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# Development of a non-pharmacological pain management model in dental and oral health care for odontectomy procedures

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**Abstract**
**Background:** Individuals with tooth impaction are at risk of developing complications in the oral cavity. These cases are usually treated through an odontectomy procedure, which is performed by a dentist specializing in oral surgery together with other health professionals, such as dental and oral therapists. After surgery, pain is often present and can affect comfort in activities. Non-pharmacological pain management can be used as an alternative treatment to help the recovery process. Therefore, the development of non-pharmacological pain management models is an important innovation in oral health care services.
**Objective:** To produce a model of non-pharmacological pain management in oral health care for odontectomy.
**Methods:** The method uses research and development (R&D) with a Quasy Experimental Pretest and Posttest design Non-equivalent Control Group. Using normality test, Wilcoxon, Mann-Whitney. The technique of taking research subjects was purposive sampling consisting of 22 patients divided into 2 control and intervention groups.
**Results:** The results of the expert validation test of the oral health care model and the non-pharmacological pain management model are worth the p-value of 0.000 and 0.001. The results of the effectiveness test showed that it was feasible in increasing patient satisfaction (p-value 0.001) in the intervention group.
**Conclusion:** The non-pharmacological pain management model in dental and oral health care is feasible to be applied in dental and oral health care services for odontectomy patients and is effective in increasing patient satisfaction with odontectomy.

**Keywords:** Dental and Oral health care, odontectomy, non-pharmacologic pain management, patient satisfaction

## Introduction
Dental and Oral health problems in Indonesia and the global community have always been a major concern. From 2013 to 2018, the oral health problems of the Indonesian population increased significantly, from 25.9% to 57.6% [1]. One of the problems is impaction of third molars, the prevalence of which ranges from 16.7% to 73.83% [2, 3]. Tooth impaction is a condition where the tooth is completely or partially covered by mucosa and bone and the tooth that grows is not in accordance with the place where it should be [4, 5]. Handling cases of tooth impaction involves dentists with special expertise, namely dentists who specialize in oral surgery, because it requires surgical tooth extraction or odontectomy [2, 6]. Surgery is an invasive action that is performed by injuring the problematic part of the body, and then closed by stitching [7]. A person who has undergone an odontectomy procedure may experience inflammation or swelling that is accompanied by pain, both after surgery and in the period after surgery [8, 9]. About 40-60% of patients will experience moderate to severe pain, especially during the first three days, which can impact their quality of life [10-12]. If pain is not managed effectively, there is a pathological reaction to pain in the body. Persistent pain in patients can cause sleep disturbances, increase stress hormones in patients, and reluctance to move due to pain [13, 14]. Pain treatment can be divided into two, namely pharmacological treatment and non-pharmacological treatment [15].

In dental health services, oral surgeons collaborate with other health professionals including dental and oral therapists in performing odontectomy care from before, during and after the procedure. There is a need for out-of-action care by specialist dentists who also play a role in achieving optimal treatment results. These treatments can be performed by dental and oral therapists.

Oral and dental therapists are authorized to provide oral health care [16]. Care services contain several stages from assessment, diagnosis, planning, implementation, evaluation and reassessment / revised [17, 18]. At the implementation stage, there is no organized method or technique to address the needs required by oral surgeons. So the need for an organized treatment approach through non-pharmacological methods. Non-pharmacological methods are methods or techniques that do not use chemical drugs to reduce pain and accelerate healing [19]. Non-pharmacological techniques include cold compresses, warm compresses, and massage therapy. Based on this background, researchers are interested in conducting research related to the development of a non-pharmacological pain management model in dental and oral health care in odontectomy.

## Materials and Methods

The method used is Research and Development (R&D). The R&D method is used in research to create new models or products and test their effectiveness. There are five main steps in the research and development procedure including: 1) Data collection, 2) Model product design, 3) Expert validation and revision, 4) Model product trials, 5) Product or model results.

The data collection stage involves gathering information to identify problems in the field. Data was obtained through observation to directly observe the existing problems and through interviews. In addition, this process also aims to prioritize problems and explore the needs of specialists in providing dental health services to patients with odontectomy.

