

Effectiveness of Oral Hygiene by Miswak on Oral Health among Critical Ill Patients

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Abstract: Critically ill patients need to constant assessment, monitoring, observing and adequate nursing care. When oral care is ignored and improperly performed; patients may become colonized by bacterial species which lead to nosocomial respiratory tract infections. Miswak contains numerous natural chemical compounds necessary for good quality oral and dental hygiene together with bactericidal and antiseptic effects, these chemical elements do not have any adverse effects. **Aim of the study:** to determine the effect of miswak on oral health among critically ill patients. **Subjects & method:** Research design; A quasi experimental research design was utilized to achieve the aim of the study. **Setting:** The study was conducted at intensive care units in Menoufia University Hospital. **Subjects:** A purposive sample of fifty six patients who had critically ill assigned randomly and alternatively into two equal groups, 28 patients for each group study group (1): receive oral care by Sewak. Control group (2) exposed only to routine hospital care. **Tool:** tool 1, Questionnaire include: Scio demographic as age, sex and medical data as diagnosis, level of consciousness, mechanical ventilation ,chest infection.Tool 2 , Oral Health Assessment Tool (OHAT) for Dental Screening by Chalmers (2004). **Results:** there was statistically significant difference between study and control group regarding oral health post intervention. **Conclusion:** Based on these researches and the current study results, the researchers supported miswak in oral hygiene because it has a strong effect on a general health which reflected by healthy oral status; miswak composition has an effective role in oral health by its properties. **Recommendation:** Nurse should be used Miswak for oral care for critically ill patients in intensive care unit.

Keywords: Oral Hygiene, Miswak.

1. INTRODUCTION

Critically ill patients need to constant assessment, monitoring, observing and adequate nursing care. Oral hygiene is a fundamental nursing care practice that provides to patients who are critically ill and cannot perform this easy care themselves. When oral care is ignored and improperly performed; patients may become colonized by bacterial species which lead to nosocomial respiratory tract infections [1].

Within three days of critical ill patients admission; without given efficient, proper oral hygiene; deposition of toughened bacterial happened; as adhesion to a superficial mouth is important for the continued presence and proliferation of organisms, bacteria which attach to the tooth surface gradually coalesce to produce a biofilm and after further development, lead to the formation of dental plaque; these conditions followed by growing gingivitis, gum inflammation, infection [2].

Performing oral hygiene to critically ill patient who are in coma and uncooperative put the patient at high risk of aspiration or are intubated can be a task at times an impossible. However, if the benefit of oral care outweighs the risk, clear, accurate oral care procedures and adequate confirmation to support these processes are needed. If providing efficiently can decrease the incidence of ventilated associated pneumonia and other complications, the care must be considered an critical component of critical care nursing [3].

Oral cavity of adults intensive care unit (ICU) patients have many microorganism as Streptococcus viridians is the dominant aerobic microorganism it changes into Streptococcus pneumoniae and Staphylococcus aureus that cause ventilator associated pneumonia (VAP) [4].

Numerous studies have been achieved to find antiseptic ingredients with plant origin. Miswak is the one of these element act as an alternative to chlorhexidine which is a tooth-cleaning stick made from the plant tree of Salvadora persica; in Arabic it is famous of arak plant [1 & 5].

Mouthwashes as chlorhexidine is measured as the gold standard for oral care because decrease the number of microorganisms, their transmission and colonization in the patient's lung but it has several adverse effects such as mucosal irritation, dryness and injuries, allergies and even the occurrence of anaphylactic shock, acute respiratory distress syndrome (ARDS), cytotoxic effects and if swallowed it causes adverse systemic effects [6 & 7].

Miswak contains numerous natural chemical compounds necessary for good quality oral and dental hygiene together with bactericidal and antiseptic effects, these chemical elements do not have any adverse effects. Moreover miswak recommended by World Health Organization (WHO); which encourages the use miswak as an efficient oral hygiene procedure and it was confirmed its effectiveness in oral hygiene [8 & 9].

Many researches performed miswak chemical analysis; which documented miswak had substances as chloride, fluoride they aid in decay avoidance and S. persica miswak contain several anionic components that have antimicrobial effects [10].

Furthermore another benefit from chemical analysis for S. persica miswak which confirmed it contains vitamin C improve healing and repair irritated gum and work as safeguard against several types of oxidative impairment produced by reactive oxygen species, which are related to some diseases as cardiovascular diseases, cancers neurodegenerative diseases, Alzheimer's disease and inflammatory diseases [11 & 12].

