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Effectiveness of mint leaves extract on thirst intensity and oral health status among intubated patients admitted in selected critical care units of GGSMC & H, Faridkot: An interventional study

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Abstract

Context: Thirst and poor oral hygiene is one of the major problem, arising because the intubation prevents the patients from drinking when they have the urge to do so. The intubation causes dryness of the oral cavity and infections which include bacterial and fungal infections which may proceed towards complications of oral cavity and can lead to various life threatening conditions. Mint leaves extract have found to have cooling effect as well as antibacterial, antifungal, antineoplastic effect to prevent various infections.

Aims and Objectives: The aim of the study is to assess the effectiveness of mint leaves extract on thirst intensity and oral health status among intubated patients admitted in selected critical care units. The objective was to assess the pre and post interventional level of thirst and oral health status and to compare the level of thirst intensity and oral health status among interventional and conventional group.

Methodology: A quantitative research approach was used to carry out a randomized control trial to assess the effectiveness of mint leaves extract on thirst intensity and oral health status among intubated patients. A convenient sampling was used to select 60 subjects and randomly allocated 30 in each interventional and conventional group as per inclusion and exclusion criteria. Self-structured socio-demographic profile sheet, clinical profile sheet, Assessment sheets for thirst intensity using Numerical rating scale and standardised Oral Health Assessment Tool (modified from Kayser-Jones *et al.* (1995) by Chalmers 2000) for oral health status assessment was used to assess the variables under study.

Results: The study revealed that out of 60 subjects, the mean age was 42.6 ± 11.313 . More than half subjects were male (66.6%), married (83.3%), non-working (51.6%). As per pre interventional assessment of thirst most of (96.7%) were having severe level of thirst in interventional group and (86.6%) conventional group. While post intervention, more than half (63.3%) had moderate thirst and (36.6%) had mild thirst in interventional group but conventional group had severe (96.6%) and moderate (3.33%). The pre-interventional assessment of oral health status of both the interventional and conventional group had majority (86.6%) and (76.6%) in the unhealthy category respectively while the post intervention assessment of the oral health status in the interventional group was (73.3%) in changed category and (23.3%) in the healthy category and conventional group had (86.6%) in the unhealthy category. As per the thirst intensity and oral health status the effectiveness of mint leaves extract was significant at $p < 0.05$ among the interventional groups.

Conclusion: The study concluded that mint leaves extract was effective in reducing the thirst level and improving the oral health status among intubated patients in the ICUs.

Keywords: Effectiveness, mint leaves extract, thirst intensity, oral health status, intubated patients

1. Introduction

Critically ill patients are different from the patients who are electively intubated for surgical purposes. Often critically ill patients have severe respiratory failure and hemodynamically instability, increased sensitivity to side effects of sedatives [1]. The intubation procedure includes airway management along with hemodynamic monitoring, gas exchange and neurologic care [2]. Thirst and poor oral hygiene is one such major problem arising because the mechanical ventilator prevents the patients from drinking when they have the urge to do so [3].

A study revealed that 70.8% of 171 ICU patients rated thirst with severe intensity and 2nd most prevalent symptom among intubated patients [4]. 80% of chronically ill patients with tracheostomy in ICU experienced mild thirst [5]. Patients who are unable to perform oral hygiene and unable to express their problems, their medications and syrups given can lead to dental problems and xerostomia [6]. Oral self-care and fluid intake which reduces dry mouth is limited in critically ill patients, mint mouth wash is beneficial for improving oral status and reduces risk of infection, although the evidence is limited [7].

Currently more than 80% of the worlds population uses the traditional medicine and medicinal plant (plant extract and essential oils). Peppermint / mint is a widely used traditional remedies because of its antimicrobial and antitumor properties [8]. The studies reveal that peppermint extract stimulates cold receptor in the mouth and nose having effect on level of thirst [9]. Extracts of Menthapiperita have antibacterial activity against gram negative and positive bacteria and hhas the ability to adhere and retention of bacteria in dental/biofilm lowering the sik of dry mouth and poor oral hygiene and various respiratory infections [10].