The model planning stage includes the stages of developing a non-pharmacological pain management model in dental and oral health care according to the results of information collection. The design of the non-pharmacological pain management model and the odontectomy dental and oral health care model, then carried out an expert validation test. The validation test by experts was carried out to ensure the feasibility of the product before the product was applied to patients. The feasibility test data collection was carried out using a questionnaire to experts, then the revision stage of the model was carried out according to the input. Meanwhile, the model product trial stage was carried out on patients with odontectomy. The product trial used the Quasy Experimental Pretest and Posttest design Non-equivalent Control Group.

The sampling technique at the information gathering stage used purposive sampling techniques consisting of hospital directors, oral surgeons, and dental and oral therapists. Samples at the expert validation test stage used purposive sampling techniques, consisting of oral health care experts, oral surgery specialists, dental and oral therapist practitioners, and two physiotherapists. Validation of oral health care experts and oral surgeons is intended to assess the sequence of care stages that are appropriate for patients with odontectomy. Physiotherapist validation is intended to assess the suitability of the non-pharmacological model which consists of cold, warm compress therapy and massage therapy. While the sampling technique at the model trial stage with purposive sampling technique, namely, patients with odontectomy treatment who agreed to be used as research subjects amounted to 22 patients.

This study has obtained ethical permission from the research ethics commission of the Poltekkes Kemenkes Semarang with Ethical Approval number No. 0165/EA/KEPK/2024 and has obtained permission from the research site, namely the Muhammadiyah Semarang Dental and Oral Hospital. Before the study began, each respondent was given an explanation of the purpose of the study, the stages of data collection, the benefits of the study, patient data that would only be known by the researcher, as well as their freedom to decide whether they wanted to participate in the study, by giving informed consent to express their willingness or unwillingness. Respondents who are willing will be given a research questionnaire. The assessment instrument at the information collection stage used an open questionnaire, while expert validation of the oral health care model and the non-pharmacological pain management model was carried out using a closed questionnaire, as well as a satisfaction assessment using a closed questionnaire.

The data processing stage includes several steps, namely editing to check the completeness of the data that has been collected, then coding to facilitate data processing, followed by entering data into a computer, cleaning data to ensure data suitability, then placing data into predetermined tables through the tabulation process, and finally conducting analysis tests. Using normality test, Wilcoxon, Mann-Whitney.

## Results

### A. Information Gathering

Interviews were used to collect information related to problems that commonly occur in the target group. This was done to further explore and seek consideration in developing a model of oral health care in oral surgery specialties. Interviews were conducted with hospital directors, doctors specializing in oral surgery, and practicing dental and oral therapists. Based on the results of the interviews, it can be concluded as follows:

1. Generally, dental health problems that exist in the oral surgery specialty clinic are tooth impaction. Related treatments that can be done to handle these cases are tooth extraction, using the odontectomy procedure.
2. Odontectomy is a procedure to treat impacted teeth by making a small incision, reducing some of the bone around the tooth, then removing the tooth and closing it with stitches. Local anesthesia is usually used to reduce pain during this procedure.
3. After the odontectomy, as the effects of the anesthesia begin to wear off, patients may experience some of the effects of the procedure, including pain.
4. There is no specialty care for oral surgery.
5. The role of the oral therapist includes providing care before, during, and after the procedure, including providing an organized method of care to meet the needs of the oral surgery specialist.
6. There is a need for an organized care model to address the impact of odontectomy treatment that oral therapists can provide to patients.

### B. Development of the model

The role of dental and oral therapists is not only important before and during the action, but also after the action. Oral therapists can educate patients about self-care at home to reduce patient complaints using non-pharmacological methods. This emphasizes the important role of oral therapists in providing holistic care for patients undergoing odontectomy. The following are the stages of care provided by dental and oral therapists to patients with odontectomy.

