

Impact of Using Pure Natural Honey as a Topical Application for Patients Who Receiving Chemotherapy Regimen on Reducing Risk of Stomatitis

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Abstract

Background: Stomatitis accompanied with receiving chemotherapy occur approximately 40% among all patients. The onset of starting stomatitis among patients receiving chemotherapy around days four to five day from starting chemotherapy with a peak on the 7th -14th day after chemotherapy. Aim of the study: to evaluate impact of using pure natural honey as a topical application for patients who receiving chemotherapy regimens on reducing risk of stomatitis. Research design: Quasi-experimental research design was utilized in the current study. Subjects: A purposive sample including (60) male and female adult patients were included in the current study. Setting: This study was carried out at oncology center in Minia city in chemotherapy outpatient clinic, inpatient and outpatient chemotherapy department. Tools of data collection: Three tools were utilized to collect data: 1- Patient's biosociodemographic characteristic: structured interview tool; 2- Beck Oral Assessment Scale (BOAS); 3- oral toxicity Scale. Results: There was a highly statistical significant difference regard beck oral assessment manifestations between study and control groups during third observation for them post first session of chemotherapy. Also, there was a highly statistical significant difference among same groups during three observations post second and third session of chemotherapy. Results illustrate that the percentage of oral stomatitis degree occurs among study group in three sessions were (0.0%, 3.3%, 6.7%) in the three observations respectively. Conclusion: Honey was an effective in preventing and decreasing oral stomatitis and gingivitis in patients receiving chemotherapy. Recommendations: Regular training programs to keep nurses in oncology unit updated with the most recent strategy for oral hygiene that promote oral wellness.

Key Words: Chemotherapy, Oral stomatitis, Honey.

Introduction

Stomatitis is a common side effect of chemotherapy and is characterized by pain, erythema, ulcerations and inflammation of the surface of the mucous membrane in the oral cavity. It develops as a direct result of chemotherapy destroying healthy cells in the mouth. Overall, 40% of people who have chemotherapy as part of their cancer treatment will develop some degree of stomatitis. Its severity depends on the type of chemotherapeutic agent and the dose used⁽¹⁾.

The provision of effective oral care is a fundamental and essential element of nursing practice in oncology setting. Nurses and medical staff have a vital role in the promotion of good oral health and hygiene, in preventing discomfort and inadequate nutrition, in detecting oral disease in the early stages and in improving outcomes for patients. The prevention of deterioration in patient's teeth and mouth will be less costly than the treatment of the oral and systemic diseases that occur as a consequence of poor oral health⁽²⁾.

Oral assessments should be carried out at regular intervals to monitor the effectiveness of oral hygiene interventions and their impact on oral health, identification of risks for oral Health problems. As well as encourage oral hygiene after meals and before going to bed .If specific problems such as swallowing difficulties are identified, the patient should be referred to physician. Assistance should be provided to maintain independence, with the use of aids to oral hygiene and techniques such as prompting, applying toothpaste to the brush, guiding the person's hand, and providing appropriate support for denture care and hygiene. Clean lips with water-moistened gauze and protect with a lubricant to minimize the risk of dry, cracked and uncomfortable lips^(3,4).

Operational definition

Clover honey is a variety of honey made by bees that are fed clover. Depending on the location and source, clover honey varies in color from water white to different tones of

amber. Honey contains a variety of phytochemicals (as well as other substances such as organic acids, vitamins, and enzymes) that may serve as sources of dietary antioxidants. Clover contains higher water content and a larger proportion of glucose relative to fructose. As a result, clover honey tends to have a higher water content, which may permit it to crystallize more readily over time (5).

Aim of the study

The aim of the present study was to evaluate impact of using pure natural honey as a topical application for patients who receiving chemotherapy regimens on reducing risk of stomatitis through:

- Assess patients who receiving chemotherapy and free from stomatitis degree.
- Prepare and implement of using pure natural honey as a topical application for patients who receiving chemotherapy regimen on reducing risk of stomatitis.
- Evaluate the effectiveness of using pure natural honey as atopical application for patients who receiving chemotherapy regimen on reducing risk of stomatitis.

Research hypothesis

- Using pure natural honey as an oral topical application for patients who receiving chemotherapy regimens will reduce risk and degree of stomatitis.

Subjects and Methods

Research Design:

Quasi-experimental research design was utilized in the current study.

