

CHAPTER I

INTRODUCTION

A. Background of The Study

The Islamic religion regulates who professes Islam to live a healthy life both physically and spiritually. That is why Muslims must make various efforts to maintain health and prevent disease infection. In addition, healthy favors are one of the two favors that humans often overlook. As our Prophet Muhammad *shallallahu 'alaihi wa sallam* said:

نِعْمَتَانِ مَغْبُورٌ فِيهِمَا كَثِيرٌ مِنَ النَّاسِ الصِّحَّةُ وَالْفَرَاغُ

“The two favors of most human beings are deceived; both are health and leisure.” (Al-Bukhari).

Some oral diseases that often occur in the society are dental disease, sore throat, and laringitis. Oral health and his hygiene are essential for us to realize. In the oral cavity, various kinds of bacteria colonies was enter into the mouth through the foods and drinks consumed daily. These bacterial inhabit the inside part of the oral cavity. There are not only pathogenic bacteria in the oral cavity but also beneficial bacteria. Types of bacteria in the oral cavity are *Streptococcus*, *Actinomyces*, *Lactobacillus*, *Veillonellae*, *Neisseria* and *Eubacterium*.¹

One of the oral and dental diseases are dental caries disease and mouth ulcer. Dental caries disease is caused by poor oral hygiene and is affected by the action of dental plaque.² Dental caries disease is caused

¹ Lakshman Samaranayake.2002. *Essential microbiology for dentistry*. 2nd ed. London: *Churcill Livingstone*.

² George Laskaris, Crispian Scully.2002. *Peridontal Manifestations Of Local And Systemic Diseases*. New York: *Spriner*.

by the presence of a buildup of dental plaque, which contains a lot of bacteria. Dental plaque is a soft coating on the teeth consisting of many microorganisms which breed in the mouth and tightly attached to the dirty surface of the teeth. The most common microorganism found in cases of dental caries are Gram-positive cocci, such as *Streptococcus mutans* and *Staphylococcus aureus*.³ Mouth ulcer is inflammation of the soft tissues in the oral cavity, usually in the form of yellow-white patches with a slightly concave surface. One of the causes of mouth ulcer is the excessive growth of the *Candida albicans* fungus, which causes infection.⁴

Diseases that occur in the mouth are caused by bacteria and other factors such as smoking, vitamin deficiency, and others. However if left unchecked can cause other more dangerous diseases, affect quality of life and shorten life expectancy. This is because a bacterial infections that develop can enter the circulatory system and carry bacteria and toxins to other parts of the body, including the heart, lungs, kidneys, and liver.⁵

Prevention of diseases in the mouth caused by pathogenic bacteria is necessary, one of which is by using mouthwash. Mouthwash is a dental and oral health care product that is categorized as an over-the-counter medicine without doctor's prescription, easy to obtain, and practically use by the public. Mouthwash has two functions, and there are therapeutic and cosmetic functions. The therapeutic process are used to reduce plaque, gingivitis, dental caries, and stomatitis. Instead, decorative processes can be formulated to minimize bad breath by

³ Daud, N, S, Desi, A,S, Ifaya, M, 2016. Formulasi Pasta Gigi Infusa Daun Jambu Biji (*Psidium Guajava* Linn) dengan Variasi Konsentrasi Na.CMC Sebagai Bahan Pengikat, *Jurnal Ilmiah Ibnu Sina*, 1(1). Page 42 – 49.

⁴ Chusniah, I. dan A. Muhtadi. 2017. Aktivitas Jeruk Nipis (*Citrus aurantifolia*) Sebagai Antibakteri, Antivirus, Antifungal, Larvasida, dan Anthelmintik. *Farmaka*, 15(2). Page 9–22.

