

# Effect of Honey mouth wash on the health outcome of patient with stomatitis

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**Abstract:** Oral stomatitis is one of the most debilitating complications for patients undergoing chemotherapy, and chronic inflammatory bowel diseases (IBD) which may be considered specific or unspecific. Honey is effective and safe because it has anti-inflammatory and healing properties that reducing pain, size, and erythema for stomatitis. Aim: This study aims to explore the effect of honey mouth wash on the outcome of patient with stomatitis. Method: Quasi experimental (study - control group,) was adopted in this study. A purposive sample included sixty patients whose stomatitis were selected randomly by Lottery method include a sixty patients whose stomatitis allocated into two groups (study and control group)who admitted to oncology out-patient clinics and university gastrointestinal clinic at Minia city. Beck Oral Assessment Scale (BOAS) to assess oral function and oral scale to assess symptoms of stomatitis, Rosenberg self-esteem scale were used. Results: There were improvements in the patients' oral function and minimizing the symptoms of stomatitis. Conclusion: Honey based mouth wash was effective care among study group whose oral stomatitis as well as improving their oral function. Recommendations: Regular training programs to keep nurses in clinical setting updated with the most recent strategy for oral hygiene that promote oral wellness.

**Keywords:** Mouthwashes, Stomatitis, Chemotherapy, Inflammatory bowel diseases.

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## 1. INTRODUCTION

The word "Apthous" originated from the Greek word "aphtha", the meaning of which is ulcer. Aphthous. stomatitis is one of most common ulcerative disease associated mainly with the oral mucosa characterized by the extremely painful, recurring solitary, multiple ulcers in the upper throat and oral cavity. These types of ulcers are usually small, multiple, ovoid or round with circumscribed margins which are having gray or yellow floors and are encompassed by erythematous haloe (Preeti et al, 2011). These are quite painful that leads to difficulty in eating, speaking and swallowing that's why it negatively affects the patient's quality of life (Wadhawan et al, 2014).

The precise etiopathogenesis of aphthous stomatitis is not fully disclosed. The potential factors responsible for aphthous ulcers are genetic predisposition, mechanical injury, microelement and vitamin B12 deficiencies, increased oxidative stress, food allergies, microbial factors, anxiety, hormonal defects, systemic diseases (e.g., ulcerative colitis, celiac disease, AIDS, Crohn's disease)( Slebioda ,etal 2014).

Stomatitis is a typical reaction of chemotherapy and portrayed by pain, erythema, ulcerations and inflammation of the surface of the mucous membrane in the oral cavity. It creates as a direct consequence of chemotherapy destroying healthy oral tissue and cells. Generally, 40% of individuals who have chemotherapy as a major aspect of their malignant growth treatment will build up some level of stomatitis which seriousness relies upon the sort of chemotherapeutic agent and the dose used (Raecessi et al., 2014).

The oral care is a fundamental component of nursing practice in different clinical setting. Nurses and medical staff have an essential job in the advancement of good oral wellbeing and cleanliness, in diminishing discomfort and enhancing nutrition, in detecting oral disease in the early stages, and in enhancing patients' outcomes. The counteractive action of weakening in long term patients teeth and mouth will be less exorbitant than the treatment of the oral and systemic diseases that happen as a result of poor oral wellbeing (**Haums child Hau& Mschild (2009)**).

Studies have revealed that using honey gum 3 times a day after meals is related to the reduction of plaque and the risk of gingivitis. It has also been helpful in treating mouth ulcers as well as stomatitis after radiation therapy. Honey is effective and safe in reducing aphthous minor ulcer pain, volume, and erythema (**Spivakovsky 2012 &El-Haddad et al., 2014**). Another important factor attributed to the success of honey and the pulpotomy agent is the increased anti-inflammatory rate and therapeutic properties due to its acidic nature. The acidity of honey aids in providing oxygen for tissue regeneration as the pH of the wound drops and creates more available oxygen than the hemoglobin in the blood. Honey has been reported to significantly stimulate the release of cytokines such as tumor necrosis factor  $\alpha$ , interleukin (IL) -1 $\beta$ , and IL-6 from monocytes, identified to play an important role in healing as well as tissue repair. (**Molan 2011**).

