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Original Article

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Assessment of oral hygiene status among children admitted in intensive care unit at tertiary care Hospital Karachi

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ABSTRACT

BACKGROUND & OBJECTIVE: Oral assessment is the vital responsibility of the nurse that can lead to preventing the illness and maintaining health in the pediatric intensive care unit. The objective of this study was to assess oral hygiene and determine associated factors among children admitted in pediatric intensive care unit at tertiary care public sector hospitals Karachi

METHODOLOGY: This Analytical cross-sectional study was accomplished at a tertiary care hospital in the pediatric intensive care unit in Dr. Ruth K.M. Pfau Civil Hospital at Karachi. A consecutive sampling technique was used to approach the study participant. Study participants were approached through a consecutive sampling technique. The calculated sample size was 92, it was calculated by the software "sample size determination in Health Sciences". Beck oral assessment scale (BOAS) was used for data collection. $p<0.05$ was considered statistically significant.

RESULTS: Out of the total 110 study participants, 80(72.75 %) were males, and 30(27.3%) were females, with overall mean age 8.45±2.97 years. In this study, 32(29.1%) children have mild dysfunction, whereas majority of the children have moderate dysfunction 67(60.9%). However severe dysfunction, which is most dangerous, was also found in 11(10.0%) children. According to results, the mild dysfunction and moderate/ severe were found statistically significant with age and gender p=0.038 and 0.013, respectively.

CONCLUSION: It is concluded that almost all the children in the Pediatric Intensive Care Unit of a public sector tertiary care hospital were suffering with dysfunctions, and the majority were suffering with moderate to severe dysfunction on the basis of Beck oral assessment scale.

KEYWORDS: Pediatric intensive care unit, Oral Assessment, Beck oral assessment scale.

INTRODUCTION

Assessment of the oral cavity is one of the pivotal responsibilities of nurse which has major part in prevention of illness, and maintaining of health in a pediatric intensive care unit (PICU) [1]. It is also fundamental element of nursing care that provides insight about overall health of children [2]. The seriously ill child needs intensive nursing care to deal with physiological and pathological changes during their diseases [3]. Nurses are unique persons who can assess high-risk children for poor oral hygiene through assessment [4]. With respect to associated factors, in PICU, numerous medications, equipment, and devices used for support e.g., sedatives, Endotracheal tube, ventilator, and feeding tube, it is useful to combat illness [5]. At the meantime long-term placement of devices, increases risk of an impairment of oral cavity and ventilator-associated pneumonia (VAP) [6]. It is established by current research that oral assessment should be carried out according to the defined criteria or scales of oral assessment like Beck oral Assessment scale [7]. A recent research study showed that in PICU 71% nurses performed oral assessment without using any standardized oral assessment scale [8]. Hence, it is a challenge for nurses to use standardized oral assessment tools in providing effective oral care [9]. It is confirmed by recent research that about 16% of a child on risk of oral complications due to inappropriate

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oral assessment protocols [10]. It is established that there is a co-relation between oral health and hospital stay [6].

In Pakistan, the prevalence of pneumonia in the intensive care unit is 28%, considered the most common infection during hospitalization [11]. There is a paucity of data in the Pakistani Setting. Therefore, the present study was conducted to assess status of oral hygiene and its associated factors among children admitted in the Intensive Care unit at tertiary care hospital Karachi.

METHODOLOGY

A present cross-sectional analytical study accomplished at a pediatric intensive care unit in tertiary care public sector Dr. Ruth K.M. Pfau Civil Hospital at Karachi. According to the study inclusion criteria, 110 children were selected for the study. The study was carried out for the period of six months, from March 2019 to August 2019. Children whose age were between 3 years to 12 years, parents gave consent and admission duration of more than two days were enrolled for the study. The children diagnosed with any mouth disease such as Oral or facial trauma or mouth cancer were excluded from the study.

Study participants were approached through a consecutive sampling technique. For sample size calculation, the software "sample size determination in Health Sciences" was used.