⁵ George Laskaris, Crispian Scully.2002. *Peridontal Manifestations Of Local And Systemic Diseases*. New York: *Spriner*.

using antimicrobials and flavoring agents.⁶ Gargling with mouthwash can eliminate bacteria that a toothbrush cannot reach. Mouthwashes on the market today contain more than one active ingredient to support oral hygiene. One of the active ingredients used is chlorhexidine and alcohol. The alcohol contained in mouthwashes can cause side effects such as an increased the risk of oral cavity cancer, xerostomia, and a burning or irritated feeling in the mouth.⁷

Due to the dangers and the large of side effects of the chemical based mouthwashes, people are turning to using herbal mouthwashes which have lower side effects than chemical mouthwashes. Natural ingredients have been extensively studied for their ability as mouthwashes because of their activity as antibacterial agents that cause dental plaque.⁸ Some natural ingredients as a substitute for chlorhexidine and alcohol in mouthwash are ginger, lemon, honey, mint leaves, and salt. The use of saline solution as a mouthwash has two effect on the survival of bacteria. First, high concentration of a saline solution (hypertonic) can be toxic, this killing bacteria.⁹ In addition, salt has hygroscopic properties, which is the ability of a substance to absorb water molecules from its environment either through adsorption or absorption. So that it can absorb the body fluids of the bacteria and cause the bacteria to dry out and die.¹⁰

⁶ Crowley. 2006. *Solutions, emulsions, suspensions, and extracts*. The Science and the Practice of Pharmacy (21st ed). Philadelphia: *Lippincott William & Wilkins*. Page 751.

⁷ Marcella Talumewo, Christy Mintjelaskan, Mona Wowor. 2015. Perbedaan efektivitas obat kumur antiseptik beralkohol dan nonalkohol dalam menurunkan akumulasi plak. *Pharmacon*. 4(4). Page 1-6.

⁸ Kartini, Hasballah, dan Murniana Sarong. 2005. Aktivitas Antibakteri Ekstrak Daun Eclipta alba L. serta Ekstrak dan Minyak Atsiri Daun Piper betle L. terhadap Bakteri Penyebab Karies Gigi. *Jurnal Kedokteran YARSI*, 13 (3).

⁹ Linda Aliffia Yoshi dan I Nyoman Widiyasa. 2016. *Sistem Desalinasi Membran Reverse Osmosis (RO) untuk penyediaan air bersih*. Prosiding Seminar Nasional Teknik Kimia “Kejuangan”. Yogyakarta. Page 2

¹⁰ Asih Susanti, Wulandari Meikawati dan Rahayu Astuti. 2012. Pengaruh Dosis Dan Lama Perendaman Larutan Garam Terhadap Jumlah Bakteri Pada Tahu *Thesis*. Semarang: Fakultas Kesehatan Masyarakat Universitas Muhammadiyah Semarang.

Salt-based mouthwashes have the advantage of being easy to use and do not take a long time to use. In addition, it is very commonly used for people who have difficulty taking tablet or capsules. Based on the above background, researchers are interested in researching "The Effect of Gargling Using Saline Solution (*NaCl*) on Dental Caries Bacteria and *Candida albicans* on mouth ulcer."

B. Problem Formulation

1. How does gargling using saline solution (*NaCl*) affect bacteria in dental caries and *Candida albicans* on mouth ulcer?
2. What concentration of a saline solution (*NaCl*) used for gargling which has a significant effect on reducing the number of dental caries bacteria and *Candida albicans* on mouth ulcer?

C. Purpose of The Study

1. It is knowing the effect of gargling using saline solution (*NaCl*) on bacteria in dental caries and *Candida albicans* on mouth ulcer.
2. It is knowing the concentration of a saline solution (*NaCl*) used for rinsing the mouth, which has a significant effect on the dental caries bacteria and *Candida albicans* on mouth ulcer.

D. Benefit

1. Teorithical Benefits

The results of this study can be used to add to the characteristics of science and basic information materials or references for further analyses, especially regarding the use of salt to treat problems in the teeth and mouth, namely dental caries and mouth ulcer.

2. Practical Benefits

The results of this study can be used as information material to the public, especially those experiencing dental and oral problems, dental caries and mouth ulcer, to use saline solution (*NaCl*) as a mouthwash.

E. The Authenticity of The Study

Research on the effect of gargling by using a saline solution (*NaCl*) has been carried out by several researchers, as shown in table 1 below.

