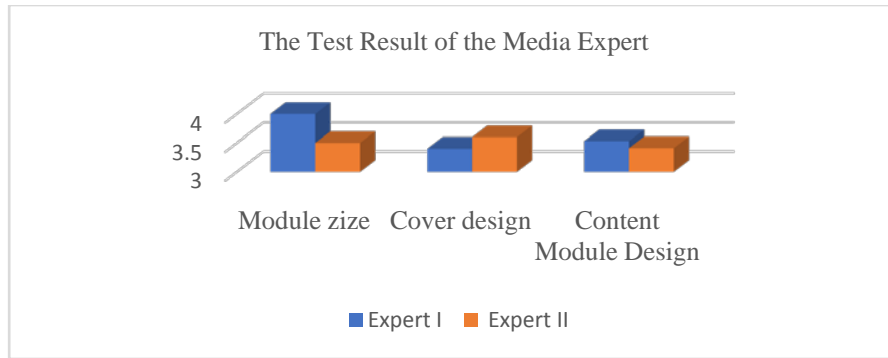
fig2. Graph of the test result of media expert towards the anemia risk detection module on the pregnancy

D. Implementation

This step is the continuation of developing step. on this step, the small scale test are applied. All media design has been developed and implemented after revision.

The small scale sample test is the step that proposed to test the ability of outcomes that produced. It is purposed to know the evaluation of the outcome's properness aspect. The small scale test is applied to 10 pregnant mothers as module user. The following result of module assessment from module user as below:

Table 3.the assessment result from the user towards the anemia risk detection module on the pregnancy.

Module User	The Assessed Aspects			Average
	Interest	Material	Language	
1	3.3	3.3	3.3	3.3
2	4	4	4	4
3	3.8	4	4	3.9
4	3.3	3.5	4	3.6
5	4	3.7	3.7	3.6
6	3.7	3.3	4	3.7
7	3.3	3.5	4	3.6
8	3.7	3.3	4	3.7
9	3.7	3.7	4	3.8
10	3.8	3.7	4	3.8
Average	3.7	3.6	3.9	3.7
Category	Very good	Very good	Very good	Very good

Primary Data, 2020

Table 3 shows the conclusion based on the assessed aspect such as the interest aspect has the average score 3.7 which classified into very good category, material aspect has the average score 3.6 which classified into very good category, and the language aspect has the average score 3.9 which classified into very good category. Thus, the whole of assessment aspects has the average score 3.73 which classified into very good category. It can be seen on the graph of the result of module user as following:
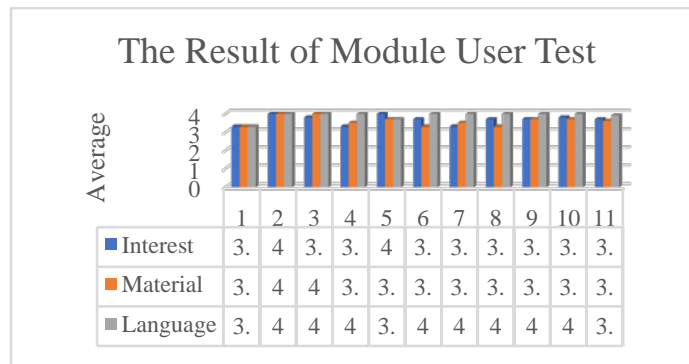

fig 3. Graph of the result of module user test

E. Evaluation

Evaluation step is the last step of the ADDIE developmental model. This step has been conducted on the developing step and implementation. Evaluation in this research is evaluation comes from the experts and the small sample test as the module user test in evaluating towards the product that being developed.

IV.   DISCUSSION

The media development in this research uses the model of*Analysis, Design, Development, Implementation and Evaluation* (ADDIE) with the basic consideration that its model is very appropriate to arrange the learning media accurately and effectively. Several developing researches also use the model ADDIE, such as the research conducted by Yandri*et al,* 2013 which describes the development of guiding and counseling modul. Then, the research conducted by Hayati*et al*, 2015 describes the development of learning media, and the research by Kurniati, 2016 focuses on the development of mathematics modul. There is several procedures of ADDIE that described as following:

Based on the problem statement of the analysis step which explained in the result of research, it can be seen that the level of knowledge on the pregnant mother about the anemia risk's detection on pregnancy is still less. When the pregnant mothers' meeting session, on both of pregnancy class or risk factor discussion activities presented by society, it uses the feedback sheet and KIA book. There is no specific material discusses the anemia risk's detection on the pregnancy. From the result of *Focus Group Discussion* (FGD) that have been applied on the module's media, it is needed to be a media that can be given for the pregnant mother to be learnt and read independently in order to enlarge the knowledge for them about anemia risk's detection on the pregnancy. Its module is also used on the discussing session of risk factors by society or the pregnant mother class. The activity of need analysis is conducted as appropriate with the researches which analyze by *Focus Group Discussion* to know the need of media user's candidate in developing the educational media of interference's prevention due to the lack

of yodium (Setyani e*t al,* 2017). Therefore, module is used to a media for transferring information related to the anemia risk's detection on the pregnancy caused by the easiness in its use which can reach the area that has the limited access of electronic's media so the anemia cases can be prevented at early.

The results of previous studies showed that the successful use of modules does not only increase knowledge, however respondents' attitude also change for better after getting the health education by modules (Wijayanti, 2019). The subsequent research also explained that by using learning modules can increase motivation and mindset which includes of attitudes, knowledge and practice (Pebruanti, 2015).

In generally thinking is a cognitive process, a mental activity to gain knowledge (Manapa, 2011). Knowledge of anemia is very important to prevent anemia, it can influence the attitudes and behavior in maintaining daily dietary habbit to prevent anemia during pregnancy (Chandra et al., 2019). These results are in line with the research conducted by Yadav et al. (2014) that good knowledgeable mother can reduce the incidence of anemia.

After conducting data analysis, the researcher does the design step which is creating the module draft based on the data obtained on the early research step or need analysis. The arrangement of module draf and layout determination is supported by module definition which can be written or arranged by the writer based on discussing learning material which involves the designed presentation with the technical direction about how it is learnt (Maswandan Laila, 2016).

The development step is core step in creating or arranging module becomes one unit and does validation by several experts. The goal is decided by experts' validation in order to get some suggestions, critiques, and revisions for producing the perfect module that being developed. Filling questionnaire validation by the experts will decide the properness of its modul to be able experimented for the pregnant mothers as the module user. Next, the implementation step is applied by the small scale sample test, on its step does not revise because the assessment of users shows very good result

V. CONCLUSION

Based on the result of the research and data analysis conducted by the researcher, it can be assumed some conclusion such as below:

1. Based on the expert validation towards the module assessment of the anemia risk's detection on the pregnancy, it can be seen that the average score of material expert is 3.75 which classified into very good category, while the score of media expert is 3.75 which classified into very good category.
2. Based on the result of small scale sample test as the module user of the anemia risk's detection on pregnancy, it can be assumed that the overall average score is 3.7 which classified into very good category.
3. Module for the detection of anemia in pregnancy is appropriate to be used as an educational medium.

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