



## PRODUCT DESIGN OF ELECTRONIC POCKETBOOKS (MAMABOOKS) FOR ORAL HEALTH CARE FOR PREGNANT WOMEN

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### ABSTRACT

According to Riskesdas data, the highest proportion of dental problems in Indonesia is dental caries which reached 45.3%, and as many as 45.7% were experienced by women, which is higher than the male group which only amounted to 44.8%. In the female group, oral care is much more important during pregnancy, breastfeeding, and menopause. According to research, the reason pregnant women do not maintain their oral health is because they do not know that during pregnancy they are more prone to oral diseases, especially gingivitis. Based on this, there is a need for health promotion in pregnant women. This study aims to conduct research and development of educational media in the form of material in electronic pocketbooks that will make it easier for mothers to access various information related to oral health maintenance in pregnant women. The method used is a qualitative method with several pregnant woman at Candilama Healthcare. The results showed that maximum education needs to be improved in pregnant women at Candilama Health Center, Semarang City, Central Java, there is a need for flexible educational media such as Mamabook electronic pocketbooks to increase literacy and education on oral health maintenance in pregnant women, the process of making mamabooks through the stages of needs analysis (need assessment), The process of making a mamabook goes through the stages of product design, expert validation, product trials, then product results containing oral health maintenance during pregnancy (dental and oral diseases of pregnant women, food diets, proper brushing of teeth), as well as quizzes on the knowledge and attitudes of pregnant women towards oral health. From the results of interviews and observations, it was found that there were no differences in characteristics between the intervention group and the control group.

Keywords: electronic pocket guide; oral care knowledge; oral care attitude; pregnant women

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### INTRODUCTION

Dental infection are often underestimated by most of pregnant women. These infection which may silent in non pregnant women can be activated in pregnancy and may affect the ability of the pregnant female to accept more nutrition (Fomete, 2021). Oral and dental disease is a disease that can affect all age groups, this disease is progressive if not treated or treated immediately it will get worse. According to Riskesdas data, the highest proportion of dental problems in Indonesia is dental caries which reached 45.3%, and as many as 45.7% were experienced by women, which is higher than the male group which was only 44.8%. Meanwhile, the oral health problem suffered by many Indonesians is swollen gums accompanied by pus (abscess) as much as 14.3% experienced by women and 13.7% experienced by men. (Kementerian Kesehatan RI, 2019).

In the female group, oral care is even more important during pregnancy, lactation and menopause. Pregnant women are expected to take some simple precautions, so that they will not experience tooth loss or other dental problems that can occur during pregnancy. However, it is known that many mothers face tooth decay and gum problems during pregnancy. These conditions can cause pregnant women to experience premature labor, low birth weight (LBW) babies, preeclampsia, gingival tissue ulceration, pregnancy granuloma, gingivitis, pregnancy tumor (epulis gravidarum), tooth loss, oral dryness, and erosion of the teeth (Yenen & Atacag, 2019).

According to research, the reason why pregnant women do not maintain their oral health is because they do not know that during pregnancy they are more prone to oral diseases, especially gingivitis. In Indonesia, around 30-70% of pregnant women experience gum swelling. According to the results of other studies, the prevalence of gingivitis in pregnant women ranges from 30-100%. Gingival infection will worsen during pregnancy if not treated. The relationship between pregnancy and periodontal disease is mutually influential, so the importance of pregnant women's knowledge of oral health maintenance during pregnancy, where clinical symptoms of gingivitis are seen in the second month of pregnancy and reach their peak in the eighth month (Simamora, Edi, & Hadi, 2022)

The Ministry of Health of the Republic of Indonesia (Depkes RI) has made many efforts to improve dental health, one of which is oral health promotion. Oral health promotion can be carried out and developed with various media, both through print media and electronic media 10-12. Educational media using pocket books according to studies, can significantly improve knowledge and behavior. Electronic pocketbooks are an alternative media used today, especially in conducting health promotion. An electronic pocketbook is an electronic book containing information that can be in the form of images or simple text and displayed on a digital screen that can be easily carried everywhere. The material in the electronic pocket book can be read and studied regardless of time and place, because it can be accessed through a smartphone that is easy to carry (portable) (Larasati, Jupriyono, Sangkot, & Hadi , 2022)

Semarang City is the capital of the densely populated Central Java Province. The pregnancy rate in Semarang City in the last 1 year reached 6,919 pregnant women, with the highest pregnancy rate in the Kedungmundu Health Center working area, which was 605 pregnant women. Based on preliminary studies conducted at Puskesmas Kedungmundu, it is known that a dental and oral health promotion program for pregnant women has been carried out in conjunction with the MCH program, which is an obstacle for dental health workers because the dental and oral health counseling program only gets a little time and only uses PPT media. So that health workers cannot provide maximum counseling, and cause the information obtained by pregnant women is very limited. The high pregnancy rate in the Kedungmundu Health Center working area, as well as the lack of maximum oral health education for pregnant women, makes the area a target that is considered appropriate in conducting research related to the development of oral health promotion media for pregnant women with electronic pocketbook media in an effort to increase knowledge and attitudes towards maintaining oral health and dental health of pregnant women related to the main purpose of this research is to produce appropriate electronic pocket book media towards maintaining the oral health of pregnant women.