Many researches revealed miswak had significantly less cytotoxicity than Chlorhexidine and more efficient method for oral hygiene among critically ill patients [10 & 13].

SIGNIFICANCE OF THE STUDY:

Inadequate oral hygiene among critical ill patients in ICUs leads pneumonia. Ventilator-Associated Pneumonia (VAP) is expected to occur in 9-27 % of all mechanically ventilated patients (Kalanuria et al in 2014) [14]. It is second nosocomial infection in the ICU, affecting patients and increased morbidity and mortality rate. There are many factors hinder the performance of oral care for critically ill patients as nurses had not adequate time to achieve oral hygiene, lack of equipment prevent nurses to perform this practice, in addition bad attitude and practice related to oral hygiene among nurses in intensive care unit. (Aboalizm2017) [15]. Hence the use of Miswak as natural, cheap and has effective method in preventing infection, so; the nurse can use it easy significant

AIM OF THE STUDY: to determine the effect of miswak on oral health among critically ill patients.

RESEARCH HYPOTHESES:

Patients in study group who will receive oral care by miswak exhibits good oral health compared to control group.

2. SUBJECTS AND METHOD

2.1 Design:

A quasi experimental research design was utilized to achieve the aim of the study.

2.2 Setting:

The study was conducted at intensive care units in Menoufia University Hospital.

2.3 Subjects:

A purposive sample of fifty six patients who had critically ill assigned randomly and alternatively into two equal groups, 28 patients for each group study group (1): receive oral care by Sewak. Control group (2) exposed only to routine hospital care.

Inclusion criteria:

The study subjects were selected according to the following criteria:

- Adult patient(20-60 years old)
- Both sexes
- Unconscious or semiconscious patients

Exclusion criteria

Mild Glasgow Coma Scale (13-15)

2.4 Sample size:

The sample sizing assumes that the expected effect size is 2.37 and the standard deviation of outcome variable is 3. To achieve 80% power to detect this difference with a significance level of 5% it is estimated that 25 subjects per group would be required. With a withdrawal/non-evaluable subject rate of 10% a total of 28 per group subjects will be recruited leading to a total required sample size of 56 subjects (Hafez,2015) [8].

2.5 Tool:

Two tools were developed and used by the researchers to gather data relevant to the study. These tools are as follow:

(Tool 1), Questionnaire include: Scio demographic as age, sex and medical data as diagnosis, level of consciousness, mechanical ventilation ,chest infection.

(Tool 2) , Oral Health Assessment Tool (OHAT) for Dental Screening by Chalmers (2004) ⁽¹⁶⁾ the researcher delete Dentures Category and dental pain because participant involved in this study unconscious .the assessment contain five items has three category, ranged from 0 to 2.

0 indicate =* healthy 1 =* changes 2 = unhealthy*

2.5.1 Reliability and validity:

Inter-carer reliability for OHAT categories: percent agreement ranged from 72.6 per cent for oral cleanliness to 92.6 per cent for dental pain; Kappa statistics were in moderate range (0.48–0.60) for lips, tongue, gums, saliva, oral cleanliness, and for all other categories in range of 0.61–0.80. Intraclass correlation coefficients for OHAT total scores were 0.78 for intra-carer and 0.74 for inter-carer reliability.

2.6 Pilot Study:

Pilot study was conducted on 6 patients to test the clarity and applicability of the data collection . A pilot study was carried out on 10% of study sample (6 patients) from intensive care unit in Menoufia University Hospital. To test feasibility and applicability of tool and modifications were done therefore. Data obtained from the pilot study was excluded from the actual study.

2.7 Ethical considerations:

Official permission was obtained from manager of hospital after explanation the aim of study to get agreement, and facilitate working.

2.8 Field work:

Data collection for this study was carried out from the March 2016 to August 2016. Once permission was granted to conduct the study, the researchers were initiated collection.

2.9 Data collection:

At baseline data: the researchers obtained data from medical sheet after introducing themselves and explain the purpose of study.

-The researchers met each patient individually, then clinical assessment of oral health was performed using Oral Health Assessment Tool (OHAT) for Dental Screening.

Each patient assessed three times during the research period :

For study group; pre- intervention assessment (before using miswak.), after intervention,(after using miswak). Patient's teeth were brushed 3times per day using miswak ,the researcher evaluate the effect of miswak after 3 days and after 5 days

For control group patient receive routine hospital intervention, the researchers assessment each patient three time (at first intervention, post 3 and 5 days).