Setting:

The current study was carried out at oncology center in Minia city in chemotherapy outpatient clinic, inpatient and outpatient chemotherapy department. The chemotherapy

outpatient clinic is located in the first floor which is one room for examination. The inpatient chemotherapy department is located in third floor. It consists of two rooms one for adult male and one for adult female; each one contains 4-5 beds. However, the another outpatient chemotherapy department is located in the fourth floor. It consists of two rooms one for adult male and one for adult female; each one contains 4 beds. It is affiliated by General Secretariat of specialized medical centers, Ministry of health.

Subjects:

A sample of purposive including (60) male and female adult patients who were willing to participate in the current study, classified equally (no.=30) for study group and (no.=30) for control group according to the determination of the sample size is based upon the following sample calculation formula: <http://www.ifad.org/gender/tools/hfs/anthropometry>.

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

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

Description:

N = required sample size

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

p = estimated prevalence of stomatitis in chemotherapy patient at Minia city oncology center 2014 (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. All adult patients newly admitted to oncology center one week before the first dose of starting chemotherapy.
2. Conscious patients who were able to use mouth care.
3. Patients with all types of cancer newly ordered for chemotherapy.
4. Both sexes (male and female).

Exclusive criteria:

1. Patients has past history of recurrent stomatitis
2. Patient with past history of anemia (hemoglobin less than 10gm)
3. Patient receiving immunosuppression medication
4. Hypersensitivity to honey
5. Diabetes mellitus.
6. Liver cirrhosis

Tools of data collection:

Three tools were utilized to collect data pertinent for this current study. Two tools are standard and one tool was developed by the researcher, and then reviewed by a panel of five experts, these tools are:

Tool 1: Patient's biosociodemographic Characteristic: structured interview tool to collect pertinent data related to the following :(age, gender, marital status, medical diagnosis, hospital stay duration, body weight ... etc.

It was adopted from ⁽⁶⁾ and modified by the researcher after revising extensive literature review.

Tool 2: Beck Oral Assessment Scale (BOAS); It is adopted from ⁽⁷⁾ which was assess the condition of the study sample's (study and control) oral cavity. Consists 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. The total score of this scale classified into four results as following: five (5): No dysfunction, six to ten(6-10): Mild dysfunction, eleven to fifteen(11-15): Moderate dysfunction, sixteen to twenty (16 -20) : severe dysfunction.

Tool 3: oral toxicity Scale .It is adopted from ⁽⁸⁾ to assess any 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).

Validity of tools

Tools content validity was done to identify the degree to which the used tools measure what was supposed to be measured. The developed tools were examined by a panel of five experts in the field of the study (Minia University , Assiut University - faculty of nursing (Medical Surgical Nursing Department) and faculty of agriculture-plant protection department (Beekeeping Specialty).All jury member (100%) agree that current study tools were valid and relevant with the aim of the study . A pilot study was carried out on 6 patients (10%) of the total sample to test feasibility, objectivity, and applicability of the tools. Results of the pilot study illustrated that no any refinements and modifications needed so the subjects were included to the actual sample.

Reliability of tools

Cronbach's alpha for reliability testing internal consistency was performed for each section for World Health Organization (WHO) Oral Toxicity Scale tool and Beck Oral Assessment Scale (BOAS) it was found (0.91,0.95) Respectively.

Ethical Consideration

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, research center afflicted to Egypt Ministry of Health and agreement from Egypt academic for research center and technology. Written consents were obtained from subjects who were informed about the purpose, procedure, benefits, nature of the study, follow up and his/her 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 obtaining formal paper agreement which was taken induration one month before conducting the study. The researcher was bought many bottle of honey from plant protection department (Beekeeping specialty) faculty of agriculture - Minia University before starting implementation of the current study. The total data Collection were collected over a period of eight months starting from October 2015 to May 2016. The researcher carry out the study on daily basis during morning shift in chemotherapy outpatient clinic to select patients relevant with study free from stomatitis.