It was calculated by taking estimated marginal means (standard error) for scores on Beck Oral Assessment Scale was 9.5 (0.35) [12]. In this study, 95% confidence interval, 80% power of the test was used. The calculated sample size was 92, Primary researcher intended to increase sample to 110.

The data was gathered by utilizing the Beck Oral Assessment Scale (BOAS) [12]. The modified BOAS consists of two parts. First part was used to take information on patient demographic data. Total eight questions like age, gender, and patient admitted through patient length of stay at hospital, how many times hospitalized, diagnosis, medications, any device and results of oral assessment (BOAS) score was recorded.

The second part of BOAS comprises 5 subscales. Like assessment of lips, mucosa, gingiva, tongue, teeth, and saliva. Maximum score of BOAS is 20 and minimum score is 5. A greater BOAS score reveals higher tissue injury and need a close observation and mouth care and lower BOAS score reflects no oral tissue injury, only needs to moisten lips and mouth. If subjects obtained score 0 to 5, was categorized in no oral dysfunction. If the patient obtained a score 6-10=mild oral dysfunction. If subjects obtained score 11 to 15= moderate oral dysfunction.

Study protocols were approved from IRC (Institutional Review Committee) of Institute of Nursing, Dow University of Health Sciences, Karachi (Ref. No: ION/MSN/2019-09/-18/530).

Permission for data collection was obtained by Medical Superintendent of Dr. Ruth K.M. Pfau Civil Hospital at Karachi.

Written informed consent was obtained from the parents of the children after explaining the purpose of the study and ensuring the confidentiality of their responses that fulfil the inclusion criteria.

After recruiting the subjects, the demographic data was collected along with oral assessment of each participant was carried out by BOAS.

Data entry and analyses were computed by using SPSS version 21.0. Quantitative variables like age, patient length of stay at the hospital, how many times hospitalized, were presented in Mean±SD. Qualitative variables such as gender, patient admitted through, diagnosis, medication, any device which was used during admission, were computed in frequency and percentages.

Association of Beck oral assessment scale (BOAS) with age, gender, Patient length of stay at hospital and how many times hospitalized was computed by using Chi-square test. Multiple bar charts were used to show the relationship of contributing factors with categories of oral health assessment (No dysfunction, Mild dysfunction. Moderate dysfunction, Sever dysfunction).

RESULTS

Table–I: Demographic characteristics of participants.

Descriptive Characteristics	
Age	8.45±2.97
Male	80(72.7%)
Female	30(27.3%)
Patient length of stay at the hospital	2.54±0.50
How many times hospitalized	1.45±0.50
N.G tube	64(58.2%)
Ventilator	3(2.7%)
ETT	4(3.6%)
Others	39(35.5%)

Table-I exhibits demographic characteristics of participants. According to the study inclusion criteria 110 children were selected for the study from Pediatric Intensive Care unit in tertiary care public sector Dr. Ruth K.M. Pfau Civil Hospital at Karachi. Regarding their demographic characteristics, 80 participants (72.75 %) were males and only 30(27.3%) were females with overall mean age 8.45±2.97 years. Their mean length of stay at the hospital was 2.54±.50 days and majority 60(54.5%) of the patients was admitted only one time. (Mean admission time 1.45±0.50). The majority of the children 64(58.2%) were on N.G tube, whereas the other were on either ventilator 3 (2.7%), ETT 4 (3.6%) or on other devices 39(35.5%).

Table-II reveals the area of Beck oral assessment scale (BOAS). For base line data of oral health assessment, BOAS was used after two days of admission of the patient in the intensive care unit. These assessments were done for lips, mucosa and gingiva, tongue, teeth, and saliva.

Table–II: Area of Beck oral assessment scale (BOAS).