2. Methodology

- Research Approach:** In this study, Quantitative research approach was used.
- Research Design:** In this study, Randomised control trail was used.
- Study area:** Study was conducted in selected critical care units of GGSMC&H, Faridkot Punjab.
- Sample:** The study was conducted among the conscious intubated patients admitted in selected critical care units

3. Results

Table 1: Frequency and Percentage distribution of intubated patients as per socio demographic characteristics among interventional and conventional group N=60

S. No	Variable	Interventional Group (n=30)		Conventional Group (n=30)		Total Freq(%)	χ^2 df	p- value
		Freq(n)	%	Freq (n)	%			
1.	Age							
	18-28	6	20.0	7	23.3	13 (21.6)	2.620	0.623NS
	29-38	7	23.3	7	23.3	14 (23.3)	4	
	39-48	6	20.0	3	10.0	09 (15.0)		
	49-58	6	20.0	4	13.3	10 (16.6)		
	59-65	5	16.7	9	30.0	14 (23.3)		
2.	Gender							
	Male	18	60.0	22	73.3	40 (66.6)	1.200	0.273NS
	Female	12	40.0	8	26.7	20 (33.3)	1	
3.	Marital status							
	Married	25	83.3	25	83.3	50 (83.3)	0.000	1.000NS
	Unmarried	5	16.7	5	16.7	10 (16.6)	1	
4.	Education							
	Illiterate	2	6.7	4	13.3	06 (10.0)	1.920	0.589NS
	Primary	10	33.3	13	43.3	23 (38.3)	3	
	Secondary	17	56.7	12	40.0	29 (48.3)		
	Graduation & above	1	3.3	1	3.3	01 (1.6)		
5.	Occupation							
	Working	15	50.0	14	46.7	29 (48.3)	0.067	0.796NS
	Non- working	15	50.0	16	53.3	31 (51.6)	1	
6.	Dietary pattern							
	Vegetarian	17	56.7	14	46.7	31 (51.6)	1.239	0.538NS
	Non- vegetarian	11	36.7	15	50.0	26 (43.3)	2	
	Eggetarian	2	6.7	1	3.3	03 (05)		
7.	Income							
	Rs 30000-39999	5	16.7	1	3.3	06 (10.0)	6.554	0.088NS
	Rs 20000-29999	16	53.3	17	56.7	33 (55.0)	3	
	Rs 10000-19999	8	26.7	6	20.0	14 (23.3)		
	Rs ≤9999	1	3.3	6	20.0	07 (11.7)		

NS- Non significant ($p > 0.05$)

of GGSMC&H, Faridkot Punjab

- Sample Size:** In this study total sample size was 60 (30 each in interventional and conventional group)
- Sampling Technique:** In this study convenient sampling technique was used.
- Tool:** The socio demographic variables, Clinical Profile sheet, Numerical Rating scale, Oral Health Assessment Tool (Modified from Kayser-Jones *et al.* (1995) by Chalmers (2004)), Assessment sheet was used to collect data from the intubated patients.
- Ethical Consideration:** The ethical approval was taken from the ethical committee of Baba Farid University of Health Sciences, Faridkot. The permission to conduct study in the hospital was taken from the Medical Superintendent, GGSMCH&H, Faridkot. The subjects or the subject's attendants were explained regarding the intervention and informed consent was taken. The confidentiality of the patients was maintained.

Data Collection

Data was collected from the intubated patients admitted in the critical care units of GGSMC&H, Faridkot. The study participants were selected according to the inclusion and exclusion criteria. All the information about the study was provided to the patient and the patient's relatives before taking informed consent. As per the criteria, pre-assessment was done. After pre assessment, the patients in interventional group were provided with oral care once a day till the 4th day with mint leaves extract and oral mint swabs were provided 2 times a day till 3 days. On the other hand conventional group was only assessed for thirst and oral health status and routine care was provided.