The researcher was started collection of data by using three tools from control group firstly after that starting data collection from study group, when both sample were in

outpatient clinic-inpatient chemotherapy department. The number of sessions for data collection from control group was nine sessions ,its duration ranged from 20 to 30 minute, in addition telephone interview for follow up presence of oral dysfunction and stomatitis symptoms while sessions duration for study group was 45-60 minute because they perform training and educational practices (tool 4):(hand washing and mouth care with honey application),this training include two parts: First part: standard hand washing procedure which include 15steps⁽⁹⁾ .Second part: mouth care with honey application which include 15 steps . Classified into two domains 1. First domain (rinse with saline solution from step (1-8)⁽¹⁰⁾. 2. Second domain (honey application from step (9-15)⁽¹¹⁾. Both previous parts grading from 2 (do the procedure) to 1(didn't the procedure). In addition telephone interview for follow up presence of oral dysfunction and stomatitis symptoms during frequency between chemotherapy sessions range from 2 to 3 weeks.

Limitation of the study

1. Formalities from the oncology center toward the study.
2. Some patients discontinue proceeding in current study due to their refusing training and educational practices or not completing their treatment session and the researcher excluded them from the study sample .
3. Cost of honey and normal saline 0.9% is high and the hospital not supported by any facilities to apply this study.

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.

Results

Table (1) Socio demographic characteristics of study & control groups (n= 60).

Socio demographic data	Groups				P-value
	Study (n=30)		Control (n=30)		
	n	%	N	%	
Age / years					
18-	4	13.3	3	10	.093 NS
30-	3	10	6	20	
40-	12	40	4	13.3	
50- 65	11	36.7	17	56.7	
Mean ± SD	45.7 ± 12.6 years		47.6 ± 11.9 years		
Gender					
Male	10	33.3	9	30	.781NS
Female	20	66.7	21	70	
Marital status					
Single	2	6.7	2	6.7	.372 NS
Married	27	90	24	80	
Widow	1	3.3	4	13.3	
Level of education					
Illiterate	21	70	23	76.7	.753 NS
Read and write	3	10	3	10.0	
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 NS
Work	6	20	5	16.7	
Not work	5	16.7	6	20	
House wife	18	60	19	63.3	
Residence					
Rural	29	96.7	26	86.7	.161 NS
Urban	1	3.3	4	13.3	

NS= not significant

It shows that , the mean average age among study group was 45.7 ± 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 ± 11.9 years old and their gender were female 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 and control groups 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 the study sample as regards medical information data (n= 60).

Medical information	Groups				P-value
	Study (n=30)		Control (n=30)		
	n	%	N	%	
Medical diagnosis					
Breast cancer	6	20	7	23.3	.542 NS
Colon cancer	15	50	15	50	
Bladder cancer	4	13.3	5	16.7	
Lymphoma	5	16.7	3	10	
Frequency of chemotherapy					
Every 2 weeks	15	50	15	50	.....
Every 3 weeks	15	50	15	50	
Hospital stay/ days					
1	15	50	15	50	.....
3	15	50	15	50	
Past experience about honey application as a method of oral care					
Doesn't know	30	100	30	100	.....
Health history of chronic disease					
Yes	4	13.3	2	6.7	.254
No	26	86.7	28	93.32	NS
If yes					
Rheumatic fever	1	25	1	5	0.372 NS
Open heart (CABG)	1	25	1	5	
Hypertension	1	25	1	5	
Rheumatoid arthritis	1	25	1	5	
Variance in body weight between pre & post chemotherapy\ kg					
No change	3	10	4	13.3	.000**
Gain 1- 4	13	43.3	1	3.4	
Gain 4 – 6	13	43.3	0	0.0	
Loss 1-4	1	3.4	18	60	
Loss 5-8	0	0	7	23.3	

NS= not significant ** highly statistically significant

It shows that, as regard medical diagnosis for study and control groups results represented that, half of them were diagnosed as cancer colon and their length of hospital stay duration was between 1 or 3 days constituted (50%) , the table illustrated that all (100%) of study sample (study and control groups) had no experience regard using of honey application . as regard the variance in body weight pre and post chemotherapy , there is gain of weight (1-6 kg) in 43.3% of the study group while there is loss of body weight (1-4 kg) in 60% of control group , there were a highly statistical significant difference between study and control groups.

Table (3) Differences of beck oral assessment scale (BOAS manifestations) among study and control groups post three sessions of chemotherapy (n= 60).