**Table 1:** Stages of dental and oral therapists in performing care services to odontectomy action patients

| Stage | Content |
|---|---|
| Stage I<br>Initial Stage Action preparation | Patient identification stage<br>Oral therapist conducts information gathering<br>Subjective assessment<br>Objective assessment<br>Edukai regarding the medical action plan that will be carried out |
| Stage II<br>Maintenance Planning | Preparation stage of a comprehensive treatment plan<br>Perform oral diagnosis based on 8 basic human needs in dental health<br>Develop a treatment plan in the form of collaborative and independent actions |
| Stage III<br>Work/Implementation | Implementation stage of planned medical interventions and actions<br>Collaborative implementation (chairside assistant) based on chairside assistant SOP on odontectomy with local anesthesia.<br>Independent implementation (patient education after odontectomy in the form of non-pharmacological methods, namely: cold compresses, warm compresses and massage therapy). |
| Stage IV<br>Evaluation | The stage of ensuring that the interventions are appropriate to the needs and deliver the expected results<br>Evaluate the medical treatment and self-care that has been done |
| Stage V<br>Reassessment | A stage to ensure that the treatment provided is still appropriate and effective, and to adjust the treatment plan if necessary.<br>Conduct follow-up after patient results are obtained<br>Conduct follow-up after any changes in treatment |

### C. Expert Validation

Validation is the process of assessing the model to validators who are experts in their fields. This is done to obtain data used as a basis for testing the feasibility of oral health care models and non-pharmacological pain management models. The percentage of product feasibility is divided into 5 categories:

1. **Not feasible:** 0-19, 99%.
2. **Less feasible:** 20-39, 99%.
3. **Quite feasible:** 40-59, 99%.
4. **Feasible:** 60-79, 99%.
5. **Highly feasible:** 80-99, 99%.

The average feasibility value of 97.78% with a p-value of 0.000 indicates that the non-pharmacological pain management model in oral health care is feasible to be applied to dental and oral health care services for patients after odontectomy (Table 2). The average feasibility value of 93.64% with a p-value of 0.001 indicates that the non-pharmacological pain management model in oral health care is feasible to be applied to post-odontectomy patients (Table 3).

**Table 2:** Expert validation of odontectomy dental and oral health care model

| Validator | Average | Category | Icc | p-value |
|---|---|---|---|---|
| V1 | 97,78% | Highly Feasible | 0,814 | 0,000 |
| V2 | | | | |
| V3 | | | | |

**Table 3:** Expert validation test results of non-pharmacological pain management models

| Validator | Average | Category | Icc | p-value |
|---|---|---|---|---|
| V1 | 93,64% | Highly Feasible | 0,894 | 0,001 |
| V2 | | | | |

### D. Satisfaction Assessment

1. **Normality Test:** The normality test results show a p-value <0.05, which means the data is not normally distributed. Therefore, non-parametric tests will be used, namely the Wilcoxon Test for paired data and the Mann-Whitney Test for unpaired data (Table 4).

**Table 4:** Data normality

| Variable | p-value | |
|---|---|---|
| | Intervention | control |
| Satisfaction Pretest | 0,026 | 0,044 |
| Satisfaction Posttest | 0,033 | 0,017 |

*Shapiro-Wilk

**Satisfaction Effectiveness**

The results of the paired data effectiveness test of patient satisfaction variables in the control and intervention groups both obtained a p-value <0.05, namely 0.003 and 0.001, meaning that the development of a non-pharmacological pain management model in oral health care is effective in increasing patient satisfaction. The results of the unpaired data effectiveness test show that there is a significant difference in increasing patient satisfaction in the control group and intervention group with an Asymp. Sig. (2- tailed) 0.003 ($p$<0.05) (Table 5).