Area		n(%)
Lips	Smooth, pink, moist, and intact	13(11.8)
	Slightly dry, red	10(9.1)
	Dry, swollen, isolated blisters	46(41.8)
	Edematous, inflamed blisters	41(37.3)
Gingiva and Oral Mucosa	Smooth, pink, moist, and intact	35(31.8)
	Pale, dry, isolated lesions	50(45.5)
	Swollen red	13(11.8)
	Very dry and edematous, inflamed	12(10.9)
Tongue	Smooth, pink, moist, and intact	21(19.1)
	Dry, prominent papillae	34(30.9)
	Dry, swollen, tip and papillae are red with lesions	11(10.0)
	Very dry, edematous, engorged coating	44(40.0)
Teeth	Clean no debris	32(29.1)
	Minimal debris	36(32.7)
	Moderate debris	19(17.3)
	Covered with debris	23(20.9)
Saliva	Thin, watery plentiful	37(33.6)
	Increase in amount	42(38.2)
	Scanty and somewhat thicker	13(11.8)
	Thick and ropy, viscid or	18(16.4)

According to the findings of the study, only 23(20.9%) children's lip were smooth and slightly dry and red whereas lips of most of them, 46(41.8%) were either dry and swollen, isolated blisters even edematous and inflamed blisters lips were found in 41(37.3%) children. Regarding gingiva and oral mucosa is concerned, most of them, 50(45.5%) have pale, dry and isolated lesions and 12(10.9%) have very dry and edematous, inflamed. In most of the children 55(50%) have their tongue either dry, swollen, tip and papillae are red with lesions or very dry, edematous with engorged coating. The teeth of 42(38.2%) were having moderate debris or were covered with debris. A similar position was found for saliva, which was Increase in amount in 42(38.2%) children. The saliva was found on scanty and somewhat thicker in 13(11.8%) children and found thick and ropy, sticky or medic in 18(16.4%) children.

Figure-I shows the dysfunction of Beck oral assessment scale (BOAS). Consequently, according to Beck oral assessment scale it was calculated that 32(29.1%) children have mild dysfunction whereas majority of the pediatric ICU children 67(60.9%) have moderate dysfunction. However, sever dysfunction which is most dangerous was also found in 11(10.0%) children.

Table-III displays the association of Beck oral assessment scale (BOAS) with age, gender, Patient length of stays at the hospital and how many times hospitalized. According to results, the mild dysfunction and moderate/ severe was found to be statistically significant with age and gender p<0.038 and 0.013 respectively. However, patient length of stay at hospital was found to be slightly greater than significant level p<0.055 and the number of times a child was admitted in the hospital found a statistically insignificant association with mild and moderate/ severe dysfunction (p< 0.742).

Table-III: Association of Beck oral assessment scale (BOAS) with age, gender, Patient length of stay at the hospital, and how many times hospitalized.

BOAS		Mild dysfunction	Moderate / Severe dysfunction	Chi-square test	p-value
Factor		**n(%)**	**n(%)**		
Age	3-5	10(29.4)	24(70.6)	6.56	0.038
	6-10	20(37.7)	33(62.3)		
	>10	2(8.7)	21(91.3)		
Gender	Male	18(22.5)	62(77.5)	6.17	0.013
	Female	14(46.7)	16(53.3)		
Patient length of stay at hospital	>Two days	10(20.0)	40(80.0)		
	>Three days	22(36.7)	38(63.3)	3.6	0.055
How many times hospitalized	One	17(28.3)	43(71.7)		
	Two	15(31.2)	33(68.8)	0.109	0.742