3. RESULTS

Table 1: Demographic and clinical data of studied groups

Demographic and clinical data		Groups				Total		P value
		Study		Control				
		N0.	%	N0.	%.	N0.	%	
Age groups	27 - < 40 years	5	17.9%	11	39.3%	16	28.6%	X ² =3.5, P=0.17 NS
	40 - < 50 years	6	21.4%	6	21.4%	12	21.4%	
	50 -60 years	17	60.7%	11	39.3%	28	50%	
Sex	Male	18	64.3%	17	60.7%	35	62.5%	X ² =0.08, P=0.78 NS
	Female	10	35.7%	11	39.3%	21	37.5%	
Diagnosis	Stroke	8	28.6%	3	10.7%	11	19.6%	X ² =16.5, P=0.01 Sig.
	Traumatic brain injury	12	42.9%	4	14.3%	16	28.6%	
	Spinal cord injury	1	3.6%	3	10.7%	4	7.1%	
	Respiratory failure	1	3.6%	5	17.9%	6	10.7%	
	Coma(diabetic-or hepatic - or renal)	6	21.5%	13	46.4%	19	34%	
Mechanical Ventilation	No	4	14.3%	8	28.6%	12	21.4%	X ² =1.7, P=0.19 NS
	Yes	24	85.7%	20	71.4%	44	78.6%	
Duration of mechanical ventilation	0	4	14.3%	8	28.6%	12	21.4%	X ² =1.9, P=0.57 NS
	1-5 days	6	21.4%	6	21.4%	12	21.4%	
	6-10 days	16	57.1%	13	46.4%	29	51.8%	
	≥11 days	2	7.1%	1	3.6%	3	5.4%	
Received anti-coagulant medication	No	13	46.4%	14	50%	27	48.2%	X ² =0.07, P=0.78 NS
	Yes	15	53.6%	14	50%	29	51.8%	
Bleeding disorders	No	21	75%	19	67.9%	40	71.4%	X ² =0.35, P=0.55 NS
	Yes	7	25%	9	32.1%	16	28.6%	
VAP	No	19	67.9%	27	96.4%	46	82.1%	X ² =7.8, P=0.005 Sig.
	Yes	9	32.1%	1	3.6%	10	17.9%	
Total		28	100%	28	100%	56	100%	

Table (1) illustrated that more than half of study group at the age between (50-60) years old, while 39.3% in control group. More than half of studied sample (study & control group) were male 64%, 60% respectively. Regarding to medical diagnosis 42.9% in study group had traumatic brain injury, however 46.4% in control group had coma (diabetic, or

hepatic or renal) and most of studied sample (study and control group) was on mechanical ventilation 85.7%, 71.4% respectively. More than half of studied stayed on mechanical ventilation at range of duration between 6-10 days (51.8%). Also more than half of them in study and control group received anti-coagulant medication 53.6%, 50% respectively. Most of studied sample hadn't ventilated associated pneumonia (82.1%).

Table 2: Means of different vital signs Pre intervention, 3 days post intervention, and 5 days post intervention of studied groups.

Vital signs	Pre intervention X± SD		3 days Post intervention X± SD		5 days Post intervention X± SD	
	Study N=28	Control N=28	Study N=28	Control N=28	Study N=28	Control N=28
Temperature	37.6±0.8	36.9±0.9	37.2±0.6	38.4±1.2	37.1±0.6	38.4±0.9
P value	0.003 Sig.		0.000 HS		0.000 HS	
Pulse	83.9±11.8	85.5±12.9	78.6±11.1	90.0±16.4	76.1±7.4	89.7±13.5
P value	0.42 NS		0.004 Sig.		0.000 HS	
Respiration	19.9±5.7	17.1±5.2	19.9±5.5	18.4±6.1	20.0±5.3	18.6±5.2
P value	0.05 Sig.		0.31 NS		0.33 NS	
Systolic BP	139.3±18.6	125.4±19.3	133.2±18.6	121.8±17.2	130.4±15.2	121.4±13.8
P value	0.008 Sig.		0.02 Sig.		0.03 Sig.	
Diastolic BP	90.0±14.1	80.7±13.8	86.8±12.7	80.7±12.1	85±10.7	78.2±10.9
P value	0.01 Sig.		0.07 NS		0.02 Sig.	

Table (2) showed that there was no statistically significant difference between study and control group regarding vital signs except blood pressure pre intervention, whereas post intervention (post 3 and 5 days) there was statistically significant difference between study and control group regarding Temperature and Pulse (P value; 0.000 HS, 0.000 HS, 0.004 Sig. 0.000 HS respectively).

