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The Effect of Honey Used in Oral Care Intervention to Reduce Mucositis in Cancer Patients Undergoing Chemotherapy

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Abstract: *Cancer is a serious threat to Indonesian society because the incidence and mortality rate continues to increase, Treatment for mucositis as side effects of chemotherapy was oral care intervention by using a variety of agents, including honey. This study used quasyexperimenteal design, pre test and post test design with consecutive samplingtehnicque. The treatment group was given of honey used in oral care intervention and the control group was givedplasebo (chlorhexidine 0,2 %). Patients who had inclusion and exclusion criteria were given of honey used in oral care intervention previously then they measured for mucositis score and after 1 week of administration. The independent t-test results that there was significant difference between the treatment group and the control group. Value of p = 0,000, the reduction mucositis score in the group that gave honey used in oral care intervention more effective than the group that gave only placebo. Conclusions of this research is honey used in oral care intervention more effective in reducing mucositis score than the placebo group.*

Keywords: *Mucositis, Oral Care, Honey, Chemotherapy*

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I. Introduction

Cancer is a serious threat to Indonesian society because the incidence and mortality rate continues to increase. Cancer is the most common cause of death and number 2 in the world with the percentage of 13%. Every year 12 million people in the world suffer from cancer and 7.6 million of them die.It is estimated that by 2030 the incidence can reach up to 26 million people and 17 million of them die from cancer [1].

Cancer is also the second leading cause of death in the United States, with more than 1.6 million new cases and nearly 600,000 cancer-related deaths estimated to occur in 2015[2]. In Indonesia based on the Ministry of Health's Basic Health Research (2013), cancer prevalence in Indonesia reaches 1.4 per 1000 population, and is the seventh cause of death in Indonesia. While in RSUP. H. Adam Malik Medan patients who were treated for cancer reached 100 people every day for all types of cancer

The high incidence of cancer requires various treatment therapies. One of the common therapies given to cancer patients is chemotherapy.Chemotherapy is the action/therapy of giving chemical compounds (drugs) to reduce, eliminate orinhibit the growth of cancer cells in the patient's body. About 5% of all cancer patients equal to 10% of cancer die every year, including malignant cancer. Although some other cancers cannot be cured with chemotherapy but it can prolong life expectancy [3].

Chemotherapy has the working principle of killing cancer cells quickly, but can also kill healthy cells so chemotherapy often causes side effects including: mucositis, difficulty in chewing, swallowing, talking, oral bleeding, dry mouth, and loss of taste sensation. About 40% of all cancer patients undergoing chemotherapy experience mucositis [3].

Mucositis is an inflammation of the mucous membranes of the oral cavity that occurs in some cancer patients who receive chemotherapy treatment [4].. Mucositis occurs in about 40% of patients receiving standard doses and as many as 100% of patients receiving high-dose therapy or acombination of chemo-radiation in head and neck cancers [5].

Mucositis felt by the patient if it is not treated immediately will cause pain, malnutrition, bleeding, advanced infections and also can be life-threatening [6]. Dosage reduction, treatment delay and decreased nutritional intake [7].

Strategic intervention can be done by maintaining oral hygiene in reducing symptoms of oral mucositis. In addition, it is proven that maintaining oral hygiene with oral care protocols (oral care) can prevent and reduce the severity of mucositis [8]. Management of mucositis can be implemented by giving various agents to do oral

care but there are no standards that are routinely used today. One of general oral care agents that are given include chlorhexidine. Chlorhexidine is used as a mouthwash but can cause pain due to irritation [5].

In addition to chlorhexidine agents, other agent can also be given. Some studies recommend honey as one of the agents used in oral care to prevent and treat mucositis. Honey has antioxidant, antibacterial, antiviral and anti-inflammatory effects, helps reduce mucositis, epithelialization and facilitates healing by reducing the toxic effects of chemotherapy and radiation [9].