### Significance of the study

Aphthous stomatitis is the most common inflammatory ulcerative condition of the oral mucosa, it recur from time to time, according to my observation of many patients whose stomatitis in clinical setting (oncology center and gastrointestinal clinic)are increased and there are lack of statically documents regarding to prevalence of some complains as stomatitis in our health care institutions. There are no single treatment options, both local and systemic has been found to be uniformly effective in all patients with stomatitis so the nurse as researcher may be necessary to try and test several treatment strategies based on evidence for reducing pain, increasing the duration of stomatitis-free periods, and accelerating its healing. So the current study focus on explore effect of honey mouth wash on the outcome of patient with stomatitis.

### Aim of the study:

The aim of the present study was to explore the effect of honey mouthwash on the outcome of patient with stomatitis.

### Research hypothesis:

Patient with stomatitis will treated by honey mouth washes will exhibit improved signs of stomatitis compared to control.

### Research Design:

Quasi-experimental research design (study - control group,) was adopted in the current study.

### Setting:

The current study was carried out at Oncology Center and University Gastrointestinal Clinic at Minia city.

### Subjects:

A purposive sample was selected randomly, including patients who were willing to participate in the current study. A dropout rate of 10%was considered ,and hence ,the final sample size was estimated out to be 30 in each group with the total sample size being 60 participants whose stomatitis is based upon the following sample calculation formula ([http://www.ifad.org/gender/tools/hfs/ anthropometry](http://www.ifad.org/gender/tools/hfs/anthropometry)).

$$N = \frac{t^2 \times p(1-p)}{m^2}$$

$$N = 59 = \frac{(1.96)^2 \times 0.04(1-0.04)}{0.05^2}$$

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Description:

N = required sample size

t = confidence level at 95 % (standard value of 1.960)

p = estimated by researcher observations for stomatitis patients at Minia city oncology center & university gastrointestinal clinics on 2017-2018 (0.04)

m = margin of error at 5 % (standard value of 0.050).

Both groups of current study were selected according to the following inclusion and exclusion criteria:

### Inclusive criteria:

1. Conscious patients who were able to use mouth care.
2. Patients with all types of cancer ordered for chemotherapy.
3. Patients with Crohn's disease and ulcerative colitis.

### Exclusive criteria:

1. Patients has past history of recurrent stomatitis
2. Hypersensitivity to honey.
3. Patients who suffer any physical disability.
4. Patients who have history of antibiotic therapy in the previous one month before the start of the study.

### Tools for data collection:

The following tools were used for data collection :

#### 1<sup>st</sup>. tool : Demographic and clinical variables assessment tool

2<sup>nd</sup>. tool: **Beck Oral Assessment Scale (BOAS) to assess level of oral function** ; it adopted from **Beck (1979)**. It used to assess the oral condition of the study sample' (study group & control group) oral cavity .It consisted of five items that assess the lips, gingiva, tongue, teeth, and saliva by inspection The scale graded from one (1) which mean normal manifestations to four (4) which mean highest degree of abnormal manifestations.

#### Scoring system:

Oral health assessment score was calculated using Beck Oral health assessment scale (standardized scale) with scores ranging from 5-20 (higher scores indicating poor oralhealth status). The scores were categorized as 1-5 (No dysfunction), 6-10 (Mild dysfunction), 11-15 (Moderate dysfunction), 16 - 20 (sever dysfunction).

3<sup>rd</sup>. tool : **Oral toxicity Scale to assess degree of stomatitis .It is adopted from Parulekar et al. 1998** to assess presence of stomatitis symptoms. It consist of five symptoms, which grading from zero(0):none(no description),one(1):mild Stomatitis , (2) :moderate Stomatitis ,three(3) :severe Stomatitis ,four (4): (Life threatening or oral alimentation impossible).