Table 2: Clinical profile of patient frequency and percentage distribution of intubated patients as per the clinical profile N=60

Sr. No	Sample Characteristics	Interventional Group		Conventional Group		Total N (%)	χ^2 df	p-value
		Freq (n)	(%)	Freq (n)	(%)			
1.	Diagnosis							
	Medical	10	33.3	12	40.0	22 (36.7)	0.412	0.814 ^{NS}
	Surgical	3	10.0	2	6.7	05 (8.3)	2	
	Others	17	56.7	16	53.3	33 (55)		
2.	Duration of illness							
	≤ 1 week	19	63.3	19	63.3	38 (63.3)	0.259	0.879 ^{NS}
	1.1 to 4 weeks	8	26.7	9	30.0	17 (28.3)	2	
	≥ 4.1 weeks	3	10.0	2	6.7	05 (8.3)		
3.	Type of ICU admission							
	Medical ICU	11	36.7	9	30.0	20 (33.3)	0.300	0.584 ^{NS}
	Surgical ICU	19	63.3	21	70.0	40 (66.7)	1	
4.	Type of Intubation							
	Endotracheal	19	63.3	18	60.0	37 (61.7)	0.071	0.791 ^{NS}
	Tracheostomy	11	36.7	12	40.0	23 (38.3)	1	
5.	Type of Diuretics							
	No	21	70.0	22	73.3	43 (71.7)	0.082	0.774 ^{NS}
	Yes	9	30.0	8	26.7	17 (28.3)	1	
6.	Co-morbidities							
	No	16	53.3	23	76.7	39 (65)	3.590	0.058 ^{NS}
	Yes	14	46.7	7	23.3	21 (35)	1	
7.	H/O Smoking							
	No	27	90.0	28	93.3	55 (91.7)	0.218	0.640 ^{NS}
	Yes	3	10.0	2	6.7	05 (8.3)	1	
8.	H/O Alcohol							
	No	19	63.3	22	73.3	41 (68.3)	0.693	0.405 ^{NS}
	Yes	11	36.7	8	26.7	19 (31.7)	1	
9.	BMI							
	≤18.5	5	16.7	3	10.0	08 (13.3)	2.081	0.353 ^{NS}
	18.6-24.9	19	63.3	24	80.0	43 (71.7)	2	
	25-29.9	6	20.0	3	10.0	09 (15.0)		
10.	Haemoglobin							
	≤12	26	86.7	25	83.3	51 (85)	0.131	0.718 ^{NS}
	12.6-15	4	13.3	5	16.7	09 (16.7)	1	
11.	RBCs							
	<4 mil/mm3	20	66.7	18	60.0	38 (63.3)	0.287	0.592 ^{NS}
	4-6 mil/mm3	10	33.3	12	40.0	22 (36.7)	1	
12.	WBCs							
	<4000/mm3	4	13.3	2	10.0	06 (10)	2.095	0.351 ^{NS}
	4-10000/mm3	22	73.3	20	70.0	42 (70)	2	
	>10000/mm3	4	13.3	8	20.0	12 (20)		
13.	Platelets							
	<150,000/mm3	7	23.3	7	23.3	14 (23.3)	0.168	0.919 ^{NS}
	150-450000mm3	19	63.3	20	66.7	39 (65)	2	
	>450000/mm3	4	13.3	3	10.0	07 (11.7)		
14.	RBS							
	70-180 mg/dl	26	86.7	24	80.0	50 (83.3)	0.480	0.488 ^{NS}
	>180mg/dl	4	13.3	6	20.0	10 (16.7)	1	

NS= Non significant at $p > 0.05$

Table 3(a): Percentage distribution of pre-interventional assessment of thirst intensity among intubated patients in interventional and conventional group as per Numerical Rating Scale. N=60

Pre interventional assessment			
Level of thirst	Interventional Group f (%)	Conventional group f (%)	Total F (%)
Mild	00(00.0)	00 (00.0)	00(00.0)
Moderate	01(3.33)	04(13.3)	17(28.3)
Severe	29(96.7)	26(86.6)	43(71.6)

Table 3 (a) depicts that most of the subjects 29(96.7%) in the interventional group were in the severe category, 01(3.33%) were in the moderate category and 00% in the mild category, while in the conventional group 26(86.6%)

were in the severe category and 4(13.3%) in the moderate category. In total maximum of the subjects 43 (71.6%) had severe level of thirst and less than half 17(28.3%) had moderate level of thirst.

