Pharmacophore

ISSN-2229-5402

Journal home page: http://www.pharmacophorejournal.com

Pharmacophore
an International Journal
ISSN 2229-5402

THE EFFECT OF ORAL CARE PROGRAM AND HONEY MOUTHWASH ON THE QUALITY OF LIFE OF ACUTE MYELOID LEUKEMIA PATIENTS UNDERGOING CHEMOTHERAPY: A SINGLE BLIND CLINICAL TRIAL

Arezoo Khanjani pour-fard-pachekenari[1*], Azad Rahmani[2], Akram Ghahramananian[3], Mohammad Asghari Jafar-abadi[4], Arefeh Davoodi [5], Jamal Eyvazi-ziaei[6]

1. *Master of Science student, department of medical-surgical nursing, nursing and midwifery faculty, Tabriz University of medical sciences, Tabriz, Iran. Corresponding Author*
2. *PhD, Associate professor, department of medical-surgical nursing, nursing and midwifery faculty, Tabriz university of medical sciences, Tabriz, Iran.*
3. *PhD, Assistant professor, Department of Medical Surgical, Nursing and Midwifery Faculty, Tabriz University of Medical Sciences, Hematology and Oncology Research Centre, Tabriz , Iran.*
4. *PhD, Associate professor, department of statistic and epidemiology health faculty, Tabriz university of medical sciences, Tabriz, Iran.*
5. *Master of Science nursing educator, Department of medical-surgical nursing, nursing and midwifery faculty, Tabriz University of medical sciences, Tabriz, Iran.*
6. *MD,PhD, associate professor, Department of internal medicine, medicine faculty, Tabriz university of medical sciences, Hematology and Oncology Research Center, Tabriz, Iran.*

ARTICLE INFO

Received:
03th Jun 2017
Accepted:
29th Nov 2017
Available online:
14th Dec 2017

Keywords: *quality of life, oral care, honey, mouthwash*

ABSTRACT

Background and objective: the fact that cancer patients who have undergone various treatment methods have been able to survive for a longer amount of time has affected the quality of their lives. On the one hand, mucositis is one of the debilitating diseases which is followed by side effects caused by cancer treatment, eating disorders and verbal and nonverbal communications. Thus, the present study has aimed to compare the effect of honey mouthwash and oral care on the quality of lives of adult AML patients undergoing chemotherapy.
Research method: in this research, which is a single blind clinical trial, 53 AML patients who were going through chemotherapy were selected and randomly divided into three groups: one control group (19 individuals) and two experimental groups, an oral care group (17 individuals) and honey mouthwash group (17 individuals). The quality of lives of patients was once measured before the beginning of the research and once at the end of the interventions using EORTC QLQ-C30.V.3 as a tool. Research data were analyzed by the SPSS software.
Findings: in the honey mouthwash group, a statistically significant difference has been seen in the cognitive aspect (p=0.04), pain aspect (p=0.03) and overall quality of life of patients (p=0.005); in such a way that at the end of the intervention, the mean score of patients in the cognitive aspect had increased but their mean score in the pain aspect and overall quality of life of patients had decreased. In the control group, the statistical difference in the emotional aspect of quality of life has been significant (p=0.02); in such a way that at the end of the intervention, the mean score of patients in this aspect has been reduced. At the end of the study, the difference between the control group and the honey mouthwash groups in the pain aspect (p=0.034) and the overall quality of life of patients (p=0.024) was significant.
Conclusion: given that the effectiveness of honey mouthwash on some of the aspects of quality of life and the fact that this mouthwash can easily been washed for oral care in patients receiving chemotherapy for preventing mucositis, eating disorder and verbal and nonverbal communications between these patients.
.

To Cite This Article: Arezoo Khanjani pour-fard-pachekenari, Azad Rahmani, Akram Ghahramananian, Mohammad Asghari Jafar-abadi[4], Arefeh Davoodi , Jamal Eyvazi-ziaei, (2017), "the effect of oral care program and honey mouthwash on the quality of life of acute myeloid leukemia patients undergoing chemotherapy: a single blind clinical trial", ***Pharmacophore, 8(6S),*** *e-1173442.*

Corresponding Author: Arezoo Khanjani pour-fard-pachekenari , Email: arezookhanjani68@gmail.com

Introduction

Nowadays, because of application of various treatment methods, cancer patients are able to survive cancer for a longer period of time(1). When different treatment methods are used on cancer patients, the quality of their lives (QOL) is affected. QOL refers to the sum of social, mental and physical welfare(2) which is influenced by the psychological and emotional burden caused by being diagnosed with the disease, diagnostic and therapeutic measures, stress, pain, depression, the effects the disease on the patients' family relations, marriage and social relations, economic issues resulted from the disease, eating disorders and the side effects of treatment (3).