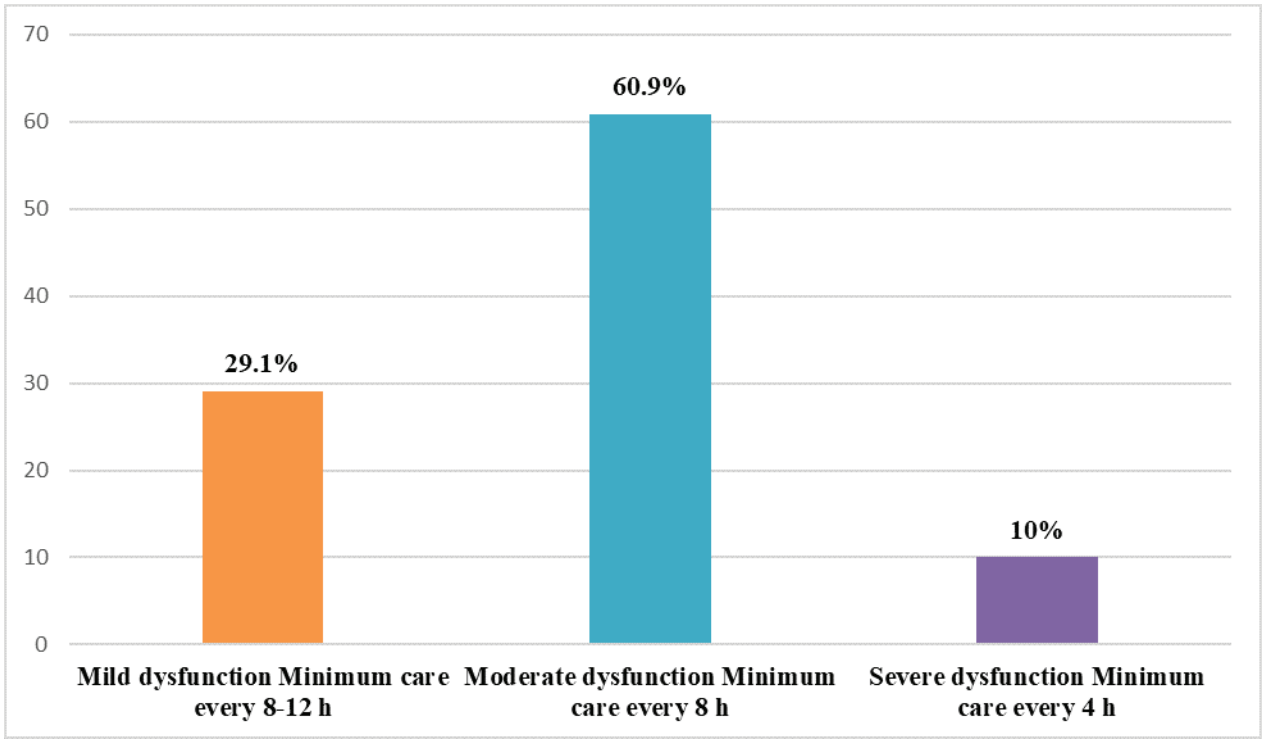

Figure-I: Dysfunction of Beck oral assessment scale (BOAS).

DISCUSSION

Oral care is a key component of nursing interventions in promotion of health and prevention of diseases. Pediatric nurses have primary responsibility to provide oral care for children's comfort and its role in reduction of spreading of infection via oral cavity. Oral disease has been identified as a grave health concern across the globe [13] .In Pakistan, prevalence of pneumonia in intensive care unit is 28%, which is considered the most common occurring infection during hospitalization. Oral infections have been found to be most prevalent across the worldwide who affects majority of people [14, 15].

Regarding the comparison of the demographic characteristics of the children of our study and other studies, it was found that in our study, the majority of the children (72.8%) were males with age group 3-12 years admitted in ICU of a public sector tertiary care hospital. In a study conducted in India, the majority of the patients (56.6%) were also males but with age group 4-6 years [16].

In pediatric ICU, many type of equipment and devices like intubation, ventilator and feeding tube were used to support the critically ill child [17] . Which are very useful but at the same time if oral care did not provide properly [18] , the child were on risk of oral cavity specially ventilator-associated pneumonia (VAP) whose incidence is 9% to 28% and major cause of death is 24%- 50% in children [17] . In our study, the majority of the children (64 i.e., 58.2%) were on N. G tube, whereas other were on either ventilator (2.7%), ETT (3.6%) or on other devices (35.5%). In another study, it is confirmed by research about 16% of child on risk of oral complications like mouth ulcers, cracked lips, and tongue. It occurs due to inappropriate oral care without using oral assessment protocols [19]. It is also documented in a study that improved oral and general health of infants and children in the pediatric critical care setting could be achieved with better nurses knowledge for equipment, and practice recommendations[20]. Another study concluded that psychological behavior change is the key to oral health promotion and greater emphasis should be given on teaching oral health professionals about health psychology [21].