**Table 5:** Patient satisfaction effectiveness test

| Statistics | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Group | Mean±SD Pre test | Mean±SD Post test | Delta±SD (Δ) | p-value | Asymp. Sig. (2-tailed) |
| Satisfaction | Control | 18,00±4,482 | 24,27±3,717 | 6,27±1,362 | 0,003 | 0,003 |
| | Intervention | 37,27±2,724 | 7,27±2,622 | 1,00±0,302 | 0,001 | |

*Wilcoxon **Mann-Whitney

## Discussion

It was found that tooth impaction is one of the most common dental conditions encountered in the specialty of oral surgery, especially in third molars. Third molar odontectomy is one of

the most common oral and maxillofacial surgical procedures performed to treat cases of tooth impaction. After odontectomy, patients will experience swelling accompanied by pain around the surgical area. An organized model needs to be developed to support optimal treatment outcomes. There are care needs beyond specialist care that can be carried out by dental and oral therapists, in dealing with pain, namely with a non-pharmacological pain management model. Dental therapists who are tasked with carrying out dental health care can apply the pain management model in their practice.

The development of an oral health care model is an innovation that aims to improve the behavior of dental and oral therapists and the handling of patient pain after odontectomy. The care model was developed from the oral health care service model according to the Indonesian Ministry of Health No.HK.01.07/MENKES/1513/2022. The non-pharmacological pain management model in oral health care, developed based on the needs of patients who will perform oral surgery, can assist in the success of treatment procedures and assist in the patient's healing process.

This innovation focuses not only on medical techniques and procedures, but also on a holistic approach that includes the psychological and emotional aspects of the patient. Developing this model, oral therapists can better understand and respond more effectively to patients' needs, ultimately providing self-administered non-pharmacological pain management instructions.

The expert validation process is very important in model development to test the validity of the product that has been designed, ensuring that the product meets the expected standards and objectives. Validators provide valuable assessments and input to improve the product before it is tested on respondents. With input from experts, the developed model can be improved and adjusted to be more effective and efficient in achieving health care goals. Based on the results of the validation test of the development of the oral health care service model, an average of 97.78% was obtained, which means that the model is relevant and feasible as a model of oral health care. The results of the validation test of the non-pharmacological pain management model obtained an average of 93.64%, which means that the model is relevant and feasible as a non-pharmacological pain management model in dental and oral health care for patients after odontectomy. This process ensures that the resulting model has a solid foundation and is ready for practical application in oral health care activities.

The results of the paired statistical test showed that there was a difference in patient satisfaction with care services between the control group with a p-value of 0.003 (<0.05) and the intervention group with a p-value of 0.001 (<0.05). Patients who received the intervention tended to report higher levels of satisfaction compared to the control group. This could be attributed to the more structured, informative and responsive service approach provided during the intervention. This study indicates that customized interventions designed to improve the quality of health care can have a positive impact on patient perceptions and experiences. Thus, intervention strategies implemented in health care services not only improve clinical outcomes but also increase patient satisfaction, which is an important indicator of health care success. With the development of this model, oral therapists can better understand and respond to patients' needs more effectively. This allows them to provide non-pharmacological pain management instructions that can be applied independently, which is associated with increased patient satisfaction as they feel more cared for and receive more personalized and comprehensive care.

Dental health service satisfaction is a comparison between the patient's perception of the service received and the patient's expectations before getting the service [20]. Patient satisfaction can be measured through patient service quality which includes dimensions of physical evidence (tangibles), reliability, responsiveness, assurance, and empathy. Oral health care provided to patients in accordance with the dimensions of service quality can increase patient satisfaction. Supported by previous research which states that there is a significant relationship between the quality of health services and the level of patient satisfaction, which shows a value of 61% with a satisfied category [21].

Another study stated that there was patient dissatisfaction with the attitude of dental and oral therapists in providing oral health services at Ujong Fatihah Health Center, Kuala Nagan Raya District [22]. This proves that the needs and expectations of patients in the utilization of health services are to pay attention to the attitude of health service providers, both doctors, nurses and other non-medical personnel who are good, the ability and knowledge of adequate personnel, good officer skills, so that patient satisfaction with service quality will be significantly related to the number of patient visits that increase.

## Conclusion

1. The development of a non-pharmacological pain management model in oral health care is feasible as dental and oral health care for odontectomy patients.
2. The development of a non-pharmacological pain management model in oral health care is effective for increasing patient satisfaction with odontectomy.

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## Author's Contribution

Not available

## Conflict of Interest

Not available

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Not available

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