Some studies say honey is one of the traditional medicines that are beneficial to health including its ability to facilitate the healing process.Honey is an acid with a pH ranging from 3.2 to 4.5, which serves to inhibit the growth of pathogens. High sugar components from honey draws water from the wound, reducing the availability of water for pathogens, which further inhibits microbial growth. It also contains the enzyme glucose-oxidase which stimulates release of hydrogen peroxide after contact with body tissues, has antiseptic effects, and colonization by oral bacteria and the risk of anti-inflammatory sepsis, antimicrobials and healing properties of honey increase healing of mucositis effectively [10].

The results of literature studies state that honey can reduce mucositis in cancer patients as side effects of chemotherapy,

This study was conducted on cancer patients undergoing chemitherapy by using of honey used in oral care intervention.

II. Material And Methods

This was aquasi experimentpre testpost testwith control group in cancer patients undergoing chemotherapy room General Hospital H. Adam Malik Medan Indonesia fromDesember 2017 to Januari2018. A total 64sample adult subjects (both male and females) of aged ≥ 18-65 years.

Study Design:this is quasy experiment study

Study Location: This was aonchemotherapy room General Hospital H. Adam Malik Medan Indonesia.

Study Duration: Desember2017 toJanuari 2017

Sample size: 64 patients (32 group intervention and 32 grorp control).

Sample size calculation: The sample size was estimated on the of table power analysis with power (1-β) = .80, *effect size* (γ) = .70 dan α = .05. The target population from which we consecutive sampling selected. The sample size this study was 64 patients for each group (32 group intervenstion and 32 control group).

Subjects & selection method: The study population was drawn from consecutive ca patients who presented in chemotherapy room General Hospital H. Adam Malik Medan Indonesiawith mucositis in patients cancer the indication chemotherapy treatment initiation between from Desember 2017 to Januari 2018.

2.1. Inclusion criteria:

2.1.1 willing to be respondent,adult males and female.

2.1.2 Aged ≥ 18 -65 years,

2.1.3 Patient with chemotherapy, and did not have diabetes mellitus and HIV / AIDS.

2.2. Exclusion criteria:

2.2.1. Patient or patient's family is not willing to be a respondent.

2.2.2. Patients who have oral cancer or nasopharyngeal stage 4 cancer and tongue cancer that make it difficult for patients to open their mouths so that oral care is difficult.

2.3 Procedure methodology

Data collection in this research began by attaining research permit to take data of patient who has mucositis. Research instrument in the assesment of oral mucositis was used to meet respondent characteristic. The Oral Assesment guide (OAG) questionnaire and data collection form are based on a literature developed in 1988& 2004 by Dodd and Eilerwith 8Functional and subjective assessments to assess the sound, salivary gland function, and swallowing ability, then described in numerical scales 1-3 for each parameters. The value of one (1) is normal, the value of two (2) if there are mild / moderate changes, and three (3) if there is a change of weight. The way in which OAGs are evaluated is by observation, visual inspection, palpation, and auditory. These assessment alsohave been validated by three experts in onkology.

Before conducting the research, researchers first made a research permit and a letter of approval for research ethics from the Faculty of Nursing Health Research Ethics Commission of the Universitas Sumatera Utara which was addressed to the RSUP.H. Adam Malik Medan. After obtaining the research permit, the researcher conducted a study.

The implementation phase of this study was data collection,the researchers asked the name of patients where the patient mucositis in patient undergoing chemotherapy, After obtaining information about the patient then went to the patient's room and performed matching based on the inclusion and exclusion criteria in patients

who will be used as respondents. Researchers conducted data collection by pretest and post-test. The researcher explained thepurpose of the study and then reviewed the mucositis score of therespondents using Oral Assesment Guide (OAG) questionnaire 1-24.