In our study, for oral health assessment, Beck Oral Assessment Scale (BOAS) was used after two days of admission of the patient in the intensive care unit. These assessments were done for lips, mucosa and gingiva, tongue, teeth, and saliva. Lips of most children (41.8%) were dry and swollen isolated blisters whereas inflamed blisters lips were found in 37.3% children. Gingiva and oral mucosa was found in 45.5% as pale, dry, and isolated lesions and 10.9% have very dry and edematous, inflamed. 50.0% children have their tongue either dries, swollen; tip and papillae are red with lesions or very dry, edematous with engorged coating. The teeth of 38.2% were having moderate debris, whereas for saliva which was Increase in amount in 38.2% children. In a study conducted on oral hygiene with very first day of admission and reassessed on 5th day concluded that decrease score was found in both assessment where as it was strong correlations during the study period with highest correlation on 5th day [22]. In Duzkaza study oral mucositis occurrence was observed 5.2% patients before any intervention which drops to 2.5% after providing proper training to nursing staff for prevention of oral mucositis occurrence [23].

A study concluded that if nurses follow the oral guide line standards, much reduction of oral cavity infection in PICU could be achieved [1]. In experimental studies the BOAS scoring showed significant differences between the two groups from the first to fifth day ($p<0.001$). The mucosal-plaque index was significantly different between the two groups from the third day to fifth day ($p<0.001$) [24].

Our study focused on over all oral hygiene health of pediatrics ICU patients which we found that no one was fit with no dysfunction. According to our study using Beck oral assessment scale, it was calculated that 32 (29.1%) children have mild dysfunction whereas majority of the pediatric ICU children (67 i.e.60.9%) have moderate dysfunction. However, sever dysfunction which most dangerous was also found in 11(10.0%) children. The same is also present in figure-I with required procedure for better oral hygiene in pediatric ICU children (Figure-I). It is higher to the other international studies as majority of the studies quoted above have shown less dysfunction in Pediatric ICU children. This shows the importance of nursing education regarding proper oral hygiene guideline.

Finally, we analyzed the data for determination of any association of Beck oral assessment scale (BOAS) with age, gender, patient length of stay at hospital and how many times a child hospitalized. According to the results, moderate dysfunction was found more in children age 3-5 years as compared to other age groups of children and it was found high statistical significance at $p<0.001$. Similarly, gender and patient length of stay at hospital were also found direct association with moderate dysfunction at statistically significant level of $p<0.039$ and $p<0.036$ respectively. However, number of times a child admitted in the hospital did not found association with dysfunction as it was not found any statistical significance in our study ($p<0.441$). In a study it was found that no statistically significant differences were found regarding oral hygiene and in relation to age, sex, BOAS, and reason for admission [25].

CONCLUSION

It is concluded that almost all the children in Pediatric Intensive Care Unit of a public sector tertiary care hospital were suffering with dysfunctions and majority 70.9% were suffering with moderate to severe dysfunction on the basis of Beck oral assessment scale. The oral hygiene was mostly worst in majority of the cases and it is directly association with age of the child, gender and patient length of stay at hospital. Delivery of oral hygiene care to PICU children varied extensively and was often insufficient.

Recommendations:

On the basis of our study findings, it is recommended that:

1. Oral care applied in line with an evidence-based oral care guide and frequent observation of patients should be implemented to avoid the dysfunction.
2. Beck Oral Assessment Scale for oral hygiene should be made mandatory for each admitted child.
3. Proper oral care should be made mandatory part of nursing care during hospitalization in PICU.
4. Nurses should advice to practice of administering oral care in accordance with oral healthcare guidelines.
5. Educational session should be provided during their academy and in clinical area regarding oral assessment and oral care.

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Author's Contribution:

Zulifqar Ali: Conceived idea, manuscript writing
Badil: Correction, revision, drafting and editing.
Nazia Khan: Data collection, data analysis, data organization.

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