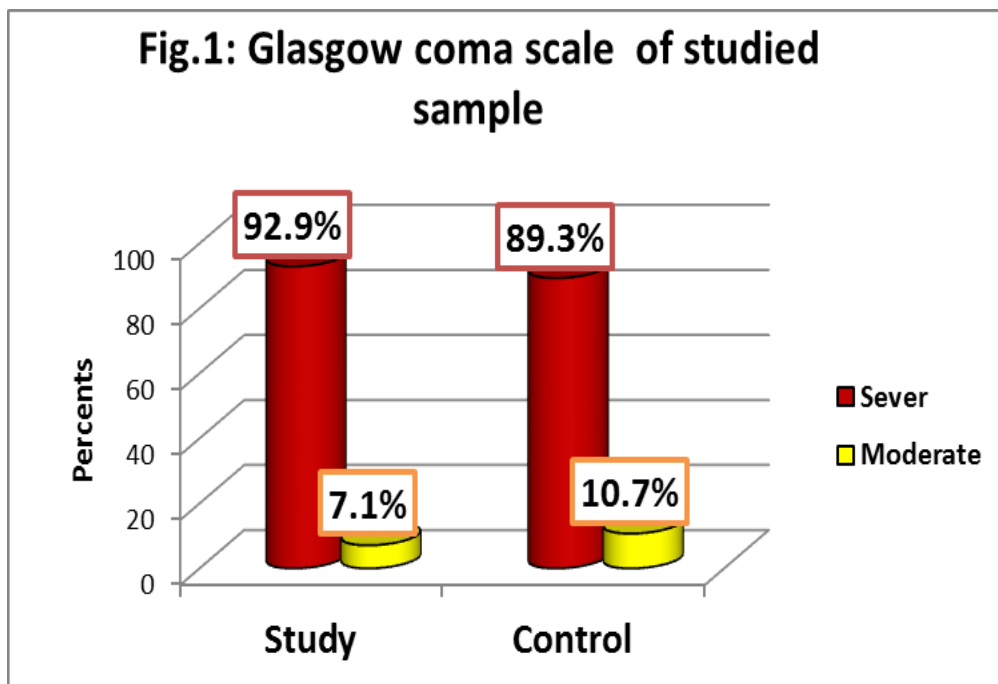


Figure (1) Glasgow coma scale of studied sample pre intervention

Figure (1) clarified that most of studied sample had severe loss of consciousness level 92.9%, 89.3% in study and control group respectively.

Table 3: Effect of Sewak on Oral health pre intervention, 3 days post intervention, and 5 days post intervention of studied critically ill patients. (N=56).