Quality of life is one of the most important consequences reported by the patients. By measuring QOL of the patients, the treatment team would receive useful information about prognosis and priorities and by continuously reviewing this information, the treatment team would become aware of the registry, adaptability and side effects of the treatment (4). Side effects of cancer can impact the quality of lives of patients from different aspects such as physical, social, psychological and professional (5) and the examination of this factor has been introduced as an important consequence in the domain of palliative care (6).

Quality of life is an indicator of the health status of patients suffering from cancer considerably affects nutritional factors. A change in metabolic activities resulted from cancer and cancer treatment can lead to a change in the psychological and physiological functions and has negative impacts on the nutritional condition of the patients and lower the quality of their lives. The study conducted by Lis *et al.* showed that malnutrition is an important factor that prevents mortality in advanced cancers and plays a significant role in the quality of lives of patients (7).

Toxic effects of chemotherapy on cells with high-speed cell division, such as oral mucosa (8, 9), disturb the health of patients' mouths. The oral cavity plays a key role in talking, eating and nonverbal communications (kissing and smiling)(10); in such a way that if it is damaged and changes that follow such damage would increase the likelihood of cancer patients' diagnosis with malnutrition to 40 to 80%. Occurrence of malnutrition is strongly related to the type of tumor and its location, stage of the disease and the treatment that is received by the patients (7). Given that the main purpose of palliative care is to improve the quality of life of patients, therefore, nutrition plays a key role in its promotion (11).

Patients' nutrition plays a basic role in oncology; in such a way that a reduction in it can lead to recurrence of the illness and to an increase in the course of the illness (12). Determining the stage of the disease plays a basic role in measuring the QOL of patients. However, based on the research conducted by Ravasco *et al.*, it becomes clear that nutrition plays a considerable role in this field (13). In the research carried out by Ravasco *et al.*, it was concluded that premature nutrition counseling can improve nutritional parameters and therefore improve QOL of patients (14). On the other hand, in a research conducted by Bozzetti *et al.* on home parental nutrition on patients diagnosed with advanced cancer, it was specified that patients have survived longer but the quality of life of patients have remained the same (15). Studies show that quality of life of patients diagnosed with leukemia is significantly lower than the quality of life of those in the control group (16). In the research conducted by Bezinelli *et al.*, findings show that the quality of life of patients diagnosed with mucositis who went through bone narrow transplantation with laser therapy and oral care protocol improved as time passed and oral problems of the patients reduced (17).

Given the importance of the issue and shortage of strong evidence on clinicians who wish to adopt various ways of promoting the quality of life of cancer patients and helping them improve their care performance, the present study has aimed to answer the following question: will using a honey mouthwash and oral care program improve the quality of life of adult AML (Acute Myeloid Leukemia) patients undergoing chemotherapy?

Method

This single-blind clinical trial was conducted at the Shahid Ghazi Tabatabaei Hospital in Tabriz from late April to the end of October, 2016. The study design was approved by the Ethics Committee of the Tabriz University of Medical Sciences (Tbzmed.rec.1394.876) and recorded at the Clinical Trials Center (IRCT2015121419919N7). The written informed consent was obtained from all the participants after providing them with sufficient information on the study. AML patients who were deemed candidates for receiving the "3+7" chemotherapy regimen (3 days of the antibiotic, daunorubicin and 7 days of the antimetabolite, cytarabine), were selected. The inclusion criteria were definitive AML diagnosis, age above 18 years, receiving chemotherapy for the first time, mucositis incidence during the study, lack of underlying diseases (diabetes as well as liver, renal and digestive diseases), lack of immune deficiency and lack of oral cavity disease prior to start of chemotherapy. Exclusion criteria were M3 grade of AML due to arsenic administration in treatment regimen, thrombocytopenia (platelets less than 20,000 per mm^3), history of smoking and treatments discontinue for any reason. The estimated sample size necessary to detect a1-point difference between any treatment groups with 95% power, α=0.05, based on a 2-sided and 1-point difference for the primary outcome has been used previously (similar clinical trials) (18)where 17 patients were estimated for each group (Test Statistic: Z test with pooled variance in the PASS software). After determining the sample size, 73 patients were deemed eligible to be included in the study but finally, 60 patients who gave written informed consent were enrolled and randomly assigned to intervention and control groups using random blocks with a volume of 3 and an assignment ratio of 1:1:1 to produce three groups consisting of oral care (20 subjects), honey mouthwash (20 subjects) and control (20 subjects) (Diagram 1). In order for concealment of allocation, dark and sequential numbered envelopes were used to enclose sequences, and necessary measures were taken so that the sequence would remain concealed until the intervention was allocated to the intervention groups