Beck Oral Assessment Scale	First dose		Second dose		Third dose	
	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
First observation						
No dysfunction (5)	30 (100)	30 (100)	30 (100)	14 (46.7)	28 (93.3)	9 (30)
Mild dysfunction (6- 10)	0 (.0)	0 (.0)	0 (.0)	11(36.7)	2 (6.7)	15 (50)
Moderate dysfunction (11- 15)	0 (.0)	0 (.0)	0 (.0)	5 (16.6)	0 (.0)	6 (20)
Severe dysfunction (16- 20)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	0 (.0)
t	.....		-4.535		-4.781	
P- value	.....		.000**		.000**	
Second observation						
No dysfunction (5)	29 (96.7)	17 (56.7)	30 (100)	6(20)	28 (93.3)	7 (23.4)
Mild dysfunction (6- 10)	1 (3.3)	13 (43.3)	0 (.0)	18(60)	2 (6.7)	8 (26.7)
Moderate dysfunction (11- 15)	0 (.0)	0 (.0)	0 (.0)	6(20)	0 (.0)	14 (46.7)
Severe dysfunction (16- 20)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	1 (3.3)
t	-3.268		-8.623		-7.601	
P- value	.002*		.000**		.000**	
Third observation						
No dysfunction (5)	29 (96.7)	12 (40)	30 (100)	6 (20)	29	7(23.4)

Beck Oral Assessment Scale	First dose		Second dose		Third dose	
	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Mild dysfunction (6- 10)	0 (.0)	16 (53.3)	0 (.0)	13 (43.3)	1 (3.3)	3 (10)
Moderate dysfunction (11- 15)	1 (3.3)	2(6.7)	0 (.0)	10 (33.3)	0 (.0)	18 (60)
Severe dysfunction (16- 20)	0 (.0)	0 (.0)	0 (.0)	1 (3.3)	0 (.0)	2 (6.7)
t		-3.889		-7.912		-8.201
P- value		.000**		.000**		.000**

* p ≤.05

** p ≤.01

(BOAS): Beck Oral Assessment Scale

It shows that, there was a highly statistical significant difference regard BOAS manifestations between study and control groups during third observation for them post first session of chemotherapy. Also, there was a highly statistical significant difference among same groups during three observations post second and third session of chemotherapy.

Table (4) Differences of (WHO) Oral Toxicity Scale among study & control groups post three sessions of chemotherapy (n= 60).

WHO oral toxicity scale	First dose		Second dose		Third dose	
	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)	Study (n=30)	Control (n=30)
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
First observation						
Non (0)	30 (100)	30 (100)	30 (100)	15(50)	28 (93.3)	10 (33.3)
Mild (oral soreness, erythema)	0 (.0)	0 (.0)	0 (.0)	11(36.7)	2 (6.7)	14 (46.7)
Moderate (oral erythema, ulcers, solid diet tolerated)	0 (.0)	0 (.0)	0 (.0)	4(13.3)	0 (.0)	5 (16.7)
Severe (oral ulcers, liquid diet only)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	1 (3.3)
Life threatening (oral alimentation impossible)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	(.0)
t	.....		-4.829		-5.420	
P- value	.....		.000**		.000**	
Second observation						
Non (0)	29 (96.7)	23(76.7)	30 (100)	6(20)	28 (93.3)	7(23.4)
Mild (oral soreness, erythema)	1 (3.3)	7(23.3)	0 (.0)	15(50)	2 (6.7)	6 (20)
Moderate (oral erythema, ulcers, solid diet tolerated)	0 (.0)	0 (.0)	0 (.0)	9(30)	0 (.0)	16 (53.3)
Severe (oral ulcers, liquid diet only)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	1 (3.3)
Life threatening (oral alimentation impossible)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	0 (.0)	(.0)
t	-2.344		-8.462		-7.295	
P- value	.02*		.000**		.000**	
Third observation						
Non (0)	29 (96.7)	13(43.3)	30 (100)	7(23.3)	29 (96.7)	7(23.4)
Mild (oral soreness, erythema)	0 (.0)	15(50)	0 (.0)	14(46.7)	1 (3.3)	10 (33.3)
Moderate (oral erythema, ulcers, solid diet tolerated)	0 (.0)	2(6.7)	0 (.0)	8(26.7)	0 (.0)	18 (60)
Severe (oral ulcers, liquid diet only)	1 (3.3)	0 (.0)	0 (.0)	1 (3.3)	0 (.0)	1 (3.3)
Life threatening (oral alimentation impossible)	0 (.0)	0 (s.0)	0 (.0)	0 (.0)	0 (.0)	(.0)
t	-3.547		-7.503		-8.020	
P- value	.001**		.000**		.000**	

(WHO): World Health Organization

It displays that, there was a highly statistical significant difference among study and control groups regard degree of stomatitis during third observation post first session of chemotherapy & also there was a highly statistical significant difference among same groups during three observations post second and third session of chemotherapy. Results also revealed that statistical significant difference among both groups regard degree of stomatitis only during second observation post first session of chemotherapy. The table illustrated that the percentage of oral stomatitis degree occurs among study group in three sessions were (0.0%, 3.3%, 6.7%) in the three observations respectively.