Respondents mucositis were in accordance with these criteria inaccordance with the criteria and willing to be a espondentthen the patient signed the approval sheet. Then theprovision of honey for oral care oral care interventions with were performed 4 times a day for 1 week and measurements were taken on 1 week. In the intervention group Oral care measures used honey with 86% honey concentrate by applying honey 10 ml-15 ml using cotton swabs throughout the mouth and lips area (for 60-90 seconds) four (4) times a day then it is recommended to rinse with mineral water. Whereas in the control group the usual oral care routine was done by using chlorhexidine 0.2% 15 ml (for 30-60 seconds) by gargling 4 times a day for 6 days. then it is recommended to rinse with mineral water.

Post-test phasewere carried out on the1 week after the intervention group respondents were given honey in oral care for 1 week (4 times a day) and the control group respondents were given regular oral care actions using chlorhexidine for 1 week (4 times a day) using the OAG mucositis assessment instrument . Reassessing the respondent's oral mucosa and comparing before and after the intervention and looking at the observation sheet for the implementation of oral care. In the post-test phase it aims as an evaluation of the interventions that have been done previously and the measurement results are documented in the form of data tabulation

This study measuredoral mucositis score of patiets before and after intervention in intervention group and control group.The intervention of oral care with honey was implemented 4 times a day for 1 week and control group. Honey used in this study was pure honey applied to the mouth and lips that experienced mucositis. The post-test stage is performed after the intervention to evaluate the outcome of the intervention using an oral mucositis assessment instrument oral assessment (OAG) and documented.

2.4 Statistical analysis

Data was analyzed using SPSS version 20. The results of the study were analyzed using paired t-test and the independent t-testfor intervention group and control group.

III. Result

This study used patients who gave cancer patients undergoing chemotherapy as respondens at RSUP. H. Adam Malik Medan North Sumatra Provincewhich had fulfilled the exclusion criteria as many as 64 patients consisting of 32 patients in the intervention oral care honey group and 32 patients in the control group.

Table 1: Analysis of the Effect of Oral Care Honey on Mucositis Score in Cancer Patients

	Mucositis Score		
Intervention	Mean	*t*	*p value*
Before	17,47±2,094	48,15	0,000
After	10,16±2,127		

The Table 1 showed pvalue = 0,000 which indicated that there was a significant difference between pre and post interventionon incidence of mucositis among patients undergoing chemotherapy. Mean of pre intervention (17,47SD 2,094) and post intervention (10,16 SD 2,127) range with t=48,15p*value*=0,000, it can be cocluded that mucositis score is better after intervention.

Table 2: Analysis of the Effect of Oral Care RutinBiasaon the Mucositis Score of Cancer patients in the control group

	Mucositis Score		
Intervention	Mean	*t*	*p value*
Before	14,38±1,93	5,326	0,000
After	13,47±1,81		

The results of the study in table 2 using statistical tests paired t-test. Obtained before intervention the average value of 13.47 SD 1.93 and after intervention the average value of 13.47 SD 1.81 with a value of t = 5.326, pvalue = 0.000. The results of the analysis showed that there was a significant difference between before and after the usual routine oral care intervention of 0.2% chlorhexidine, meaning that there was an effect of regular oral care of chlorhexidine 0.2% on the reduce in mucositis scores.

Table 3 : Comparative Test Analysis of Oral Care in the Intervention and Control Groups

.	Mucositis Score		
Group	Mean	*t*	*p value*
Intervention	3,094±2,12	-6,704	0,000
Control	3,313±1,81		

The results of the study in table 3 using independent t-test statistics with statistical test results averaging 3,094 in the honey oral care group and an average of 3,313 regular routine oral care groups with t-6,704 and p value = 0,000. The results of the analysis showed that there were significant differences in mucosis scores between after honey oral care intervention and regular routine oral care chlorhexidine 0.2%. The average value of oral care for honey is lower than the average value of regular routine oral care 3,313 means that oral care honey is better than regular oral care to reduce mucositis scores and cure mucositis.