In order to control the confounding variables, some actions were taken. A review of the literature suggests that low age and female gender are among the factors influencing the incidence rate of mucositis (19, 20). These variables were controlled by matching all the three groups and through statistical analyses. Also, oral health and salivary glands function are of the effective factors in the risk of developing mucositis (19, 20). In order to control this confounding variable, the patients were examined by physicians before entering the study and those with oral and dental problems were excluded. Furthermore, considering that

the type of chemotherapy treatment given is known to promote the development of mucositis (19, 20), all the patients were under the "3+7" induction chemotherapy regimen.

EORTC QLQ-C30.V.3 Questionnaire was used to assess quality of life. The questionnaire belongs to the European Cancer Research and Treatment Organization, which is used to assess the quality of life in cancer patients in general, and five functional scales (physical, role, emotional, cognitive and social), three symptom scales (fatigue, pain, nausea/vomiting), a global health/QoL scale and six single items assessing symptoms and financial impact of disease (15). The raw scores were linearly transformed to give standard scores in the range of 0–100 for each of the scales and single items. Higher scores on the functional and global health scales indicated better functioning, whereas higher scores on the symptom scales represent more symptomatology. A psychometric version was used in Iran and the internal consistency reliability was calculated through Cronbach's alpha calculation.

The method in each of the three study groups was implemented as follows:

The oral care group: In the oral care group, a new Oral-B® toothbrush (soft and proper) was provided to each patient before the intervention was initiated, and all surfaces of the teeth were brushed twice a day for at least 90 seconds during the intervention. Also, dental floss was used once a day, and normal saline, 60 cc (i.e., a quarter cup), was used three times a day for 30 seconds in the form of gargling and holding in the mouth. Use of alcohol, tobacco and food that is acidic, hot or spicy was also avoided by participants during the intervention. The training for body hydration was given to the patients so that they could protect the oral mucosa. In addition, all the patients were evaluated for malnutrition by a nutrition counselor at the participating hospital and appropriate nutritional advice was given to those were deemed malnourished. For control of nausea and vomiting, antiemetic medications (8mg Dexamethasone and 3mg Granisetron administered half an hour before commencement of chemotherapy) were prescribed for the patients in all the three groups. In addition to a face-to-face training, a written educational program was also provided to each patient and their family.

The honey mouthwash group: In the honey mouthwash group, honey-mouthwash solution (honey to water ratio of 1:20) with no bacterial contamination and temperature 37°C was used before and after each meal, and once before bed for 30 seconds, through gargling and holding in the mouth, so that the solution permeated all parts of the mouth, gum and tongue. Natural honey is produced from nectar of flowers and plants by honeybees in the mountainous regions of northwest of Iran. In this research patients received Baran-Baghro honey (No.9922, Baran-Baghro, Ardabil, Iran).Unfortunately, today, some variations of commercially prepared honey have sugar as an additive, greatly reducing the purity of the honey. For this reason, the genuineness of the honey along with its purity, concentration, absence of bacterial contamination and PH was reviewed and confirmed in an accredited food laboratory (The Nobel laboratory affiliated to Tabriz University of Medical Sciences).

The control group: Patients in the control group received only routine care for the prevention of mucositis which consisted of nursing care, mouth hygiene training and ingestion of capsule fluconazole as prescribed to prevent fungal and bacterial ulcers. The patients in the other intervention groups also received this same routine care program, in addition to the designed interventions (the oral care protocol and honey mouthwash).

Data were analyzed using the SPSS software version 21. To analyze the data, descriptive statistics (namely frequency, percentage, mean, standard deviation) was used and inferential statistics including analysis of variance, Chi-square and Fisher's exact test (comparison of data distribution), and Šidák correction test (paired comparison) was also employed to determine the data significance.

Findings

In the present study, 60 patients entered the research and the data obtained from 53 participants, including 35 male patients and 18 female patients, were analyzed. Participants were divided into the following groups: honey mouthwash group (17 participants), oral care program group (17 participants) and control group (19 participants). No statistically significant difference was seen between these three groups after comparing these groups in terms of the age, weight, body mass index, frequency of brushing tooth and underlying index of patients (P>0.05) (table 1).

All patients in the oral care program group and the honey mouthwash group did not have any underlying illness; whereas, out of the patients in the control group, one had anemia and another suffered from hypertension and these differences were not statistically significant (p-value=0.292) (table 1).