Table (5) Correlations between socio demographic data regard to beck oral assessment scale (BOAS) and oral toxicity scale (sum of three sessions) for the study and control groups.

Socio demographic data	BOAS				Oral toxicity scale			
	Study		Control		Study		Control	
	r	p	r	p	r	p	r	p
Age	-.293	.116	.138	.468	-.410*	.024	.176	.353
Gender	.158	.403	-.119	.530	.076	.692	-.151	.424
Marital status	-.037	.845	.355	.054	-.192	.308	.323	.082
Educational level	.164	.386	.101	.597	.290	.120	.055	.773
Employee status	.141	.457	-.004	.984	.00	.00	-.015	.939
Residence	.148	.437	.121	.525	.164	.386	.108	.570

It shows that, there was no statistical significant correlation between socio demographic data for study and control groups with result of beck oral assessment scale (BOAS) post three sessions of chemotherapy. Also there was no statistical significant correlation between socio demographic data for study and control groups with result of oral toxicity scale except for age among study group, a correlation was found with previous scale post three sessions of chemotherapy.

Table (6) Correlations between beck oral assessment scale (BOAS) and oral toxicity scale (sum of three sessions) for the study and control groups.

BOAS	Oral toxicity scale			
	Study		Control	
	r	p	r	p
	.945**	.000	.961**	.000

It shows that, there was strong positive correlation between result of beck oral assessment scale (BOAS) and oral toxicity scale among study and control groups post three sessions of chemotherapy.

Table (7) Correlations between medical data regard to BOAS and Oral toxicity scale (sum of three sessions) for the study and control groups.

Medical data	BOAS				Oral toxicity scale			
	Study		Control		Study		Control	
	r	p	r	p	r	p	r	p
Medical diagnosis	-.129	.497	.107	.574	-.037	.845	.058	.759
Health history	-.113	.552	.001	.995	-.126	.508	-.029	.880
Variance in body weight between pre & post chemotherapy\ kg	.346	.03*	.206	.274	.456	.06	.261	.274

* p = ≤.05 (statistical significance)

** p = ≤.01 (highly statistical significance)

It shows that, there was no statistical significant correlation between all medical data for study and control groups with result of beck oral assessment scale (BOAS) and oral toxicity scale except Variance in body weight between pre & post chemotherapy among study group, a correlation was found with beck oral assessment scale (BOAS) only post three sessions of chemotherapy.

Discussion

Oral stomatitis is one of the most common and a significant complication of cancer chemotherapy and is experienced by around 40% of the patients undergoing chemotherapy .Stomatitis-induced pain disturbs patients and makes it difficult to eat and drink, resulting in indigestion and dehydration, compromise the patient’s nutritional status because of a decrease of food intake, leading to weight loss. Stomatitis can also disturb speaking and communication with others, resulting in psychological , social problems, increase the length of hospitalization, increased morbidity, mortality, and increased health care costs. Good oral care is the only effective intervention that is helpful in prevention, reducing the duration and severity of oral stomatitis and it has impact of oral flora.

The present study revealed that most of patient age ranged from 40 -65 years old due to lower immunity and poor nutrition. This result supported by the work of the (12) who concluded that the risk of begin diagnosed with cancer increases as individuals aged, most cases occur in adults in the middle aged or older. In the same line study by (13) stated that it is worth mentioning that 55% of cancer occurs in people over

65 years of age. Also this result supported by (14) who stated that patients over 50 years of age may develop severe stomatitis, perhaps because of insufficient DNA repair ,decreased renal function and compromised tissue recovery caused by the decline in stem cell reserves in elderly patients. However this result was in contradicted with (15, 16, 17) they said that Younger age is thought to be a risk factor due to a higher mucosal turnover rate; with an earlier onset observed in pediatric patients.