## **METHOD**

This study used qualitative research. Data were collected from November 2023 to February 2024 at the Kedungmundu Health Center and Candilama Health Center in Semarang City, Central Java. The data collection process is by conducting observations and interviews with dentists, dental therapists and 3 pregnant women to obtain need assessment data, in addition to filling in data on the characteristics of pregnant women to 45 pregnant women at the Puskesmas working area of the Semarang City Office as the intervention group population. The interview and observation data that have been collected are then validated by 2 dental health experts and IT experts in accordance with ISO 9126 guidelines. The technique of processing the results of interviews and observations is then described through 4 stages, namely the Needs Analysis Stage, the Design Stage, the Expert Validation and Revision Stage and the Trial Stage.

## **RESULTS**

### **1. Needs Analysis**

Based on the results of interviews with 3 pregnant women, dentists and nurses, the results of the needs analysis are as follows.

- a. The media needed is media that is easily accessible
- b. Media that contains text, images, and videos
- c. Media with language that is easy to understand
- d. Material about oral and dental diseases in pregnant women
- e. Materials on maintaining oral health during pregnancy.

Based on the results of the food needs analysis, researchers developed an educational model in the form of an electronic-based pocket book, namely "MAMABOOKS". The mamabooks media can be downloaded via playstore which makes it easier for pregnant women to obtain information related to oral and dental health during pregnancy, and has been tested by dental and oral health experts. The material in the mamabooks is adjusted to the results of the needs analysis, namely oral and dental diseases, signs of oral and dental diseases, and maintenance of oral and dental health in pregnant women.

The material presented in the mamabooks media is not only in the form of text, but there are also pictures and videos that can help pregnant women understand the material. In the mamabooks there are also quizzes that can be filled in by pregnant women to see how far pregnant women know related to oral health.

### **2. Design Stage**

At the product design stage, media making is adjusted to the summary of the results of the needs analysis. The products made by researchers are mamabooks in the form of applications containing material related to the dental and oral health of pregnant women that have been validated by material experts and IT experts through improvements and revisions to MamaBooks products..

### **3. Validation and Revision Stage**

The results of this study have gone through the validation and revision stages through IT experts and material experts according to ISO 9126 guidelines..

#### 4. Trial Phase

##### a. Respondent characteristics

###### 1) In terms of age of respondents

There were 1 pregnant woman <20 years old in the intervention group, and 3 pregnant women in the control group. In the age range of 20-35 years, there were 36 pregnant women in the intervention group, and 37 pregnant women in the control group. While the age of pregnant women >35 years in the intervention group was 5 pregnant women, and in the control group as many as 2 pregnant women.

###### 2) Data in terms of education level

In the intervention group and control group, the highest frequency was at the high school education level, as many as 20 pregnant women in the intervention group and as many as 21 pregnant women in the control group. In the intervention group there were respondents with elementary school education level as many as 4 pregnant women, while in the control group the lowest education level was at the junior high school education level as many as 14 pregnant women and in the intervention group with junior high school education level as many as 4 pregnant women. At the last level of education D4 / S1 as many as 13 pregnant women in the intervention group and as many as 5 pregnant women in the control group. In both groups, the highest level of education of the respondents was S2, with 1 pregnant woman in the intervention group and 2 pregnant women in the control group.

###### 3) Data in terms of gestational age

The intervention group had 10 pregnant women in the first trimester of pregnancy, while the control group had 4 pregnant women. In the second trimester of pregnancy, there were 14 pregnant women in the intervention group, and 23 pregnant women in the control group. In the third trimester of pregnancy, there were 18 pregnant women in the intervention group, while in the control group there were 15 pregnant women.

###### 4) Initial condition of knowledge and attitude of oral health maintenance of pregnant women

Information on knowledge of dental and oral health maintenance of pregnant women in each group. In the intervention group, the average value before the intervention was higher than the control group, namely the average value in the control group of 10.76 while in the intervention group it was 10.95. The average difference between the two groups is 0.19.

###### 5) Oral health maintenance attitude

Oral health maintenance of pregnant women before the intervention in the control group was higher than the intervention group at 44.48, while in the intervention group it was 43.05. The average difference between the two groups is 1.43.