IV. Discussion

The result of analysis showed the value of p<0,000, which is less than pvalue 0,000 so that it can be concluded that there was a difference in the score of mucositis before and after the intervention intervention group and control group.Itmeans that the action or intervention carried out has an influence on the improvement of respondents' mucositis ability.The results of the study in table 3 using independent t-test statistics with statistical test results averag in the honey oral care group and regular routine oral care groups p value = 0,000. The results of the analysis showed that there were significant differences in mucositis scores between after honey oral care intervention and regular routine oral care chlorhexidine 0.2%. The average value of oral care for honey is lower than the average value of regular routine oral care means that oral care honey is better than regular oral care to reduce mucositis scores and cure mucositis.

Oral mucositis is the most common side effect of the patient. Therefore, the most important responsibility of the nurse is to minimize the severity of the oral mucositis, take the necessary action to address the problem, and provide the most effective treatment.

The study by Al-Jaouni, et al, (2016) that the results of the study showed that honey significantly have a positive result in reducing oral mucositis of cancer patients undergoing chemo / radiotherapy used as oral care (P = <0.05) because honey maintains oral health, reduces microbes, accelerates repair, healing and reduces inflammation[11].

Oral care helps reduce the risk of infection in the oral cavity because it can reduce abnormal flora, thus preventing infection and reduce the side effects of cancer therapy [12]. Basic oral care (brushing and flossing as tolerated) is recommended for maintaining oral health and reducing microbes [11]. Clean mouth care is done routinely by brushing, flossing, and moisturizing at least twice a day and should be brushed four times a day. Duration during a brushing session of at least 90 seconds [12].

One method used to prevent and treat oral mucositis is the use of honey. Honey has antioxidant, antibacterial, antiviral, and anti-inflammatory effects, honey helps to reduce oral mucositis progression or reduces the severity of oral mucositis and facilitates healing by reducing thetoxic effects of chemotherapy. Honey has recently gained a lot of attention in alternative therapies. Honey has bacterial and antioxidant properties, and improves wound healing and epithelialization [9].

The study byBaliga, et al, (2017) which aims to identify the effect of honey in reducing oral mucositis in cancer patients. The sample size was 50 people, 25 people in the intervention group were given honey for mouthpiece three times a day (1 hour before radiation, and 2 and 6 hours after radiation) and in control group given iodine povidon (betadine 1 ml with 100 ml water) used as oral care three times a day (morning, after lunch, and at night). The results showed that honey reduced oral mucositis in patients undergoing radiation therapy (p <0.0001)[13].

Honey is one of the substances that play a role in cancer treatment. Honey can also reduce edema. Reduced edema in the tissue will reduce the suppression of blood capillaries. As a result, the flow of oxygen and nutrients through blood capillaries in the wound tissue will run smoothly.Honey will also increase fibroblasts so that the formation of new tissue is faster.Nutrientcontent in honey help vital organs and epithelial cells and macrophages, so that it will increase the body's ability to cure mucositis of new mucosal epithelial cells.Honey facilitates increased lymphocytes and phagocytes and helps monocytes to release cytokines and Interleukin,thus stimulating the healing process and having bactericidal properties that exist in several types of honey is believed to be effective in preventing andreducing fungal and bacterial infections[14].

Honey can be used to reduce mucositis because honey contains glucose oxidase enzyme that will convert glucose into glucose acid that will inhibit bacterial growth.Honey has a high osmolarity that causes honey to extract water from bacterial cells, causing bacteria to die. Low honey causes the bacteria to be difficult to live. Honey contains antioxidant peroxide, debridement, increased subcutaneous blood flow in ischemic tissue, stimulates new tissue growth and strengthens anti-inflammatory response, thus speeding up the healing process [15].

V. Conclusion

This study shows that oral careusing honey 4 times a day is more effective in reducing and treating mucositis cancer patients due to chemotherapy with pvalue = 0.000. The use of honey in the act of oral care has been shown to reduce and treat mucositis due to chemotherapy. Honey contains various types of chemical and microbiological components that can reduce and treat mucositis. Therefore, in reducing and treating mucositis is recommended to apply oral care using honey.

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