Oral health Items	Pre intervention		3 days post intervention		5 days post intervention	
	Study Gr. NO. (%)	Control Gr NO. (%)	Study Gr. NO. (%)	Control Gr NO. (%)	Study Gr. NO. (%)	Control Gr NO. (%)
Lips:						
Healthy	6 (21.4%)	7 (25%)	20 (71.4%)	0 0	25 (89.3%)	0 0
change	20 (71.4%)	21 (75%)	8 (28.6%)	26 (92.9%)	3 (10.7%)	19 (67.9%)
Unhealthy	2 (7.2%)	0 0	0 0	2 (7.1%)	0 0	9 (32.1%)
P	LR=2.8, P _{Pre} =0.23 NS		LR=40.5, P _{Post1} =0.000 HS		LR=60.1, P _{Post2} =0.000 HS	
Gum:						
healthy	2 (7.1%)	5 (17.9%)	22 (78.6%)	4 (14.3%)	27 (96.4%)	0 0
Change	24 (85.8%)	23 (82.1%)	6 (21.4%)	20 (71.4%)	1 (3.6%)	17 (60.7%)
unhealthy	2 (7.1%)	0 0	0 0	4 (14.3%)	0 0	11 (39.3%)
P	LR=4.1, P _{Pre} =0.12 NS		LR=27.2, P _{Post1} =0.000 HS		LR=69.9, P _{Post2} =0.000 HS	
Tongue:						
healthy	3 (10.7%)	6 (21.4%)	18 (64.3%)	2 (7.1%)	28 100%	0 0
Change	22 (78.6%)	22 (78.6%)	10 (35.7%)	23 (82.2%)	0 0	23 (82.1%)
Unhealthy	3 (10.7%)	0 0	0 0	3 (10.7%)	0 0	5 (17.9%)
P	LR=5.1, P _{Pre} = 0.07 NS		LR=24.1, P _{Post1} =0.000 HS		LR=77.6, P _{Post2} =0.000 HS	
Saliva:						
Healthy	0 0	5 (17.9%)	21 (75%)	2 (7.1%)	28 (100%)	0 0
Change	27 (96.4%)	23 (82.1%)	6 (21.4%)	22 (78.6%)	0 0	20 (71.4%)
unhealthy	1 (3.6%)	0 0	1 (3.6%)	4 (14.3%)	0 0	8 (28.6%)
P	LR=8.6, P _{Pre} = 0.01 Sig.		LR=29.9, P _{Post1} =0.000 HS		LR=77.6, P _{Post2} =0.000 HS	
Teeth:						
healthy	3 (10.7%)	2 (7.1%)	21 (75%)	0 0	25 (89.3%)	0 0
Change	25 (89.3%)	26 (92.9%)	7 (25%)	28 (100%)	3 (10.7%)	25 (89.3%)
Unhealthy	0 0	0 0	0 0	0 0	0 0	3 (10.7%)
P	LR=0.22, P _{Pre} = 1.0 NS		Fisher P _{Post1} =0.000 HS		LR=58.5, P _{Post2} =0.000 HS	
odor and mouth cleanness:						
healthy (smooth, good, pink)	0 0	2 (7.1%)	23 (82.1%)	0 0	26 (92.9%)	0 0
change	26 (92.9%)	25 (89.3%)	5 (17.9%)	26 (92.9%)	2 (7.1%)	20 (71.4%)
unhealthy	2 (7.1%)	1 (3.6%)	0 0	2 (7.1%)	0 0	8 (28.6%)
P	LR=3.1, P _{Pre} =0.18 NS		LR=50.2, P _{Post1} =0.000 HS		LR=64.2, P _{Post2} =0.000 HS	
Total	28 (100%)	28 (100%)	28 (100%)	28 (100%)	28 (100%)	28 (100%)

NB1: For each item of oral health : healthy =smooth, moist, &pink, except in odor and mouth cleanness = smooth, good, & pink ; change= dry, chapped or red at corner; unhealthy = swelling, ulcer bleeding . **NB2:** LR = Likelihood Ratio, HS = High significant, NS= Not significant. P_{Pre}= Pre intervention test of significant between study and control groups for each item of oral health. P_{Post1}= 3 days post intervention test of significant between study and control groups for each item of oral health. P_{Post2}= 5 days post intervention test of significant between study and control groups for each item of oral health.

Table (3) illustrated that there was statistically significant difference between study and control group regarding oral health (for each items lips, gum, tongue, saliva, teeth, odor and mouth cleanness) post intervention (after using miswak for oral care).

Three days post intervention and five days post intervention revealed a highly significant improvement ($p < 0.000$) in the different items of oral health. The three days post intervention' healthy items ranged from 82.1% for odor and mouth cleanliness to 64.3% for tongue. The five days post intervention' healthy items ranged from (100%) for both tongue and saliva to 89.3% for both lips and teeth.

4. DISCUSSION

Good oral hygiene is the key to good oral and systemic health. The body-mouth relationship is of great interest among health care professionals. Oral hygiene by miswak or sewak has unique role in maintenance of oral health. The present study aimed to investigate the effectiveness of oral hygiene by miswak of oral health among critical ill patients.

Regarding to socio-demographic characteristics:

The present study revealed that most of studied sample were male which agreed with *Wineberg & Simon Rhea (2013) [17]*, who mentioned that more than half of ICU patients were male gender. As regarded to age; the current study clarified that half of studied sample (study and control group) at aged between 50-60 years old, this result was in the same line with *Badawy, et al (2015) [18]*, who they showed that most of ICU patients were in middle age with their age mean was 45.08 ± 15.52 .

Also most of studied sample had diagnosis of Traumatic Brain Injury this result supported by *Chowdhury et al; (2014) [19] and Tamer et al; (2015) [20]*, who documented that Traumatic Brain Injury (TBI) is a major global problem and affects approximately 10 million peoples annually; therefore has a substantial impact on the health-care system throughout the world.