### Ethical Considerations:

An official permission to conduct the study was obtained from the ethical committee in the faculty of nursing, dean of nursing faculty, oncology institute director, and director of Minia university hospitals. Written consents were obtained from subjects who were informed about the purpose, procedure, benefits, nature of the study, follow up and they had the right to withdraw from the study at any time without any rational. Confidentiality and anonymity of each subject were ensured through coding of all data and protecting the obtained data.

**Procedure**

The current study was conducted by preparing of different data collection tools. In addition of obtaining formal paper agreement which was taken in duration of one month before conducting the study. The researcher bought many bottle of honey from plant protection department (Beekeeping specialty) faculty of agriculture at Minia University was tested for purity before starting implementation of the current study and also bottles of normal saline 0.9%. The total duration of data collection was eight months starting from October 2018 to May 2019. The researcher carry out the study on daily basis during morning shift in both chemotherapy and university gastrointestinal outpatient clinics, selection of patients who have any stomatitis symptoms, were identify the second and third tools were used to identify who will be included in this study.

The pH of mouthwash formulation was checked before conducting the study and both the mouthwashes were well above the critical pH of saliva (demineralizing action on teeth). pH of honey mouthwash and normal saline mouthwash was 5.9 and 0.9%, respectively. The researcher was teach studied groups and their care provider about performance regarding standardization of the hand washing and oral hygiene and ensure their competency regard it to eliminate confounders in the results, ten milliliters honey based mouthwash administered by study group and ten milliliters normal saline based mouthwash formulations administered by control group twice daily and swishing the mouthwashes for 30 seconds then spit it in the nearby wash basin also asked not to eat or drink anything for 30 minutes and informing them (both groups) to use this mouthwash for three weeks. The researcher was reassessed stomatitis symptoms by tools (II&III) and the level their self-esteem by using tool (IV) at the end 21<sup>th</sup>. day and 28<sup>th</sup>. days of mouthwashes discontinue by face to face interview during patient's follow up schedule and sometimes using telephone interview method.

**Limitation of the study**

The cost of honey and normal saline 0.9% were high and the hospital not supported by any facilities to apply this study.

**2. STATISTICAL ANALYSIS OF DATA**

Data were summarized, tabulated, and presented using descriptive statistics in the form of frequency distribution, percentages, means and the standard deviations as a measure of dispersion. A statistical package for the social science (SPSS), version (20) was used for statistical analysis of the data, as it contains the test of significance given in standard statistical books. Numerical data were expressed as mean and SD. Qualitative data were expressed as frequency and percentage. Probability (P-value) is the degree of significance, less than 0.05 was considered significant. The smaller the P-value obtained, the more significant is the result (\*), less than 0.001 was considered highly significant (\*\*). Correlation coefficient was done by using Pearson correlation test. ANOVA test was used to compare two different mean among study and control group in the current study.

**3. RESULTS**

**Table (1) Demographic characteristics of study & control groups (n= 60).**

Socio demographic data	Study group (n=30)		Control group (n=30)		P-value	P-value
	N	%	N	%		
<b>Age / years</b>						
18-	5	16.7	6	20	.093	.093
30-	3	10	3	10		
40-	11	36.7	4	13.3		
50- 65	11	36.7	17	56.7	NS	NS
Mean ± SD	45.7 ± 12.6 years		47.6 ± 11.9 years			
<b>Gender</b>						
Male	10	33.3	21	70	.781NS	.781NS
Female	20	66.7	9	30		
<b>Marital status</b>						
Single	2	6.7	2	6.7		.372
Married	27	90	24	80	.372	NS
Widow	1	3.3	4	13.3	NS	

Level of education						
Illiterate	21	70	23	76.7	.753	.753
Read and write	3	10	3	10.0	NS	NS
Secondary school and diploma	5	16.7	4	13.3		
University graduate	1	3.3	0	0.0		
Employment status						
Student	1	3.3	0	0	.751	.751
Work	6	20	5	16.7	NS	NS
Not work	5	16.7	16	50.1		
House wife	18	60	9	30		
Residence						
Rural	29	96.7	26	86.7	.161	.161
Urban	1	3.3	4	13.3	NS	NS