## DISCUSSION

**In this research, the stages of the method were used with the results described as follows. Needs Analysis Stage**

From the results that have been carried out, it was found that the main informants, in this case pregnant women, did not receive oral health education during pregnancy on an ongoing basis. The education carried out is not comprehensive so that the health material on teeth and mouth during pregnancy is not understood in depth. This resulted in many pregnant women

assuming that tooth and mouth pain during pregnancy was not a major problem that required a check-up to the dentist. According to research by Wijaksana, Bargowo and Supandi (2021), even periodontal disease experienced by pregnant women is one of the risk factors for babies born prematurely and LBW. From the study results, it was found that the prevalence of pregnant women with gingivitis was 73% and periodontitis was 36%. Periodontitis is more capable of affecting pregnancy than smoking or consuming alcohol during pregnancy. From the interview results, it is also known what media was previously used when providing oral health education to pregnant women. According to the main informants, the media they have seen during oral health education include leaflets, posters, power points, and dental phantoms. According to the study, education with leaflet and poster media is less effective, because for leaflets themselves are media that are easy to carry anywhere, but leaflet media if the print is less interesting to the reader, it will make the reader not want to keep it.

In addition, the triangulation data explained that the main informant of oral health education at the Puskesmas is not a mandatory program, so it is very rare to provide oral health education to pregnant women. Limitations also make the provision of education related to the oral health of pregnant women in the pregnant women's class program not optimal. According to triangulation informants, the lack of human resources, funds and time make limitations in providing education. The media used is very limited, the lack of time also limits the space for pregnant women to move in the oral health education session, so that pregnant women do not have much opportunity to ask questions and understand the information conveyed. In this case, it is necessary to have more effective media for pregnant women in providing material about oral and dental diseases that often occur in pregnant women, so that pregnant women realize the urgency of caring for and maintaining oral and dental health.

### **Product Design Stage**

At the product design stage, the development of mamabooks media is carried out, containing material that is tailored to the results of the needs analysis. The products made by researchers are mamabooks in the form of applications containing material related to oral health of pregnant women. The product made by researchers is electronic-based media in the form of applications, in which the application users will get information related to oral and dental health during pregnancy that has been tested by experts. The material in the mamabooks application includes various kinds of dental and oral diseases that are often experienced by pregnant women, how the signs are, how to maintain oral health during pregnancy such as the habit of brushing teeth and the right mouth, food diet and there are also videos that make it easier for pregnant women to understand the material of brushing teeth.

### **Expert Validation and Revision Stage**

After media development, the media will be assessed by several experts and revised. This is done so that the media is said to be suitable for use. The assessment by material experts and IT experts is attached. Some suggestions given by experts are then adjusted by researchers in revising the products made. Furthermore, if the media has been revised, then the researcher conducts a limited trial. In addition to revisions and suggestions, there is a feasibility assessment conducted by experts. Researchers use the ISO 9126 assessment in testing the feasibility of the developed media.

### **Limited Trial Stage**

At the limited trial stage, identification was carried out related to the characteristics of respondents, identification of the knowledge of pregnant women and the attitudes of pregnant women, as for the description is as follows.

### **Characteristics of respondents**

The awareness of pregnant women towards oral health during pregnancy play the important role of her general health. It is happen because it can affect pregnancy outcomes, as well as it may affect the newborn overall health. Based on that, every pregnant woman plays critical role in shaping oral hygiene habit so the pregnancy until their childbirth moments will happen in a good condition (Wassihun, 2022).

#### **Age**

Based on the results of the study obtained data on the characteristics of pregnant women in the intervention group and control group based on age there is no difference, with the average age of respondents being 20-35 years. This shows that the average pregnant woman is at a productive age. According to research studies the right age for women to conceive is 20-30 years, and if a woman's age is > 35 years or <20 years then it can pose a risk to pregnant women. Before entering the age of 20, there is a high risk for pregnant women because the function of the reproductive organs is not mature enough to work properly. (Dumilah, 2019). In addition to women less than 20 years of age, women over 30 years of age also have a high risk. In addition, increasing age also affects the learning ability of individuals, so that the older the age, the more difficult it is for individuals to learn due to the decline in individual physical abilities. (Rinata & Andayani, 2018). The readiness for childbirth in mothers one of the factor is affected by age. The more older pregnant women, the more mature they are to learn and choose the right decision for themselves (Karmila, 2024). Same result happen in Fegita (2022) that show most productive age of the mother is in between 20 – 35 years old, at that age most of the pregnant mother able to accept pregnancy both from psychological and physical perspective. On the other hand, Setiawati (2020) stated that there is no significance amount of effect between pregnant women's age and their knowledge.