Based on the EROTIC QLQ-C30 questionnaire, table 2 displays the mean score of 5 functional aspects, 9 aspects of symptoms and the overall quality of life of patients. In general, in the honey mouthwash group, a statistically significant difference has been seen in the cognitive aspect (p=0.04); in such a way that an increase was observed in the mean score after the intervention. On the other hand, in the aspect of symptoms, a significant difference was seen in this group in the pain aspect (p=0.03); in such a way that the mean score was decreased after the intervention. In this group, the overall quality of life of patients has also been significant (p=0.005); in such a way that mean score of patients was reduced and the quality of life of patients was reduced at the end of the research (table 2).

In the oral care group, there was no significant difference between any of the aspects under study before and after the intervention (table 2). In the control group, the difference in the emotional aspect has been significant (p=0.02); in such a way that the mean score was reduced after the intervention; meaning that patients had regressed in the emotional aspect of the quality of life of patients (table 2).

The groups were compared two by two by using the Sidak test, it became clear that there was a difference between the control group and the honey mouthwash group in the aspect of pain symptoms (p=0.034) and the overall quality of life of patients (p=0.024) (table 3). In other words, the intensity of the pain felt by the patients decreased after using the honey mouthwash, but the results were the complete opposite for the overall quality of life of patients (table 2 and 3).

Discussion and conclusion

The results of this study have shown that using the honey mouthwash will reduce the intensity of the pain felt by the patients in the period that it is being used. This result complies with the findings of the research conducted by Owoyele *et al.* (21).

Potential side effects of cancer and cancer treatments can potentially affect the cognitive function of cancer patients. Therefore, they play an exponential role in the daily lives of cancer patients (22). Given the results obtained from this study, the cognitive function of the patients has only significantly improved in the honey mouthwash group.

However, despite the reduction in one of the aspects of pain symptoms and improvement of the cognitive aspect of QOL and given that quality of life has various aspects, a reduction in one of the aspects of pain symptoms and an improvement in the cognitive aspect has not been able to ultimately improve the quality of life of patients. Because of factors such as an enhancement in the prevalence of cancer patients, early diagnosis and treatment improvements, cancer patients who live in western countries survive longer. However, as the prevalence of cancer increase, the number of cancer patients who deal with long-term side effects of cancer and cancer treatment their entire lives also increases and these side effects can negatively affect the quality of life of these patients (23).

Sarokhani *et al.* systematically reviewed studies in the field of quality of life of patients and came to the result that in the 17 studies they reviewed with a sample consist of 1476 Iranian individuals, quality of life of female cancer patients is better than that of male cancer patients; in such a way that the mean scores of QOL of women and men were (30.61) and (28.90), respectively. The mean score of quality of life in Iran was 42 (confidence distance of 95%: (34.05 to 49.96)) which was (55.20) in the emotional dimension, (40.8) in the social dimension, 36.50 in the mental health dimension and (38.17) in the physical health dimension. On the other hand, the mean score of quality of life varied in different parts of Iran and the highest mean score of quality of life was that of center of Iran (70.99) (with a confidence distance of 95%: (56.11 to 85.88)). what has been specified in this article is that measuring quality of life of individuals suffering from chronic diseases can be a useful guideline for promoting health cares (24). In the present study, total mean score of quality of life in the honey mouthwash group has been statistically significant and it has reduced.

In another research conducted by Aj *et al.* called reviewing the effect of education in the field of common breast cancer care and treatments on the quality of life of patients with breast cancer, it was specified that presenting four educational sessions does not improve the quality of life of patients (25).

One of the limitations of this research is the four-week follow-up on the patients which is not a sufficient period of time for reviewing the quality of life variable.

Using oral care program and honey mouthwash in association with the QOL variable, in the honey mouthwash group, we observed that using honey reduced the pain felt by the patients throughout the treatment and improved the cognitive aspect of quality of life but it was not able to improve the overall quality of life of patients, but this group was more efficient than the other two groups. Thus, considering the results of using honey mouthwash, using the honey mouthwash on patients undergoing chemotherapy is recommended.

Acknowledgement

The master's dissertation in the faculty of nursing and midwifery in Tabriz University was converted to the present article. Researchers sincerely thank all of the patients participating in the present study and also the personnel of the oncology sectors of Ghazi Tabatabayi Hospital of Tabriz.