In relation to vital signs:

The present study illustrated that about one third of study group had chest infection, presence of fever which indicator to chest infection this result agreed with *Edwin and Attaree (2015) [21]*, they documented that presence of a temperature over normal range is part of the criteria which together with a respiratory source of infection indicates sepsis. In study group (experimental group) body temperature enhanced after performing oral hygiene by miswak; indicated by lowered mean of body temperature post 3 days and 5 days of intervention, this result was consistent with *Taraghi, et al (2011) [22]*, who found that *Salvadora persica* (Sewak) have good antibacterial effects on *Staphylococcus aureus* and *Streptococcus pneumonia* has effect on oral microorganisms. In addition to *Al-Bayati and Sulaiman (2008) and Darout et al., (2002) [23&24]*, who reported that *S. persica* miswak have antimicrobial effects and inhibitory effect on the levels of certain bacteria. Also *Halawany (2012) [2]*, noted that *S. persica* roots was found the sulfur content to be as high as 4.73%; Sulfur has a bactericidal effect. The researchers explained that performing oral care three times per day by miswak which act as antimicrobial agent decrease infection.

As regarding pulse, the current study illustrated that the mean of pulse rate was decrease in study group post intervention (3-5) days, these results in line with *Davies and Maconochie (2009) [25]*, who noted that an increase of approximately 10 beats per minute when body temperature elevated one degree centigrade. The researcher clarified that as fever improved heart and respiratory rate became within the normal range.

Regarding to effect of Sewak on oral health:

Miswak had strong positive effect on all items of oral health status, post 5 days of intervention for oral hygiene by miswak, lips, gum, tongue, saliva, teeth improved, oral health status appeared in smooth, pink and moist status, because of increase in saliva production this result agreed with *Akhtar, et al; (2011) [26]*, *Bader et al (2002) [27]*, *Areej K Almas & Khalid Almas; (2013) [10]*, they based their results on analysis of miswak chemical composition and they mentioned that presence of *Benzyl-isothiocyanate* (BITC) which is root oil as essential oils in *S. persica* miswak stimulates the flow of saliva. Furthermore mechanical using of miswak encouraging saliva discharge which acts as a protecting agent against oral dryness. The secreted saliva saturated with calcium encourages enamel re-mineralization. In Additional miswak has high concentrations of chloride inhibit the formation of calculus. The researcher clarified that miswak is a good parameter for oral health manifested by smooth, pink and moist all oral parts caused by excessive saliva production by gently mechanical rubbing miswak bristles on gums and stimulate blood supply.

Regarding to tongue, the current result documented that patients in study group had healthy tongue this result supported by **Areej K Almas & Khalid Almas; (2013)[10]**, they reported that using of miswak in cleaning teeth is very effective against cleaning the surface of the tongue by excessive saliva secretion. Through broken the sticks into a V-shaped manner and the resulting blade can be used to scrape several times across the tongue. The miswak is not only a natural toothbrush; it can also become a makeshift natural tongue scraper for achieving good oral hygiene. The researcher explained that to maintain oral cavity healthy and clean ,needs to clean tongue because tongue is considered to be the cause of bad breath odor/ halitosis if it coated by white substance on the dorsum of the tongue.

As regarding to gum, the present study reported that the studied sample had improved in their gum free from inflammation and became healthy gum after 5 days of oral hygiene by miswak ; this result agreed with **Parveen, (2012) [28]**, who noted that miswak have *Alnus glutinosa*, *Antidesma venosum*, and *A. indica*, in its composition they have Strong anti-inflammatory action on the gums. Additional miswak contain Vitamin C benefits in healing and repair the inflamed gum. The researcher explained that gingivitis resolves with good oral hygiene by miswak, it prevent signs of gum inflammation wherever gums appeared in red, puffy gums, and may be bleed, miswak has therapeutic effect on gingivitis which can lead to much more serious gum disease called periodontitis and tooth loss.

In relation to teeth, the present study documented that the studied sample had cleaning teeth by using of miswak as an effective tool for oral hygiene the result in line with **Mohammed and Khan (2013) [29]**, they reported that the miswak have furan derivatives containing hydroxyl groups could possess antioxidant activities. The antioxidant enzymes have high level of peroxidase and low level of catalase and polyphenoloxidase. These compounds have effective actions on cleaning teeth, oral hygiene, oral health and food purposes; so miswak was a good tool for oral hygiene.

Furthermore odor and mouth cleanness, the current study reported that good odor and mouth cleanness happened among study group after oral hygiene by miswak due to absentees' of bad odor causes as bacteria growth and chest infection; this result supported by **American Dental Association (2012) [30]**, it reported that bad breath, most often in dry mouth, mouth lesions, bad oral hygiene lead to bacteria development, and may be result from infections in the nose, throat or lungs. In other hand oral care by miswak increase saliva flow which maintain mouth moist , so it act as protective against bad breath. Additional to chemical analysis of miswak **Hafez; et al (2015) [8]**, they reported that Miswak contains several natural chemical compounds essential for good oral and dental hygiene together with bactericidal and antiseptic effects. Many researches were established that Miswak was effective for oral hygiene and recommended by WHO. The researcher explained that miswak has many components have antibacterial effect; destroy the micro-organisms responsible of incidence of VAP and mouth bad odor among ventilated patients so using miswak maintain mouth cleaned and maintain oral health status.