Table 3(b): Percentage distribution of pre- interventional assessment of Oral Health Status among intubated patients among interventional and conventional group as per Oral Health Assessment Tool (OHAT)

Pre - Assessment (Day 1)			
Level of oral health status	Interventional group f (%)	Conventional group f (%)	Total f (%)
Healthy	0 (00)	00(00)	0(00)
Changes	4 (13.3)	07(23.3)	11 (18.3)
Unhealthy	26(86.6)	23 (76.6)	49 (81.6)

Table 3 (b) explains the pre- interventional assessment of oral health status among conventional and interventional group using OHAT. The oral health status was categorised into healthy, Changes and unhealthy. The conventional and interventional group both had no subjects in the category of healthy during the pre- assessment. The subjects with changes in the conventional group were 7 (23.3%) and

unhealthy were 23 (76.6%). In the interventional group maximum 26(86.6%) were in the category of unhealthy while 4 (13.3%) were in the changes category. Out of 60 subjects 49(81.6%) had unhealthy score of oral health status while 11(18.3%) had changes in the level of oral health status.

Table 4(a): Assessment of effectiveness of mint leaves extract on thirst intensity as per numerical rating scale among interventional group on day 1 and day 3. N=30

Level of thirst	Observation 1 (Day 1) f (%)	Observation 2 (Day3) f (%)	Total F (%)	χ^2 df p-value
Mild	00 (00.0)	11 (36.6)	11 (18.3)	$\chi^2 =56.20$ df=2 p-value=0.00**
Moderate	01 (3.33)	19(63.3)	20 (33.3)	
Severe	29(96.6)	00 (00)	29 (48.3)	

**=Highly significant at $p < 0.05$

The table 4 (a) and figure 6 illustrates that out of 30 subjects 29(96.6%) felt severe level of thirst on day 1 and very low 1(3.3%) felt moderate level of thirst. More than half

19(63.3%) felt moderate level of thirst followed by 11(36.6%) under mild level of thirst.

Table 4(b): Assessment of effectiveness of mint leaves extract on oral health status as per oral health assessment tool (OHAT) among interventional group on day 1 and day 4 N=30

Levels of Oral Health Status	Pre-assessment Scores (day 1) f (%)	Post- assessment scores (day 4) f (%)	Total N=60 f (%)	χ^2 df p-value
Healthy	00 (00)	07 (23.3)	07 (11.6)	42.62 0.00**
Changes	04 (13.3)	22 (73.3)	26 (43.3)	
Unhealthy	26 (86.6)	01 (3.33)	27 (45.0)	

**= Highly significant at $p < 0.05$

Table 4 (b) reveals that out of 30, majority 26 (86.6%) were found to be in the category of unhealthy, 4 (13.3) were found to be in Changes while no subject in the healthy category in the pre assessment. However on the other hand the post assessment column depicts that only 1 (3.33%) was in the category of unhealthy, more than half 22 (73.3%) in the category of changes and 7 (23.3) in the category of healthy.

thirst. On day 3, more than half 19(63.3%) felt moderate thirst and 11(36.6%) felt mild thirst. On the other hand in the conventional group, on day 1 maximum 26(86.6%) felt severe thirst and 4(13.3%) felt moderate thirst. On day 3, 25(83.3%) felt severe thirst and 5(16.6%) felt moderate thirst.

Table 5 (a): The comparison of thirst intensity as per numerical rating scale among interventional and conventional group on day 1 and day 3 N=60

Days	Levels of thirst intensity f(%)	Interventional group f(%)	Conventional Group f(%)	χ^2 df p-value
1	Mild	00 (00.0)	00 (00.0)	1.9636
	Moderate	01 (03.3)	04 (13.3)	1
	Severe	29 (96.6)	26 (86.6)	0.160
3	Mild	11 (36.6)	00 (00.0)	44.1667
	Moderate	19 (63.3)	05 (16.6)	2
	Severe	00 (00.0)	25 (83.3)	0.00**

**= highly significant at $p < 0.05$

The table 5 (a) depicts the comparison of the 1st observation of day 1 to 2nd observation of day 3 among the interventional and conventional group. Out of 30 subjects in the interventional group on day 1, most of the subjects 29(96.6%) felt severe thirst while 01(3.3%) felt moderate

Table 5(b): The comparison of oral health status as per Oral Health Assessment tool among interventional and control group on day 1 and day 4 N=60

Days	Variable	Interventional Group	Conventional Group	χ^2 df p-value
1	Healthy	00 (00.0)	00 (00.0)	1.00
	Changes	04 (13.3)	07 (23.3)	1
	Unhealthy	26 (86.6)	23 (76.6)	0.31
4	Healthy	07 (23.3)	00 (00)	42.60
	Changes	22 (73.3)	04 (13.3)	2
	Unhealthy	01 (03.3)	26 (86.6)	0.00**

**= highly significant at $p < 0.05$

The table 5(b) depicts the total Oral health assessment score of the conventional group and the experimental group. The table shows that there has been decrease in the unhealthy scores in the interventional group (day 1) from 26 (86.6%) to 1 (3.33%) on day 4 while on the conventional group there was an increase in the unhealthy scores from 23 (76.6%) to 26 (86.6%).