1. So WK, Marsh G, Ling W, Leung F, Lo JC, Yeung M, et al. Anxiety, depression and quality of life among Chinese breast cancer patients during adjuvant therapy. European Journal of Oncology Nursing. 2010;14(1):17-22.
2. Bardy J, Slevin NJ, Mais KL, Molassiotis A. A systematic review of honey uses and its potential value within oncology care. Journal of Clinical Nursing. 2008;17(19):2604-23.
3. Safaee A, Zeighami B, Tabatabaee H, Moghimi Dehkordi B. Quality of life and Related Factors in Breast Cancer Patients under Chemotherapy. Iranian Journal of Epidemiology. 2008;3(3):61-6.
4. Oliva EN, Nobile F, Alimena G, Ronco F, Specchia G, Impera S, et al. Quality of life in elderly patients with acute myeloid leukemia: patients may be more accurate than physicians. Haematologica. 2011;96(5):696-702.
5. Santarpia L, Contaldo F, Pasanisi F. Nutritional screening and early treatment of malnutrition in cancer patients. Journal of cachexia, sarcopenia and muscle. 2011;2(1):27-35.
6. Fasihi-Harandi T, Anosheh M, Ghofrani-Pour F, Montazeri A, Ahmadi F, Mohammadi I, et al. Quality of Life in Women with Breast Cancer: A Qualitative Study. Payesh Journal. 2011;11:73-81.
7. Lis CG, Gupta D, Lammersfeld CA, Markman M, Vashi PG. Role of nutritional status in predicting quality of life outcomes in cancer–a systematic review of the epidemiological literature. Nutrition journal. 2012;11(1):27.
8. Barkokebas A, Silva IHM, Andrade SC, Carvalho AAT, Gueiros LAM, Paiva SM, et al. Impact of oral mucositis on oral-health-related quality of life of patients diagnosed with cancer. Journal of Oral Pathology & Medicine. 2014.
9. Song JJ, Twumasi-Ankrah P, Salcido R. Systematic review and meta-analysis on the use of honey to protect from the effects of radiation-induced oral mucositis. Advances in skin & wound care. 2012;25(1):23-8.
10. Eilers J, Million R, editors. Prevention and management of oral mucositis in patients with cancer. Seminars in oncology nursing; 2007: Elsevier.
11. Prevost V, Grach MC. Nutritional support and quality of life in cancer patients undergoing palliative care. European journal of cancer care. 2012;21(5):581-90.
12. Cravo M, Gloria L, Claro I. Metabolic responses to tumour disease and progression: tumour–host interaction. Clinical nutrition. 2000;19(6):459-65.
13. Ravasco P, Monteiro-Grillo I, Vidal P, Camilo M. Cancer: disease and nutrition are key determinants of patients' quality of life. Supportive care in cancer: official journal of the Multinational Association of Supportive Care in Cancer. 2004;12(4):246-52.

14. Ravasco P, Monteiro-Grillo I, Camilo ME. Does nutrition influence quality of life in cancer patients undergoing radiotherapy? Radiotherapy and Oncology. 2003;2(67):213-20.
15. Bozzetti F, Cozzaglio L, Biganzoli E, Chiavenna G, De Cicco M, Donati D, et al. Quality of life and length of survival in advanced cancer patients on home parenteral nutrition. CLINICAL NUTRITION. 2002;21(4):281-8-8.
16. Hadi N, Namvar E, Montazeri A. Quality of life-related health in adults with leukemia. Payesh Journal. 2011;10(2):151-6.
17. Bezinelli L, Eduardo F, Neves V, Correa L, Lopes R, Michel-Crosato E, et al. Quality of life related to oral mucositis of patients undergoing haematopoietic stem cell transplantation and receiving specialised oral care with low-level laser therapy: a prospective observational study. European journal of cancer care. 2016;25(4):668-74.
18. Ghadiri K, Farokhi A, Akramipour R, Rezaei M, Razaghei R. Effect of honey use in preventing the occurrence and reduction of mucositis severity Chemotherapy in children with cancer. Journal of Kermanshah University of Medical Sciences(J Kermanshah Univ Med Sci). 2014;18(2):74-9.
19. Veeck EB, Trucci VM, Morosolli ARC. Current strategies for the management of oral mucositis induced by radiotherapy or chemotherapy. Revista Odonto Ciencia. 2009;24(3):309-14.
20. Yarom N, Ariyawardana A, Hovan A, Barasch A, Jarvis V, Jensen SB, et al. Systematic review of natural agents for the management of oral mucositis in cancer patients. Supportive Care in Cancer. 2013;21(11):3209-21.
21. Owoyele BV, Oladejo RO, Ajomale K, Ahmed RO, Mustapha A. Analgesic and anti-inflammatory effects of honey: the involvement of autonomic receptors. Metabolic brain disease. 2014;29(1):167-73.
22. Schagen S, Klein M, Reijneveld J, Brain E, Deprez S, Joly F, et al. Monitoring and optimising cognitive function in cancer patients: Present knowledge and future directions. EJC supplements: EJC: official journal of EORTC, European Organization for Research and Treatment of Cancer[et al]. 2014;12(1):29-40.
23. Mols F, Beijers T, Vreugdenhil G, van de Poll-Franse L. Chemotherapy-induced peripheral neuropathy and its association with quality of life: a systematic review. Supportive Care in Cancer. 2014;22(8):2261-9.
24. Saroukhani D, Omidi K, Norouzi R, Zali H, Sayehmiri K, Forozeshfard M. The quality of life in cancer patients in Iran: A systematic review by using meta-analysis. Koomesh. 2016;18(1):1-12.
25. Nezal A, Javadi A, Mahmod-Babooi M, Rezaii F, Honardar A. The effect of education on the treatment and care of breast cancer on quality of life in breast cancer patients referring to oncology clinic of Kowsar hospital in 2011. Iranian Journal of Breast Diseases. 2011;5(2):60-70.