5. CONCLUSION

Based on these researches and the current study results, the researchers supported miswak in oral hygiene because it has a strong effect on a general health which reflected by healthy oral status; miswak composition has an effective role in oral health by its properties. Miswak Efficacy is high if be compared with other tools of oral hygiene among critical ill patients.

6. RECOMMENDATION

Nurse should be used Miswak for oral care for critically ill patients in intensive care unit .

REFERENCES

- [1] Matej Par, Ana Badovinac and Darije Plancak; (2014). Oral hygiene is an important factor for prevention of ventilator –associated pneumonia. *Acta Clin Croat* 2014; 53:72-78.
- [2] Hassan Suliman Halawany; (2012). A review on Miswak (*Salvadora persica*) and its effect on various aspects of oral health. Volume 24, Issue 2, Pages 63–69.<http://dx.doi.org/10.1016/j.sdentj.2011.12.004>.

International Journal of Novel Research in Healthcare and Nursing

 Vol. 4, Issue 1, pp: (263-272), Month: January - April 2017, Available at: www.noveltyjournals.com

- [3] Nancy, J., Ames, Pawel Sulima, Jan M., Yates, Linda McCullagh, Sherri L., Gollins, Karen Soeken, and Gwenyth, R. Wallen; (2012). Effects of Systematic Oral Care in Critically Ill Patients: A Multicenter Study. *Am J Crit Care*. 2011 Sep; 20(5): e103–e114.
- [4] Nzeako, B.C., S. Al-Rushiedi, F. Neilson and A. Al-Balkhair, 2010. Types of Bacteria On Some Medical Devices Used in Sultan Qaboos University Hospital Wards. *Middle-East J. Scientific Res.*, 5(6): 449-453.
- [5] Gholipour Baradari, A., H. Darvishi Khezri and S. Arabia, 2010. Comparison of antibacterial effects of oral rinses chlorhexidine and Matrica® in patients admitted to intensive care unit. *Bratislava Medical J.*, pp: 526. (IN PRESS).
- [6] Baldo, B.A., N.H. Pham and Z. Zhao, 2001. Chemistry of drug allergenicity. *Curropin Allergy Chin Immunol*, 1: 327- 35.
- [7] Ostda, S.N. and R.R. Card, 2000. Cytotoxicity and teratogenicity of chlorhexidine diacetate releasing from, hallownylon fiber. *J. Pharmacy and Pharmacol.*, 25. Pedreira, 52: 772-784.
- [8] Hafez, S., Ahmed, M. El-Mehalawy, Ali M. Sadek and Hesham S. Bahy; (2015). Oral Care as a Preventive Measure of VAP; Miswak Versus Chlorhexidine and Toothbrush, A Prospective, Controlled, Randomized, Non-Blind Study. *Int.J.Curr.Microbiol.App.Sci* (2015) 4(10): 723-732 .
- [9] Zohreh Taraghi, Hadi Darvishi Khezri, Afshin Gholipour Baradari, Mohammad Ali Heidari Gorji, Ali Sharifpour and Mohammad Ahanjan; (2011) Evaluation of the Antibacterial Effect of Persica Mouthwash in Mechanically Ventilated ICU Patients: A Double Blind Randomized Clinical Tria. *Middle-East Journal of Scientific Research* 10 (5): 631-637.
- [10] Areej K Almas & Khalid Almas;(2013). Miswak (salvadora persica chewing stick) and its role in oral health; an update. *jpdavol*. 22 no. 04 oct-dec 2013.
- [11] Hoobi N, Hussein B, Qasim, A and Abdulrahman M,. Dissolution of calcium ion from teeth treated with different concentrations of siwak water extract in comparison with sodium fluoride, *J Bagh College Dentistry* Vol. 26(1), March 2014.
- [12] Gazi, M., Saini T., Ashri N, Lambourne A. Miswak chewing stick versus conventional toothbrush as an oral hygiene aid. *Clin Prev Dent* 1990; 12 (4): 19-23 39. Consensus Statement on Oral Hygiene. *Int Dent J* 2000; 52: 235-242.
- [13] Almas K., Zhu Q., Komabayashi, T. Cytotoxicity of *S. persica* (Miswak) Extract and Chlorhexidine Gluconate on Fibroblasts. *IADR* 2012.
- [14] Kalanuria A, Zai,W and Mirski,M. Ventilator-associated pneumonia in the ICU, *Critical Care* 2014;18:208.
- [15] Aboalizm,S & Kasemy, Z .2017. Nurses' Knowledge, Attitude and Practice toward Mouth hygiene among Critical Ill patients.*International Journal of Novel Research.in Healthcare and Nursing*; 2016 , Vol.3,Issue3,pp(1-15).
- [16] Chalmers J., Johnson V, Tang JH, Titler MG. Evidence-based protocol: oral hygiene care for functionally dependent and cognitively impaired older adults. *J Gerontol Nurs*. 2004 Nov; 30 (11):5-12.
- [17] Wineberg & Simon Rhea; *Adult Critical Care in England*; The Health and Social Care Information Centre; 2013.
- [18] M.Sh. Badawy, Hend, M. Omar, Hamdy A. Mohamdien, Esam A. Moktar, and Enas A. Deaf. Evaluation of risk factors of ventilator associated pneumonia on outcome of acute exacerbation of chronic obstructive pulmonary disease. *Egyptian Journal of Chest Diseases and Tuberculosis* Volume 64, Issue 4, October 2015, Pages 799–803.
- [19] Chowdhury, T., KOWALSKI S., ARABI Y. and DASH H.H.: Specific intensive care management of patients with traumatic brain injury: Present and future. *Saudi J. Anaesth. Apr.*, 8 (2): 268-75, 2014.
- [20] TAMER, A. HELMY, M.D.; SHERIF ABD EL-MONEM, M.D. and MAHMOUD OMRAN, M.Sc. Effect of Hypernatremia on the Outcome of Patients with Severe Traumatic Brain Injury *Med. J. Cairo Univ.*, Vol. 83, No. 2, June: 35-39, 2015.