The present study revealed that more than half of the study and control groups were female because current study setting illustrated that female had a poor performance status. This results agrees with (6) reported that cancer is three times as common in women as in men. Also, (18) studied the impact of gender on the incidence of oral stomatitis as part of a randomized trial 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. The present study mentioned that , the chemotherapy agent were received by study group is 5-FU related to study setting protocol of management (fluorouracil, cisplatin,

adriamycin,.....etc.) .This results agrees with ⁽¹⁹⁾ women receiving 5-FU appear to be at higher risk for oral stomatitis, in an analysis of 4 colorectal cancer trials of 5-FU-containing regimens including 1074 patients and reported that, compared with men, women had a significantly higher average toxicity grade and incidence of toxicity grade 2 or higher. On the other hand ⁽²⁰⁾ contradicted this finding which explained that men experience a higher incidence of cancer than do women.

The result of the present study revealed that the majority of patients were from rural area in both groups currently held to be strictly related to social, cultural and educational background, lack of facilities. On contrary to the finding, ⁽²¹⁾ found that there is evidence to suggest rural populations are diagnosed at a more advanced stage of cancer .This finding raises questions regarding availability and utilization of preventive, screening, and diagnostic services in rural areas as well as the existence of unique social and behavioral barriers.

According to ⁽²²⁾ the majority of data available indicate there are no differences between rural and urban populations with regard to cancer incidence and mortality, but a number of studies find cancer incidence increases with population density, which is a characteristic of relatively more urban settings.

In relation to type of cancer, half of the patients were colon cancer in study and control groups because colon cancer receive continuous repetitive and higher dose of chemotherapy and stay three day in the inpatient chemotherapy unit than other types of cancer. This result was in agreement with ⁽²³⁾ who stated that prolonged or repetitive and higher doses administration of cytotoxic agents are thought to be associated with an increased risk of developing oral stomatitis and the risk of developing oral stomatitis also increases with the number of chemotherapy cycles and previous experiences of chemotherapy-induced stomatitis . This result was in contradicted with ⁽²⁴⁾ who stated that breast cancer is the most common tumor among women worldwide.

The current study revealed there were gains of weight in less than half of the study group while there is loss of body weight in more than half of control group due to development of stomatitis among them. There is a highly statistical significant difference between study and control groups which (P - value =.000**) ,this finding is in agreement with ^(25,26) who stated that 55% of the honey-treated patients showed either static or positive weight gain during radiotherapy in comparison to 25% in the control arm (p<0.05).

In the current study has been used honey as a prevention of stomatitis. This finding is congruent with that of ⁽²⁷⁾ which aimed to evaluate the efficacy of pure natural honey as prophylaxis against radio chemotherapy induced stomatitis in head and neck cancer among forty patients. They found that prophylactic use of pure natural honey was effective in reducing stomatitis resulting from radio chemotherapy in patients with head and neck cancer.

As well this finding is in agreement with ^(28, 29, 30, 31, 32, 33, 34) they found that honey is also recommended in dental hygiene. The use of honey three times a day after meals significantly reduces plaque and the risk of gingivitis. It also has therapeutic properties in the treatment of gingivitis and periodontal disorders. In a study on 10 cases of dental infections, the local use of natural honey in dental abscesses proved to have antibacterial effects.

Results of the current study showed a highly statistically significant improvement in the total (WHO) oral toxicity scale among patients over time which p value =

.000** . This result was further supported by ⁽³⁵⁾ showed that honey caused virtually better recovery of stomatitis among patients compared with routing solution administered at the ward among 70 patients with acute myeloid leukemia and lymphoid leukemia under chemotherapy.

Also, the world Health Organization (WHO) has cited that honey demulcents may soothe the throat; honey reduces inflammation and edema, stimulates epithelialization and tissue regeneration and thus improves granulation and debridement. Honey by its sweet substances stimulates saliva secretion and also the secretion of mucus in the airways. Previously, some studies have proved promising effects of honey on the cancer treatment-induced oral stomatitis. Honey potentiated the antitumor activity of chemotherapeutic drugs such as 5-fluorouracil and cyclophosphamide. ^(28, 30, 36, 37)

The current study revealed that statistically significant differences between control and study groups who receive normal saline plus honey for prevention of oral stomatitis. This finding is in agreement with ⁽³⁸⁾ who found that statistically significant differences between control group and those who receive normal saline alone or normal saline plus honey for prevention of oral stomatitis. About normal saline these data are compatible with previous reports that showed effectiveness of normal saline in prevention of oral stomatitis in patients with cancer.