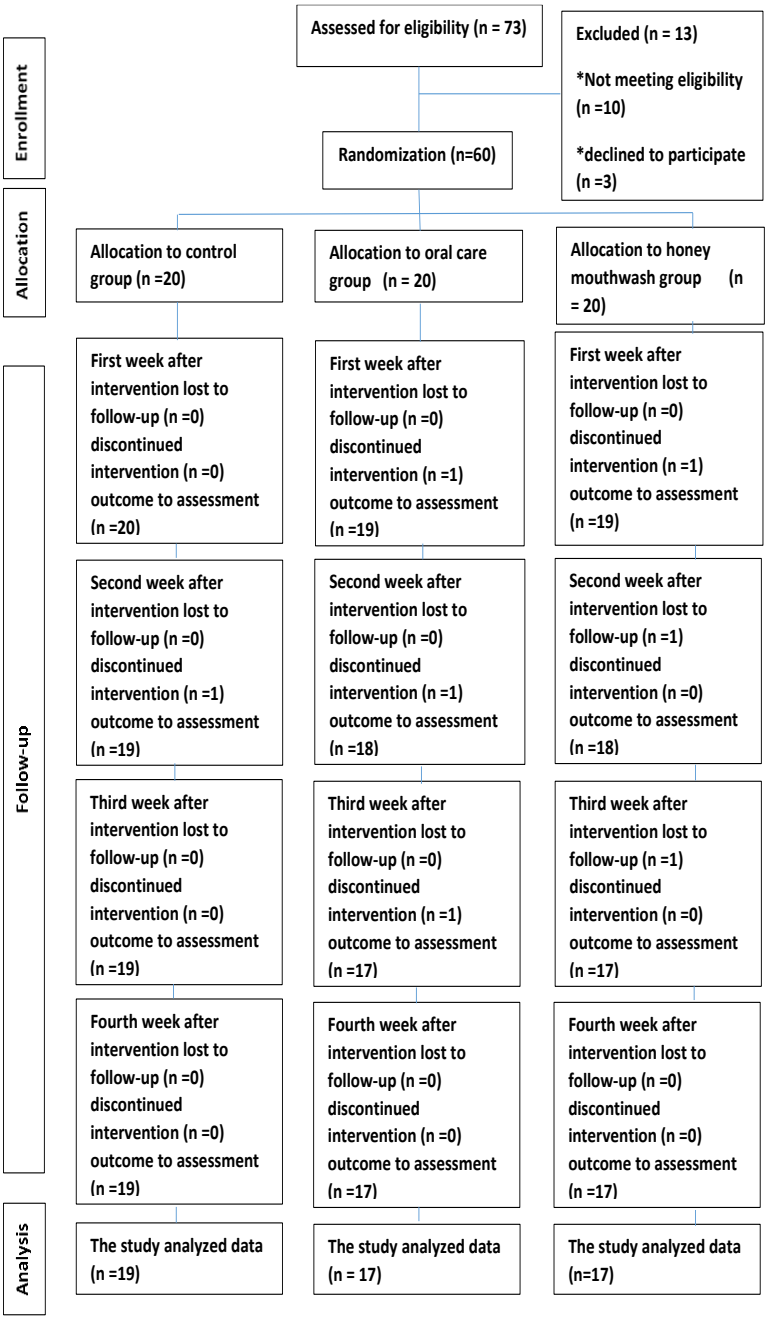

Fig1. Flow diagram of the study

Table1: Baseline characteristics of the study participants [a]				
Characteristics	**Honey mouthwash (n=17)**	**oral care (n=17)**	**Control(n=19)**	**P Value**
Gender				.936[b]
Female	5	6	7	
Male	12	11	12	
Marital status				1.000[b]
Single	7	7	7	
Married	10	10	12	
Chemotherapy regimen				.531[c]
7+3	16	16	19	
Arsenic+(7+3)	1	1	0	
Job				.630[c]
Self-employed	7	4	9	
Employee	1	2	1	
Farmer	1	1	0	
Housewife	3	4	7	
Student	3	4	2	
Other	2	2	0	
Education				.886[c]
Illiterate	2	1	4	