NS= not significant

**Table 1:** shows that , the mean average age among study group was  $45.7 \pm 12.6$  years old and more than two third (66.7 % ) among them their gender were female while the mean average age among control group were  $47.6 \pm 11.9$  years old and their gender were male constituted (70%) . As regard marital status for both groups, the highest percentage among study and control groups were married constituted (90%&80%) respectively. Nearly similar percentage (70%&76.7%) & (60%&63.3%) respectively among study their level of education and occupation were illiterate and house wives. Most of the study sample (study and control group) was lived in rural area constituted (96.7% &86.7%) respectively.

**Table (2) Percentage distribution of both study & control groups as regards medical diagnosis and previous mouthwash using (n= 60).**

	N	%	P-value
<b>Medical diagnosis</b>			
<b>Study group (n=30)</b>	15	50	.542 NS
Ulcerative colitis			
Cancer Colon	15	50	
<b>Control group (n=30)</b>			
Crohn's disease	9	30	
Bladder and breast cancer	21	70	
<b>Previous using any mouthwash</b>			
Doesn't use			
<b>Study group</b>	30	100	.00 NS
<b>Control group</b>	30	100	

**Table (2):** shows that, half of study group was diagnosed as cancer colon & ulcerative colitis , while highest percentage(70%) among control group was diagnosed as bladder and breast cancer . The table illustrated that all (100%) of studied sample have no experience regard using of mouthwash application , there were not statistical significant difference between both groups  $P=.542$  &  $.00NS$ .

**Table (3): Differences of Beck oral assessment scale (BOAS manifestations) among both groups at the end of 21<sup>th</sup>. and 28<sup>th</sup>. day from mouthwashes discontinue (n= 60).**

Beck Oral Assessment Scale	Study group (n=30)		Control group (2) (n=30)		T	P-value
	n	(%)	n	(%)		
<b>First observation at 21<sup>th</sup>.day</b>					<b>-4.781</b>	<b>.000**</b>
No dysfunction	-	-	-	-		
Mild dysfunction	-	-	15	50		

Moderate dysfunction	28	93.3	15	50		
Sever dysfunction	2	6.7	-	-		
<b>Second observation at 28<sup>th</sup> day</b>					-4.535	000**
No dysfunction	26	87.1	11	36.7		
Mild dysfunction	2	6.7	2	6.7		
Moderate dysfunction	2	6.7	11	36.7		
Sever dysfunction	-	-	6	19.8		

**Table (3)** :shows that, there was a highly statistical significant difference regard BOAS manifestations between study group and control group at the end of 21<sup>th</sup> and 28<sup>th</sup>. day from mouthwashes( honey and normal saline respectively) discontinue .

**Table (4): Differences of (WHO) Oral Toxicity Scale among both groups at the end of 21<sup>th</sup>. and 28<sup>th</sup>. day from mouthwashes discontinue (n= 60).**

	Study G. (n=30)	Control G. (n=30)	Study G. (n=30)	Control G. (n=30)
	n (%)	n (%)	n (%)	n (%)
<b>WHO oral toxicity scale</b>	1 <sup>st</sup> .observation at 21 <sup>th</sup> . day		2 <sup>nd</sup> .observation at 28 <sup>th</sup> day	
Non (0)	-	-	26 (85.8)	10 (33.3)
Mild (oral soreness, erythema)	4 (13.3)	7 (23.4)	2 (6.7)	14 (46.7)
Moderate (oral erythema, ulcers, solid diet tolerated)	20 (66.6)	11(36.7)	2 (6.7)	1 (3.3)
Severe (oral ulcers, liquid diet only)	6(20)	12 (40)	0 (.0)	5 (16.7)
Life threatening (oral alimentation impossible)	0 (.0)	0 (.0)	0 (.0)	(.0)
T	-4.829		-5.420	
P- value	.000**		.000**	

**Table 4:** displays that there was a highly statistical significant difference among study group and control group regard symptoms of stomatitis during 1<sup>st</sup>&2<sup>nd</sup> observations day from mouthwashes ( honey and normal saline respectively) discontinue .