#### **Education**

The results of the analysis of characteristics based on the education of respondents, it is known that there is no difference between the intervention group and the control group. The average level of education of respondents is high school education (SMA-Sarjana), and the highest average is pregnant women with a high school education level. Education is an effort made to develop one's personality and abilities. Education also affects the learning process, the higher a person's education, the easier it is to get information. Another study said that knowledge is influenced by formal education factors, this is closely related because it is expected that with a person's higher education, knowledge will be broader. The low level of maternal education will also have an impact on accessing knowledge, especially in the health sector, so it will be difficult in the application of household life. Education level based on Kiftia (2022) stated that the pregnant women's readiness towards controlling their behavior will give the best care for their own childbirth, because it is shown by the huge significant difference between women who receive educational level and who are not.

#### **Knowledge of Pregnant Women**

Knowledge is an indicator of a person in taking action. If someone is based on good knowledge of health, then that person will understand the importance of maintaining health and motivate them to be applied in their life. (Notoatmodjo, 2007). Prenatal knowledge often accepted in prenatal class held by goverment healthcare or even hospital. Prenatal education is extremely important, especially for the first time parents. Pregnant women who taking classes that provides information about birth, breastfeeding, pregnancy and parenthood transition can help communicating what they will need and avoid during their pregnancy (Rosh & Fetal Medicine, 2022). Pregnant women need to educate themself in order getting more knowledge

about the importance of oral health during pregnancy. The information that they get might affect to prevent newborn infection, and acknowledge them with the food they eat and the cleanliness of their oral (Manurung, 2021). Knowledge about oral care also break the myths that has been widespreading in pregnant women, as a result pregnant women will no more receive less dental care than when they are not pregnant (Yenen, 2019) because the more pregnancy women having a good knowledge about oral health care it will develop the treatment plan, and delivery suitable medical, nutritional and dental care to them (Hemalatha, 2023).

Knowledge is very important in the formation of a person's action (ovent behavior), it is obtained through what is heard and seen. Things that can affect knowledge are education, age, occupation, interest, experience, culture, and information. (Maryam, 2018). Based on Groisman (2023) knowledge of the oral health in pregnant woman with emphasis in dental caries happen more often in area with low economical status, so the need for give more educational knowledge in oral health care is very urgent in rural and some low economic status area. From the results of the study, it is known that the initial condition of knowledge of pregnant women in the intervention group has an average score of 10.95, while in the control group it is 10.76. This shows that the knowledge of dental and oral health maintenance of pregnant women in the intervention group and control group is at a level of knowledge that is not much different or even the same. Mamabook will provide on how pregnant women can implement good oral hygiene, and healthy foods to eat. Mamabook act as a guideline for pregnant women so that they can reach the simplest access to the oral health information during pregnancy.

### **Attitude of Pregnant Women**

The attitude of pregnant women is a mother's response to maternal oral health during pregnancy. Attitude is one of the means in achieving a goal in terms of the adjustment function, because the attitude taken by someone will be able to adjust well to the surroundings. Attitudes are influenced by several things, namely personal experience, the influence of other people who are considered important, culture, mass media, educational institutions, religion, and the influence of emotional factors. (Maryam, 2018) Pregnant women during pregnancy need to attend prenatal classes to encourage themself of what to do and what to prevent, also they need to stop using products that will affect to their newborn and stay healthy by maintaining the food, exercise, everytime (Tips for Good Oral Health During Pregnancy, 2022). The definition of attitude according to experts is also said to be a state of mind and a state of mind that is prepared to respond to an object which is then organized through experience and can have a direct or indirect influence on practice or action. Attitude is also said to be a response that only arises when individuals are faced with a stimulus. A person's attitude towards an object is a feeling of support or favor (favorable) or a feeling of non-support or impartiality (unfavorable) to a particular object. (Notoatmodjo, 2007)

The attitudes towards oral pregnancy care based on Abdullati (2023) can be determined such as using toothpicks, dental floss, brushing and attending dental examination can be more impactfull for pregnant women. Also, the most important part is healthcare providers recommend due to pregnancy, pregnant women need to observe their hygiene more than before pregnancy. It is proven by Ojeda research that claims women with no history of oral problems are more likely having a good perception of medium high income, good oral hygiene practices and tend to have a good perception of their oral health (Ojeda, 2022).

## **CONCLUSION**

Based on this, the conclusions from the results and discussion above are as follows. The media used previously cannot be used for the long term because it is not easy to carry anywhere, or easily lost, so the media needs for pregnant women are more flexible media, namely electronic pocket books (mamabooks) developed by researchers. The development of mamabooks media was carried out through several stages, namely needs analysis (need assessment), product design stage, expert validation, product trials, then product results containing oral and dental health maintenance during pregnancy (dental and oral diseases of pregnant women, food diet, how to brush teeth properly), as well as quizzes on the knowledge and attitudes of pregnant women towards oral and dental health. Based on the result, It was found that there was no difference in characteristics between the intervention group and the control group using MAMABOOK as their oral pregnant guidelines.

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