Elementary	10	9	8	
Diploma	3	5	6	
Bachelor	1	1	0	
Student	1	1	1	
Grade of AML				.344[c]
M0	0	0	2	
M1	1	2	1	
M2	7	4	9	
M3	1	3	0	
M4	7	7	4	
M5	1	1	3	
History of surgery				.293[c]
Yes	1	4	1	
No	16	13	18	

[a] Values are expressed as mean(SD) or No. (%).

[b] Chi-square test

[c] Fisher's exact test.

Tab2. Comparison of QOL at different time points by treatment groups

Group / Symptom item	Honey mouthwash							Oral care							Control						
	Pre. mean	Pre. SD	Pre. 95% CI for mean	Post. Mean	Post SD	Post. 95% CI for mean	Sig a	Pre. Mean	Pre SD	Pre 95% CI for mean	Post. mean	Post SD	Post. 95% CI for mean	sig a	Pre Mean	Pre SD	Pre 95% CI for mean	Post mean	Post SD	Post. 95% CI for mean	Sig a
Physical function	77.64	25.37	64.59 to 90.69	77.21	4.46	68.26 to 86.16	.57	69.41	24.27	56.93 to 81.89	71.11	4.44	62.17 to 80.06	1.00	70.52	21.92	59.96 to 81.09	68.33	4.21	59.86 to 76.81	.30
Role function	76.47	27.04	62.56 to 90.37	63.57	7.34	48.79 to 78.35	.36	62.74	27.96	48.36 to 77.12	52.27	7.14	37.89 to 66.66	.09	53.50	30.21	38.94 to 68.07	51.60	6.94	37.63 to 65.57	.40
Emotional function	72.05	26.01	58.68 to 85.43	70.08	5.78	58.43 to 81.73	.95	65.68	25.32	52.66 to 78.70	58.54	5.79	46.89 to 70.20	.20	69.29	26.50	56.52 to 82.07	56.83	5.50	45.76 to 67.90	.02
Cognitive function	73.52	33.88	56.10 to 90.94	87.11	4.02	79.01 to 95.21	.04	92.15	14.57	84.66 to 99.65	78.93	4.09	70.68 to 87.17	.10	78.94	31.83	63.60 to 94.29	77.74	3.79	70.10 to 85.39	.64
Social function	73.52	27.67	59.30 to 87.7	80.79	5.47	69.76 to 91.82	.25	69.60	36.43	50.87 to	66.94	5.49	55.88 to 78.00	.46	74.56	32.09	59.09 to 90.02	62.54	5.22	52.03 to 73.06	.07

			5							88.34										
Global health status/QOL	41.66	28.41	27.05 to 56.27	20.09	4.18	11.67 to 28.51	.005	31.37	20.31	20.92 to 41.81	30.27	4.15	21.91 to 38.64	.35	34.21	18.40	25.34 to 43.08	36.06	3.90	28.20 to 43.93	.64
Fatigue	41.83	29.53	26.64 to 57.01	28.97	6.42	16.03 to 41.91	.100	35.94	23.74	23.74 to 48.15	42.73	6.49	29.66 to 55.80	.69	43.85	26.05	31.30 to 56.41	45.19	6.15	32.81 to 57.58	.47
Nausea and vomiting	12.74	13.85	5.62 to 19.86	9.88	3.93	1.96 to 17.79	.36	12.74	23.22	.80 to 24.68	9.23	3.96	1.26 to 17.21	.05	23.68	35.70	6.47 to 40.89	15.34	3.81	7.66 to 23.03	.38
Pain	36.27	31.86	19.89 to 52.65	13.75	6.12	1.42 to 26.08	.03	25.49	26.42	11.90 to 39.07	34.13	6.14	21.77 to 46.50	.46	29.82	26.39	17.10 to 42.54	36.09	5.79	24.42 to 47.76	.35
Dyspnea	15.68	23.91	3.39 to 27.98	3.92	4.11	-4.36 to 12.21	.08	9.80	15.65	1.75 to 17.85	10.91	4.18	2.50 to 19.32	.33	22.80	33.43	6.69 to 38.92	13.04	3.99	5.00 to 21.07	.25
Insomnia	27.45	33.81	10.06 to 44.83	9.15	5.44	-1.81 to 20.12	.09	13.72	29.00	-1.18 to 28.64	19.56	5.38	8.73 to 30.39	.43	10.52	27.33	-2.64 to 23.70	19.91	5.13	9.57 to 9.57	.29
Appetite loss	35.29	41.61	31.89 to	20.97	7.28	6.32 to 35.63	.27	23.52	30.65	7.76 to	17.62	7.42	2.68 to 32.56	.17	40.35	37.80	22.12 to	26.86	6.99	12.78 to	.13