International Journal of Novel Research in Healthcare and Nursing

 Vol. 4, Issue 1, pp: (263-272), Month: January - April 2017, Available at: www.noveltyjournals.com

- [21] Edwin, N. and Attaree, R; AN APPROACH TO CHEST INFECTIONS IN ADULTS. THE SINGAPORE FAMILY PHYSICIAN, 2015-NVOL41(3)JUL-SEP2015:30.
- [22] Zohreh Taraghi, Hadi Darvishi Khezri, Afshin Gholipour Baradari, Mohammad Ali Heidari Gorji, Ali Sharifpour and Mohammad Ahanjan; (2011) Evaluation of the Antibacterial Effect of Persica Mouthwash in Mechanically Ventilated ICU Patients: A Double Blind Randomized Clinical Trial. Middle-East Journal of Scientific Research 10(5):631-637.
- [23] Al Bayati, F., Sulaiman, K., 2008. In vitro antimicrobial activity of *Salvadora persica* L. extracts against some isolated oral pathogens in Iraq. Turk. J. Biol. 32, 57–62.
- [24] Darout, I., Albandar, J., Skaug, N., Ali, R., 2002. Salivary microbiota levels in relation to periodontal status, experience of caries and miswak use in Sudanese adults. J. Clin. Periodontol. 29(5), 411–420.
- [25] Davies P., Maconochie I, The relationship between body temperature, heart rate and respiratory rate in children. Emerg Med J. 2009 Sep; 26(9):641-3. doi: 10.1136/emj.2008.061598.
- [26] Khtar, J., Siddique, K., Bi, S., Mujeeb, M., 2011. A review on phytochemical and pharmacological investigations of miswak (*Salvadora persica* Linn). J. Pharm. Bio Allied Sci. 3(1), 113–117.
- [27] Bader, A., Flamini G., Luigi P., and Morelli I. The composition of the root oil of *Salvadora persica* L. J. Essential Oil Res 2002; 14:128-129.
- [28] Parveen Dahiya, Reet Kamal, R.P. Luthra, Rahul Mishra, and Gaurav Saini. Miswak: A periodontist's perspective. J. Ayurveda Integr Med. 2012 Oct-Dec; 3(4):184–187.
- [29] Mohammed, S. A. and Khan J. A. Antioxidant capacity of chewing stick miswak *Salvadora persica*. BMC Complement Alternative Med 2013; 13:40.
- [30] American Dental Association (ADA). Bad breath Causes and tips for controlling it. 2012 JADA Vol. 143(9) <http://jada.ada.org>.