4. Discussion

The results of the study shows that oral swabs and oral care with mint leaves extract is effective in relieving thirst ($p=0.00$) and improving oral health status ($p=0.00$) which is supported by similar study conducted by Zhang W, Gu Q, Zhao Y (2021) ^[11] on the effectiveness of an intervention bundle to relieve thirst and dry mouth where use of vitamin C sprays, peppermint water mouthwash, and a lip moisturiser were used. The results concluded that the average decrease in thirst intensity and oral health status scores after the interventions were larger in the experimental group than in comparison to control group (1.27 and 0.36 vs. 0.19 and 0.1 points, respectively).

The present study showed that on the pre- assessment the level of thirst was severe 43(71.6%) among the patients in the ICU which is supported by a similar study, Stotts NA et. Al. (2015) ^[12] where out of 50 chronically critically ill patients, 36 reported symptoms and most of the subjects 90% of those reported severe thirst. Thirst was reported in more than 70% of cancer patients in ICU, patients in ICU who are at high risk of dying and mechanically ventilated ICU patients.

The present study concludes that oral care with mint reduces thirst from severe on preassessment 29(96.6%) to mild 11(36.6%) or moderate 19(63.3%) on post assessment and improves the general oral health status from unhealthy 26(86.6%) on preassessment to changes 22(73.3%) changes and 7 (23.3%) healthy on post assessment which is supported by another study conducted by Agbor MA(2015) ^[13] which concludes that the oral care with the mint extract or mint derivatives has found to be effective in reducing thirst and improving oral health status among intubated patients in the critical care setting. A similar study was conducted by Atashi V (2018) ^[14] to improve oral health and prevent VAP was performed by brushing all internal and external surfaces of the teeth, gums, and tongue for 2 min using a baby toothbrush and antimicrobial chlorhexidine 0.2%; moisturizing all surfaces of the oral mucosa, gums, and tongue of the patient using swabs and moisturizing gel containing aloe vera and peppermint essential oil. The results of this study showed that the frequency of pneumonia on the third and fifth days was 15.80% (6) and 23.70% (9) in the control group and 10.50% (4) and 7.90% (3) in the intervention group, respectively.

The present study revealed that on implementing the mint leaves extract daily, there is a reduction in the level of thirst (severe 29(96.6%) in pre-assessment to severe (00%) on post assessment which is supported by another study conducted by Leemhuis A (2019) ^[15] on palliation of thirst in intensive care Unit patients: to implement a thirst intervention performed by ICU nurses and patients family members. Where the patients were asked to rate the level of thirst using Numerical Rating Scale. After the intervention, thirst level was found to decrease from 7.9 to 3.9 (mean). Word scale scores also decreased. Proving the decrease in level of thirst.

The present study also reveals that mint leaves extract prevents dry mouth by reducing thirst level among patients which is aided by another research study conducted by Eccles R 2000) ^[16] which infers that the oral care performed in patients with essential oil (application of essential oil consisting of geranium, lavender, tea tree, and peppermint) showed oral comfortness, positive results of

objective oral state and reduced colonisation of candida albicans.

5. Recommendations

1. A similar studies can be replicated with large samples with generalisation.
2. A descriptive study can be conducted to check the incidence of thirst among the ICUs.
3. A study can be conducted at different settings like paediatric ward among children with endotracheal or tracheostomy intubation.
4. A comparative study can be conducted to find out the effectiveness of ice chips versus mint leaves extract care on reducing the thirst intensity and improving oral health status among intubated patients.
5. A study can be conducted to evaluate the knowledge and the attitude of nurses regarding oral care and identification of thirst.
6. An exploratory study can be done at various settings to identify factors enhancing and deteriorating thirst intensity and oral health status.

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