			56.69							39.28							58.57			40.93	
Constipation	5.88	13.09	-.85 to 12.61	5.70	3.66	-1.67 to 13.09	.16	9.80	22.86	-1.95 to 21.56	10.17	3.66	2.80 to 17.54	1.00	17.54	34.00	1.15 to 33.93	8.59	3.52	1.51 to 15.68	.33
Diarrhea	5.88	13.09	-.85 to 12.61	5.82	4.04	-2.32 to 13.97	1.00	5.88	13.09	-.85 to 12.61	2.60	4.06	-5.57 to 10.78	.16	10.52	24.97	-1.51 to 22.56	6.49	3.88	-1.31 to 14.30	.49
Financial	43.13	36.82	24.20 to 62.07	32.85	7.52	17.70 to 48.01	.605	31.37	39.91	10.85 to 51.89	39.75	7.45	24.74 to 54.75	.42	28.07	38.90	9.31 to 46.82	33.27	7.14	18.89 to 47.66	.49

[a] Fisher's exact test.

Scores were based on patient responses to the EORTC QLQ-C30(European Organization for Research and Treatment of Cancer Quality of Life Questionnaire).

Table3. Comparison of two by two the groups after 4 weeks for each item [a]

Groups	Honey with control		Oral care with control		Honey with oral care	
Items	**MD (95% CI) [b]**	**P Value**	**MD (95% CI) [b]**	**P Value**	**MD (95% CI) [b]**	**P Value**
Physical function	**8.87(-6.39 – 24.17)**	**.400**	**2.78(-12.48 – 18.04)**	**.959**	**6.09(-9.54 – 21.73)**	**.712**
Role function	**11.97(-13.79 – 37.73)**	**.587**	**.675(-24.125 – 25.47)**	**1.00**	**11.29(-14.13 – 36.72)**	**.622**
Emotional function	**13.25(-6.65 – 33.16)**	**.285**	**1.71(-18.20 – 21.63)**	**.995**	**11.53(-8.76 – 31.84)**	**.420**
Cognitive function	**9.36(-4.33 – 23.07)**	**.264**	**1.18(-12.86 – 15.23)**	**.996**	**8.18(-6.28 – 22.65)**	**.424**
Global health status/QOL	-15.97(-30.29 - -1.65)	.024	-5.78(-19.97 – 8.40)	.682	-10.18(-25.01 – 4.64)	.260
Social	18.24(-.610 – 37.10)	.061	4.39(-14.53 – 23.32)	.919	13.85(-5.35 – 33.05)	.223
Fatigue	-16.22(-38.35 – 5.90)	.211	-2.46(-24.92 – 19.99)	.990	-13.75(-36.41 – 8.89)	.362
Nausea and vomiting	-5.46(-19.24 – 8.30)	.700	-6.11(-20.03 – 7.81)	.631	.64(-13.08 – 14.37)	.999
Pain	-22.34(-43.34 - -1.34)	.034	-1.95(-23.04 – 19.12)	.994	-20.38(-42.01 – 1.24)	.070
Dyspnea	-9.11(-23.45 – 5.22)	.323	-2.12(-16.77 – 12.52)	.978	-6.99(-21.46 – 7.48)	.557
Insomnia	-10.75(-29.59 – 8.07)	.415	-.35(-18.84 – 18.14)	1.00	-10.40(-29.48 – 8.66)	.455
Appetite loss	-5.88(-30.94 – 19.17)	.917	-9.23(-34.99 – 16.51)	.760	3.35(-22.50 – 29.20)	.984
Constipation	-2.89(-15.66 – 9.88)	.925	1.57(-11.15 – 14.30)	.986	-4.46(-17.25 – 8.31)	.774
Diarrhea	-.66(-14.67 – 13.33)	.999	-3.88(-17.96 – 10.19)	.873	3.21(-10.95 – 17.39)	.924
Financial	-.420(-26.51 – 25.67)	1.00	6.47(-19.26 – 32.20)	.900	-6.89(-33.15 – 19.37)	.889

[a] Sidak test was used to compare pairwise

[b] Mean difference (95% confidence interval).