Table 1. The Authenticity of The Study

Research Title	Research Method	Variable	Result	Research Differences
Effectiveness of Gargling with 10% Saline Solution Against Decreased Plaque Score. ¹¹	Literature Studies	Dependent: Gargle with 10% Saline solution. Independent: Decrease in plaque score	Gargle saline solution water 10% effective in lowering plaque scores.	Dependent: The dental caries bacteria and <i>Candida albicans</i> in mouth ulcer. Independent: Gargle with salt concentration of 1%, 2% and 3%
Manufacture And Antibacterial Test Of Hypertonic Sodium Chloride Solution As Mouthwash. ¹²	Experiment	Dependent: Antibacterial test of Hypertonic Sodium Chloride solution Independent: Manufacture of mouthwash preparations	Sodium chloride solution effectively inhibits the bacteria <i>Streptococcus sanguinis</i> at a concentration of $\geq 7.5\%$ and <i>Staphylococcus aureus</i> at a concentration of $\geq 15\%$ by transmitting and visual methods	Dependent: The dental caries bacteria and <i>Candida albicans</i> in mouth ulcer. Independent: Gargle with salt concentration of 1%, 2% and 3%

¹¹ Desty Rahmadina, Marlindayanti. 2020. Efektivitas Berkumur dengan Larutan Garam 10% Terhadap Penurunan Skor Plak. *Jurnal Kesehatan Gigi dan Mulut*, 2(1).

¹² Steven. 2021. Pembuatan Dan Uji Antibakteri Larutan Natrium Klorida Hipertonis Sebagai Obat Kumur *Thesis*. Sumatera Utara: Universitas Sumatera Utara.

Research Title	Research Method	Variable	Result	Research Differences
The effectiveness of oral care using a solution of brine (normal saline) and baking soda (sodium bicarbonate) against pain and comfort in mucositis patients undergoing chemotherapy at Medan Regional Hospitals ¹³	Experiment	Dependent: Pain and comfort in mucositis patients undergoing chemotherapy at Medan regional hospitals Independent: The effectiveness of oral care using saline solution and baking soda.	There is an effect of oral care using salt water (normal saline) and baking soda (sodium bicarbonate) against pain and comfort in mucositis patients undergoing chemotherapy.	Dependent: The dental caries bacteria and <i>Candida albicans</i> in mouth ulcer. Independent: Gargle with salt concentration of 1%, 2% and 3%

¹³ Eka Nugraha Naibaho. 2019. Efektivitas Perawatan Mulut Menggunakan Larutan Air Garam (Normal Saline) Dan Baking Soda (Sodium Bicarbonate) Terhadap Nyeri Dan Kenyamanan Pada Pasien Mukositis Yang Menjalani Kemoterapi Di Rumah Sakit Wilayah Medan *Thesis*. Medan: Universitas Sumatera Utara.

Research Title	Research Method	Variable	Result	Research Differences
Effectiveness of Brine Gargles Against Pain Reduction in Dental Pain Sufferers. ¹⁴	Experiment	Dependent: Decreased pain in dental pain sufferers. Independent: The effectiveness of salt water gargles.	Salt water gargles are effective against pain reduction in tooth pain sufferers.	Dependent: The dental caries bacteria and <i>Candida albicans</i> in mouth ulcer. Independent: Gargle with salt concentration of 1%, 2% and 3%
Effectiveness of Gargling Warm Brine 2% Against <i>Gingivitis</i> . ¹⁵	Experiment	Dependent: <i>Gingivitis</i> disease. Independent: The effectiveness of gargling warm brine 2%.	Use 2% and 0.9% warm brine solution as a mouthwash can reduce degree of <i>gingivitis</i> (by looking there is a decrease in plaque scores and scores PBI clinically).	Dependent: The dental caries bacteria and <i>Candida albicans</i> in mouth ulcer. Independent: Gargle with salt concentration of 1%, 2% and 3%

¹⁴ Sutomo. 2017. Efektivitas Kumur Air garam Terhadap Penurunan Nyeri Pada Penderita Nyeri Gigi, 13(2).

¹⁵ Dwi Kurniawati. 2011. Efektivitas Berkumur Air Garam Hangat 2% Terhadap *Gingivitis*. *Jurnal Ilmu-Ilmu Kesehatan Surya Medika*, 7(2).