

# Prevention of Dental Caries in Pregnant Women and Stunting Prevention Through Interactive Education

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## Abstract

Poor dental and oral health status of pregnant women has an impact on the development of early childhood caries which can result in many consequences for the child's health in the future. Preventing dental infections during pregnancy requires pregnant women to receive dental and oral health education as well as self-care behavior education. The purpose of this community service is to increase the knowledge of pregnant women in preventing dental caries. The implementation of community service through dental and oral health education through smart catalogs and assistance in brushing teeth practices in pregnant women is able to increase knowledge, attitudes and actions to maintain dental health and reduce the index debris score in pregnant women.

## 1. Introduction

The Global Burden of Disease Study 2016 states that dental and oral health problems, especially dental caries, are diseases experienced by almost half of the world's population (3.58 billion people) (Ministry of Health of the Republic of Indonesia, 2019). The results of Basic Health Research (Riskesdas) in 2018 stated that the prevalence of caries in Indonesia was 88.8% with the prevalence of root caries at 56.6% (Ministry of Health of the Republic of Indonesia, 2018). Riskesdas Semarang in 2018 for the prevalence of dental caries is 37.20%, swollen gums or abscesses 8.68%, bleeding gums 27.43% and canker sores 6.08% (Riskesdas, 2018). Pregnant women are a vulnerable group to dental caries with a prevalence of 84.7%, while those who are free of caries are only 15.3%. With the average DMF-T value of pregnant women is stated as follows: D = 3.03, M = 1.08 and F = 0.05. The average DMF-T index in pregnant women was 4.34. Pregnant women in the first trimester had a DMF-T value of 2.33, while in the second trimester had a DMF-T value of 4.69. Pregnant women in the third trimester had a DMF-T value of 4.57 (Tedjosasongko, Anggraeni, Wen, Kuntari, & Puteri, 2019).

Dental caries is a disease caused by bacteria damaging the hard tissues of the teeth. Dental caries are chronic and develop over a long period of time, so most sufferers experience them for a lifetime. If left untreated, the disease can result in pain (pain), tooth loss and infection. During pregnancy, the pain due to dental caries makes pregnant women not want to eat. As a result of malnutrition, it can cause babies to be born with low birth weight (BBLR). The pain caused by dental caries can also cause an increase in blood pressure in pregnant women so that there is a risk of pre-eclampsia. This dental caries also stimulates the release of prostaglandin hormones. This hormone causes contractions in the uterus, if the uterus continues to contract, it will threaten premature birth to miscarriage. In addition, dental caries can reduce health status in pregnant women (Anisah Nur Aini, Henry Setyawan Susanto, 2018).

Poor dental and oral health status of pregnant women has an impact on the development of early childhood caries which can result in many consequences for the child's health in the future. Preventing dental infections during pregnancy requires pregnant women to receive dental and oral health education as well as self-care behavior education. A study on pregnant women's knowledge and awareness of dental and oral health found that they had low levels of knowledge and awareness. In addition, another study found that most pregnant women did not get dental or oral health care at a service facility during their

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pregnancy (Deghatipour et al., 2019).

Personal hygiene behavior in dental and oral health by brushing teeth properly and correctly according to the program's recommendations, namely after breakfast and before going to bed at night is only 2.8%, although the percentage of people who brush their teeth every day is quite high, namely 94.7%. The fact that this condition continues shows that the people's self-care practices in the field of dental health have failed to improve the situation. Behavior is one of the determinants of health, it can affect disease incidence as a measure of health outcomes (such as quality of life, life skills, or health expectations (Sutomo, Sulaeman, Akhyar, & Sakuntalawati, 2022). Behavior control can be carried out with the Theory of planned behavior (TPB), which is a theory developed by Ajzen which is a refinement of the Theory of reasoned action (TRA) proposed by Fishbein and Ajzen. According to this theory, a person's intention to behave is the most important factor in his behavior. The results of the measurement of attitudes, subjective norms, and behavior control (Perceived Behavioral Control) determine the intention to display a behavior (Davis) *et al.*, 2015). Along with proper systematic health education, health services such as comprehensive oral health screenings and care during antenatal visits can play an important role in improving dental and oral health during and after pregnancy (Traisuwan, 2021). In addition, the success of health promotion is influenced by the media used in delivering health information. The most widely used tool or media in counseling is print media because it makes it easier for the target to use media and store it (Qomariah and Handayani, 2016).