**Table (5): Correlations between beck oral assessment scale (BOAS) and oral toxicity scale overall observations at 21<sup>th</sup>. and 28<sup>th</sup>. day from mouthwashes discontinue for the both groups.**

BOAS	Oral toxicity scale			
	Study G.		Control G.	
	R	P	R	P
	.945**	.000	.961**	.000

**Table 5:** shows that there was strong positive correlation between result of beck oral assessment scale (BOAS) and oral toxicity scale scores among both groups P value .000

#### 4. DISCUSSION

The general oral care is the source of oral stomatitis management, and it has a crucial role in prevention of its occurrence among patients. Mouth care by honey was high regarding to their acceptance and confidence (Worthington et al.,2011). Also (Fukuda et al., 2010; Maiti et al., 2012) who recommended use of a standardized oral care protocol by brushing with a soft toothbrush, flossing and the use of non-medicated rinses (e.g. 0.9% normal saline or sodium bicarbonate rinses). Patients and health care providers must be educated and informed about the importance of effective oral hygiene. Honey as a mouthwash to increase the antibacterial properties of it when weakened. This action of honey is due to the enzyme glucose in the oxidase that hydrogen peroxide produces when diluted which is a powerful and popularly used antibacterial substance..(Bang., etal., 2003) .Another study has shown that the PH of the saliva rapidly resumes to the



normal level of 6.8 after swallowing of the honey. The honey mouthwash formulation can be safely used twice daily, even during the night when salivary flowrate is less (Sela 1998).

The contemporary study discovered that most of patient age ranged from 40 -65 years old among both groups due to lower immunity and poor nutrition. This braced by the work of the **Mohamed et al., (2012)** who reported that risk of begin diagnosed with cancer rises as individuals aged, most cases happen in adults in the middle aged or older. In the same line study by **American Cancer Society (2009)** stated that it was worth citing that 55% of cancer transpires in people over 65 years of age. but more commonly in the second and third decade of life, becoming less common with advancing age. Aphthous stomatitis can be a manifestation of Behcet syndrome, systemic lupus erythematosus, reactive arthritis, or inflammatory bowel disease (especially Crohn disease) **Wang et al., (2018)**. These disorders may be excluded based on systemic signs and symptoms. However this result was in contradicted with **Queiroz et al., (2018)**. Aphthous stomatitis affects approximately 20% of the general population. Recent studies show an increasing rate of IBD in several developing countries (Africa, South America and Asia). Western countries have an increased incidence of ulcerative colitis together with CD, due to their life style and the contemporary way of life in general **Glocker et al., (2009)**.

The present study revealed that more than half among study group while reverse percentage among control group, this highest percentage from females because current study setting illustrated that female had a poor performance status. This results agreed with **Kumar et al., (2008)**, studied the impact of gender on the incidence of oral stomatitis as part of a randomized comparing therapeutic mouthwashes in 148 patients undergoing autologous stem cell transplantation. Oral stomatitis occurred significantly more often in women than in men (86% vs. 60%) and was more severe and of longer duration. On the other hand **Fraser et al., (2009)** opposed this finding which enlightened that men practice a higher frequency of cancer than do women.

The result of the current study revealed that the majority of studied groups were from rural area in both groups currently held to be cancer and IBD incidence strictly related to social, cultural and educational contextual, deficiency of services. The findings by **Monroe et al. (1992)** found that there is indication to suggest rural populations are diagnosed at a more progressive stage of cancer. But rendering to **Köstler et al., (2009)** the majority of data accessible indicate there are no differences between rural and urban populations regarding cancer incidence and mortality, nevertheless a number of revisions find cancer incidence upsurges with population compactness, which is a characteristic of fairly more urban settings.