Current study showed that, the length of hospital stay for study group were ranged from 1 to 3 days equally half among them this related to setting study protocol for colon cancer average 3 days in addition hospital stay increase when patients complain from stomatitis which is not occur with study group.

The current study revealed that study group was reduced in their complaining from stomatitis than control groups, this related to compliance of study group with training and educational practice about hand washing and mouth care with honey application. This finding is in agreement with ⁽³⁹⁾ who states that the prevention and improvement trend of stomatitis was better among the patients receiving the honey mouthwash than those receiving the chamomile mouthwash due to its powerful antitumor effects, strengthen the immune system and increase feeling of comfort during its using.

The present study showed that the majority of patients in study group didn't develop stomatitis and most of control group developing different grade of stomatitis, This finding is agreement with ⁽³⁴⁾ who evaluated the potential of a honey to reduce the number of outbreaks of recurrent stomatitis ulcers and showed that honey is effective in decreasing the number of recurrences and improve the quality of life in patients who suffer from recurrent stomatitis.

The result of the current study revealed that honey had effective in reduction of moderate and sever stomatitis in patient undergoing chemotherapy .This finding is in agreement with that of ⁽³⁹⁾ who stated that honey had very positive results against oral stomatitis among pediatric cancer patients undergoing chemo/radiotherapy and showed a significant reduction in grade III & IV oral stomatitis in the experimental group (20%) incidence rate versus 55% in the control and those results are in agreement with what was reported by others on the use of honey inside the mouth of cancer patients undergoing chemo/radiotherapy. ^(40, 41, 42)

The current study shows that, there are strong positive correlation between beck oral assessment scales (BOAS) and (WHO) oral toxicity scale among study and control groups because it is normally oral cavity or oral function assessment

with absent of oral stomatitis symptoms and reversely occur. This result in agreement with⁽⁴³⁾ analyzing the influence of chemotherapy on oral health status confirm the finding that poor oral hygiene increases the risk of oral stomatitis. Also⁽¹⁵⁾ report that Pre-existing conditions such as gingivitis, periodontal disease, plaques and dental carries are likely to result in a higher incidence of oral stomatitis.

Finally Patients in study group in the current study had significant correlation regarding increase in body weight and showed better improvement in all of the outcome variables because they understanding the importance of honey as a solution for prevention of stomatitis and as nutritive supplement. These findings are in agreement with^(44, 45, 46) report that General oral care is the basis of oral stomatitis management, and it has a crucial role in prevention of its occurrence. Current study found that compliance of study sample toward applicator or mouth care by honey is high regard to their acceptance and confidence about aim of the study and early prevention of stomatitis occurrence, this agreement with The Multinational Association of Supportive Care and the International Society for Oral Oncology (MASSC/ISOO) guidelines recommend use of a standardized oral care protocol including 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 caregivers should be educated regarding the importance of effective oral hygiene⁽⁴⁷⁾.

As well,^(48,49) advised that frequent use of non-medicated oral rinses (e.g. saline mouth rinses 4–6 times/day) is recommended to promote healing of oral mucosal lesions ,could reduce the oral micro flora, Promote reepithelization of soft tissue lesions, normalize the pH of oral fluids and have an acceptable taste and be nontoxic.

Conclusion

Honey was an effective in preventing and decreasing oral stomatitis and gingivitis in patients receiving chemotherapy. There was a highly statistical significant difference among study and control groups regard degree of stomatitis during third observation post first session of chemotherapy and also there was a highly statistical significant difference among same groups during three observations post second and third session of chemotherapy. Also results revealed that statistical significant difference among both groups regard degree of stomatitis only during second observation post first session of chemotherapy. Results illustrated that the percentage of oral stomatitis degree occurs among study group in three sessions were (0.0%,3.3%,6.7%) in the three observations respectively .

Recommendations

- Regular training programs to keep nurses in oncology unit updated with the most recent strategy for oral hygiene that promote oral wellness.
- Creating an oral care assessment sheet for every patient with or without stomatitis during his hospitalization is an important in preventing oral complications and decreasing severity of oral stomatitis.
- The nursing care plan must encompass the entire process of chemotherapy, the purpose and side effects of the medication prescribed.
- Formulate a standard of oral care technique on patients with chemo/radiotherapy induced stomatitis.

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