Based on the above background, one of the solutions that will be carried out by the author to overcome the problem of maintaining dental health health through the dental health education education model "The Application of the D-Salma's Catalog Smart Model in the Prevention of Dental Caries of Pregnant Women and the Prevention of Stunting". The advantages of *D-Salma's Catalog Smart* are equipped with a smart pen as an audio counseling that contains the definition of caries, signs and symptoms of caries, its causes, treatment and prevention, aiming to change the behavior of pregnant women in improving knowledge, attitudes and skills, lowering OHIS scores during pregnancy and preventing stunting from the moment the baby is in the womb.

## 2. Method

This research-based community service activity was carried out by lecturers and students of the Semarang Ministry of Health Polytechnic with the main target of pregnant women in Cepoko Village, and was fully supported by the local Village and Puskesmas. As a form of implementation of the Tri Dharma of Higher Education, this program aims to overcome the low behavior of maintaining dental and oral hygiene and prevent stunting from pregnancy. The activity process is carried out systematically, starting from the preparation stage through licensing and the preparation of educational materials in the form of D-Salma's Catalog Smart, to the stage of taking initial data (pre-test) to measure respondents' knowledge, attitudes, actions, and debris index scores. At the intervention stage, pregnant women are given dental health education, nutritional assistance, and the practice of brushing their teeth together to instill healthy habits directly. This series of activities ended with an evaluation through a post-test which aimed to measure the effectiveness of the program in changing behavior and improving the oral hygiene status of partners in an integrated manner.

## 3. Result and Discussion

There are several activities carried out in community service through the implementation of education and the practice of brushing teeth together. The activity was carried out for 3 weeks, namely initial data collection, implementation of activities and periodic monitoring as well as final data collection. The results of data collection were to measure knowledge, attitudes and actions to maintain dental health and the status of debris index score in pregnant women.

**Pregnancy Behavior Measurement Table**

| Yes | Categories | Knowledge |    |      |    | Attitude |    |      |    | Actions |    |      |    | Debris Index |    |      |    |
|-----|------------|-----------|----|------|----|----------|----|------|----|---------|----|------|----|--------------|----|------|----|
|     |            | Pre       |    | Post |    | Pre      |    | Post |    | Pre     |    | Post |    | Pre          |    | Post |    |
|     |            | n         | %  | n    | %  | n        | %  | n    | %  | n       | %  | n    | %  | n            | %  | n    | %  |
| 1   | Good       | 2         | 13 | 8    | 53 | 3        | 20 | 10   | 67 | 3       | 20 | 8    | 53 | 4            | 27 | 11   | 74 |
| 2   | Medium     | 6         | 40 | 5    | 34 | 3        | 20 | 2    | 13 | 6       | 40 | 4    | 27 | 7            | 46 | 2    | 13 |
| 3   | Bad        | 7         | 46 | 2    | 13 | 9        | 60 | 3    | 20 | 6       | 40 | 3    | 20 | 4            | 27 | 2    | 13 |

The measurement results showed a significant improvement in all aspects of respondents' dental and oral health behavior after the intervention. In the knowledge aspect, there was an increase in the percentage of the "Good" category from 13% to 53%, which was accompanied by a drastic decrease in the "Bad" category. The most striking change was seen in the attitude aspect, where respondents with the "Good" category jumped from 20% to 67%, indicating that the education provided was very effective in changing respondents' perceptions.

In line with the increase in knowledge and attitudes, the real action aspect of dental care has also improved, with an increase in the "Good" category by 33%. The success of this intervention was clinically proven through the results of the Debris Index measurement, where respondents who had the oral hygiene criteria "Good" increased rapidly from 27% to 74%. Overall, it can be concluded that the combination of education through smart catalogs and accompanying practices of brushing teeth together is effective in improving healthy behavior and reducing the index of food residues in the respondents' mouths.

The implementation of community service through dental and oral health education through smart catalogs and assistance in brushing teeth practices in pregnant women is able to increase knowledge, attitudes and actions to maintain dental health and reduce the index debris score in pregnant women. The service activities were carried out for two weeks. On the first visit, data on attitudes and actions to maintain dental and oral health were collected. This is done to assess how well pregnant women understand dental health. The activity was carried out with the practice of brushing teeth which is usually done by pregnant women every day. In the second week of the service program, the team focused on an in-depth educational intervention using smart catalogs. This is not just an ordinary guidebook, but an interactive medium designed specifically for pregnant women. The goal is to convey important information about dental and oral health in a more interesting and easy-to-understand way. Compared to conventional lecture methods, the use of visual catalogs has been proven to increase participants' interest and motivation.