Concerning type of cancer, half of the study groups were cancer colon because colon cancer receive continuous and greater dose of chemotherapy than other types of cancer. This finding was in covenant with **Beiki et al., (2012)** who stated that protracted or repetitive and higher doses administration of cytotoxic agents are supposed to be connected with an amplified risk of developing oral stomatitis and the risk of emerging oral stomatitis also upsurges with the number of chemotherapy cycles and preceding experiences of chemotherapy-induced stomatitis. This was in opposed with **Köstler et al., (2008)** who definite that breast cancer is the most common and global tumor among women.

Results of the contemporary study exhibited a highly statistically significant enhancement in the total (WHO) oral toxicity scale among study group over time which p value =000\*\*. This result was further reinforced by **Motallebnejad et al., (2008)**; **Song et al., (2012)** who said that prophylactic use of pure natural honey was effective in plummeting Stomatitis resulting from radio chemotherapy in patients with head and neck cancer. Additionally **Peterson et al., (2011)** and **Hashemi et al., 2015** counseled that regular use of non-medicated oral rinses (e.g. saline mouth rinses 4–6 times/day) was suggested to enhance healing process of mucosal lesions in the oral cavity, reduce the oral micro flora, encourage re-epithelization of soft tissue lesions, normalize the pH of oral fluids and have an satisfactory taste and be nontoxic. Nature has been a source of medicinal treatments and play an essential role. One such natural product is honey. Studied have indicated the antibacterial effect of honey can be attributed to the presence of hydrogen peroxide .....ect. **Vallianou et al., (2014)**. Also honey is a natural product locally available in almost all countries and regions. It has a high nutritive profile because is composed of various vitamins, minerals, antioxidants, enzymes, etc., A recent study has identified the antimicrobial properties in honey with other chemical substances, it found that distinct mechanisms involved in the bactericidal activity of honey **Mandal et al., (2011)**.

The existing study revealed that study group was decreased in their complaining from stomatitis than control group, This result is in contract with **Bahramnezhad et al., (2015)** who conditions that the prevention and enhancement trend of stomatitis was healthier among the patients receiving the honey mouthwash than those receiving the chamomile mouthwash due to its authoritative antitumor effects, support the immune system and upsurge feeling of comfort through its consuming. **Parolia et al., (2010)** who assessed the probable of a honey to lessen the number of outbreaks of repeated stomatitis ulcers and showed that honey is effective in diminishing the number of repetitions and progress the quality of life in patients with recurrent Stomatitis. Moreover, **(Konwinska&Mehr 2014 )** who scrutinizing the effect of chemotherapy on oral health status confirmed the finding that poor oral hygiene raises the risk of oral Stomatitis and **Queiroz et al., (2018)** described that pre-existing circumstances such as gingivitis, periodontal disease, plaques and dental carries are likely to consequence in a greater incidence of oral Stomatitis. In recent years, the multidisciplinary approach of patients with IBD focused on detecting problems that arise not only from organic events but also often involving psychosomatic events. quality of life measurements were often utilized in patients with IBD **Mantzouranis et al., (2015)**.

The present study revealed that, there was strong positive correlation between beck oral assessment scales (BOAS) and (WHO) oral toxicity scale in both groups ,this indicated a validity of this tools when assessing patient complains from stomatitis symptoms, that assist to develop a comprehensive nursing care plan . This results congruent with **(Johnson, JR. 2013)** establish the nursing process to be implemented among patients with oral mucositis, it is essential to take into account the individual's wholeness. Continuous assessment and monitoring is paramount for efficacious management and detection of oral mucositis nursing diagnoses in order to define specific interventions that incorporate the basic principles of wound treatment. Seeking current knowledge regarding the evidence-based and time-related aspects of clinical manifestations and standardized assessments are also important for improving patients' outcomes.

## 5. CONCLUSION

Honey based mouth wash was effective care among study group who had oral stomatitis as well as improving their oral function.

## 6. RECOMMENDATIONS

Regular training programs for nurses in the oncology unit should present by the most current to an oral hygiene strategy that stimulates oral wellness. Establishing an oral care assessment sheet for each patient with or without stomatitis by being in the hospital is vital in preventing oral complications and reducing severity of oral Stomatitis.

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