The smart catalog contains a variety of essential information. The first material is about the close relationship between dental health and pregnancy. Many pregnant women are unaware that dental and oral problems, such as gingivitis, can affect fetal health (Riolina, 2022). This catalogue explains in simple terms how gum infections can increase the risk of premature birth or low-weight babies (Salmawati, Hadisaputro, Sunarjo, & Sutomo, 2023). With this understanding, pregnant women will realize how important it is to maintain dental hygiene not only for themselves, but also for the baby. Next, the smart catalog discusses nutrition guidelines for dental health. Inside is a list of foods that are good and bad for teeth. For example, pregnant women will be taught to eat calcium-rich foods such as milk, cheese, or green vegetables that are good for the formation of teeth and bones. Instead, they are reminded to reduce the consumption of sugary foods or soft drinks that can trigger tooth decay. This information is very practical and relevant to their daily diet.

In addition to nutrition, this catalog also emphasizes the importance of regular check-ups with the dentist during pregnancy. Many pregnant women are reluctant to have their teeth checked because of untrue myths. This catalog straightens out those misconceptions and explains why regular visits are essential to detect problems early and get safe treatment. The team also provides guidance on the timing and benefits of brushing your teeth correctly, including how to brush your teeth effectively and why this habit should be done at least twice a day. Many pregnant women still have the myth that tooth decay during pregnancy is normal because "calcium is taken up by the baby". In fact, baby calcium is taken from the mother's food intake and bone reserves, not teeth. With increased knowledge (from 13% to 53%), pregnant women now understand that tooth decay can be prevented through effective plaque control. Preventive measures taken during pregnancy are also the first step in health education for the baby-to-be, because mothers who have the habit of maintaining good oral hygiene tend to apply the same pattern to their children in the future (Aprilia, Purwaningsih, & Marjianto, 2022).

Providing education through counseling supported by smart catalogs has proven to be very effective in motivating pregnant women. The combination of interactive verbal explanations and engaging visuals makes the learning process more enjoyable. This method has succeeded in changing their views, from simply knowing information to being moved to taking concrete actions in maintaining dental health. This high motivation is the key to the program's success in creating positive and sustainable behavior change

A significant increase in the aspects of knowledge, attitudes, and actions in this activity is in line with the Theory of Behavior Change (Lawrence Green), which states that a person's health behavior is influenced by predisposing factors, one of which is knowledge and attitudes (Rahmawati, 2019). The changes that have occurred show that education uses media *Smart Catalog* Acting as a *Enabling Factor* (possible factors) that make it easier for respondents to absorb complex information to be simpler and more interesting. In addition, a positive correlation between action and decline *Debris Index* is supported by the research of Notoatmodjo (2014), which confirms that practices based on knowledge will be much more lasting (*Long lasting*) compared to non-knowledge-based practices (Notoatmodjo, 2014). Clinically, mechanical control of plaque and debris (brushing your teeth) with the correct technique is the most effective way to lower the risk of periodontal disease, especially in at-risk groups such as pregnant women who experience hormonal changes (Sormin & Puri, 2019).

During pregnancy, there is a significant increase in the hormones estrogen and progesterone. An increase in this hormone causes the blood vessels in the gums to become wider and more sensitive to irritation from plaque or food residue (*Debris*) (Rahmayanti, Suryanti, & Suwargiani, 2020). If the pregnant woman has a score *Debris Index* (such as data on *Pre-test*), the leftovers will quickly trigger gum inflammation or *Gingivitis Gravidarum*. Therefore, lowering debris scores through educational interventions is essential to prevent more severe inflammation during pregnancy. The use of the demonstration *method* in this activity is also strengthened by Albert Bandura's social learning theory, where the process of direct observation and imitation during the practice of brushing teeth together accelerates the mastery of the respondents' (psychomotor) skills. This explains why the percentage of the "Good" category on the *Debris Index* jumped sharply to 74%, because respondents not only knew, but were also able to practice how to clean teeth with precision.

#### 4. Conclusion

The integration of interactive visual education and psychomotor assistance is an effective solution in reducing the risk of periodontal diseases (such as *Gingivitis Gravidarum*) and supporting the health of pregnant women and fetuses in an integrated manner.

#### Author Contributions

Bedjo Santoso: wrote a manuscript for the discussion and supervisor section. Jeffri Ardiyanto: wrote the manuscript of the introductory and supervisory sections. Marsum: write a manuscript for the results and discussions. Manzilina Hani Baity Jannaty: translating the manuscript, Rose Asni Lathifah: writing the introductory manuscript, Lanny Hapsari Winnursita: writing the manuscript of the research methods and conclusions.

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The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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