CASE STUDY

Assessment of Pre-existing Medical Conditions that Could Affect Oral Health Care of Children Living in Orphanage: A Case-Control Study

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Abstract

The study aimed to assess the medical health conditions that could affect oral health care and dental treatment planning among children living in governmental orphanage centers compared to non-orphan children living with their parents. This case-control study included 6- to 12-year-old children residing in five governmental orphanages (cases) matched in gender and age with children living with their parents (controls) in Jeddah, Saudi Arabia. At the scheduled appointment, a trained dentist interviewed the caregiver through a validated Arabic questionnaire consisting of the socio-demographic information of the child and guardian and the medical history of the children. Seventy children in the case group and 155 in the control group were included, with a mean age of 7.47 ± 2.26. Significantly more children living in governmental orphanage centers were diagnosed with medical problems that might affect their dental health, including congenital heart disease (p = 0.029) and mental/cognitive/psychologic and behavioral disorders (p = 0.005). Children living in governmental orphanage centers are more likely to be affected by medical conditions that might impact their dental health care and treatment planning than non-orphan children living with their parents, which calls for special dental care precautions for this population.

Keywords

Dental health care, Congenital heart disease, Medical conditions, Orphanage, Orphans

INTRODUCTION

A child who has lost one or both parents or is of unknown parentage is considered an orphan[1]. Orphan children are typically deprived of natural family care and warmth, usually raised in socioeconomic poverty, lack adequate healthcare, and experience psychological trauma[1-3].

Government orphanage centers in Saudi Arabia host children with unknown parentage under the supervision of the Ministry of Human Resources and Social Development, where they receive complete medical, social, psychological, and educational care[1,4]. In the city of Jeddah, there are five governmental orphanage centers, and every four to six children are usually under the care and supervision of a single foster mother or father. Until the age of seven years, both male and female orphans are under the care of a female foster. Once they reach seven years of age, the male orphans get separated from the females and become under the care and supervision of a male foster father. All orphanage centers have a nurse who keeps track of the orphan's medical and dental health[4].

Based on the American Academy of Pediatric Dentistry (AAPD), patients with special health care needs (SHCN) are defined as those with any physical, developmental, mental, sensory, behavioral, cognitive, or emotional impairment or those with a limiting condition that requires medical management, health care intervention, and/or use of specialized services or programs[5]. Oral and dental health cannot be separated from general health and well-being; therefore, a better understanding of the medical health status of orphans will aid in determining the treatments needed to develop appropriate dental preventive programs for this group of children.

In Saudi Arabia, the medical and dental health status in orphanages was investigated by several studies[6,7], but only Al Jobair et al., in 2013[1] evaluated the medical health status among 4- to 12-year-old orphans compared to children living with their parents in Riyadh, Saudi Arabia. A higher prevalence of caries and worse oral health were reported among orphans. Also, more orphans were diagnosed with chronic medical conditions; asthma and psychological disorders were among the highest[1]. The prevalence of such medical health conditions that could affect oral health, which requires special dental care precautions among this group of children, has not been investigated.

Therefore, the study aimed to assess the medical health conditions that might affect oral health care and dental treatment planning among 6- to 12-year-old children living in governmental orphanage centers compared to non-orphan children living with their parents in Jeddah, Saudi Arabia.

MATERIALS AND METHODS

Study Design and Ethical Approval

This case-control study was conducted in Jeddah, Saudi Arabia, between May 2022 and January 2023 at the JedMed Health Center or King Abdulaziz University Dental Hospital (KAUDH). The study was approved by the Research Ethics Committee of the Faculty of Dentistry (28-01-23) at King Abdulaziz University.

Participants Recruitment

In the city of Jeddah, Saudi Arabia, there are five governmental orphanage centers, all under the supervision of the Ministry of Human Resources and Social Development. A trained dentist contacted the five governmental orphanage centers and introduced the research objectives. A dental appointment was scheduled at JedMed Health Center or KAUDH for all the 6- to 12-year-old children living in one of the five governmental orphanage centers and diagnosed based on the American Society of Anesthesiologists (ASA) to be either healthy (ASA I) or have mild systemic disease (ASA II)[8].

The case group consisted of 6- to 12-year-old children with ASA I or II living in one of the five governmental orphanage centers in Jeddah, Saudi Arabia. The control group consisted of non-orphan children living with both their parents and attending JedMed Health Center or KAUDH during their regular dental treatment. Cases and controls were matched in sex and age in a ratio of 1:2. Orphans living outside the governmental orphanage centers or diagnosed with severe systemic disease (ASA III) or severe systemic disease that is a constant threat to life (ASA IV) were excluded.[8]

At the beginning of the scheduled appointment, informed consent was obtained from the legal/foster parent attending with the subjects. Then, a trained dentist interviewed the legal/foster parent through a validated Arabic questionnaire.

Questionnaire

The questionnaire was composed of three parts. The first part included the subject's age and sex and, for children living in one of the governmental orphanage centers, the age at which they joined the center. The second part included the caregiver information (type, age, and sex). Finally, the third part included the medical history of the subjects. The medical diseases were listed according to the American Academy of Pediatric Dentistry for management of dental patients with special health care needs, including physical, developmental, mental, sensory, behavioral, cognitive, or emotional impairment[5].

The questionnaire was validated for content and face validity. Five expert pediatric dentists at KAUDH reviewed the questionnaire for content validity. The face validity was obtained by interviewing the parents/legal guardians of 20 randomly selected children. The validity of the questionnaire was evaluated by calculating the Content Validity Index (CVI), and the results showed excellent validity with CVI = 0.85.

Face validity was obtained by interviewing the parents/legal guardians of 20 randomly selected children. The questionnaire's validity was evaluated by calculating the Content Validity Index (CVI), and the results showed excellent validity, with CVI = 0.85.

Sample Size

The sample size was calculated according to Aljobair et al. (2013)[1], who reported that 36% of children living in orphanage centers in Saudi Arabia were diagnosed with a medical condition compared to 14.4% of the children living with their parents. The sample size calculation was conducted using MedCalc® Statistical Software version 20.116 (MedCalc Software Ltd, Ostend, Belgium; https://www.medcalc.org; 2022). A sample size of 126 (63 cases and 63 controls) with a power of 80 and a confidence level of 95% was found to be adequate. However, we are limited by the number of available children living in orphanages, so we increased the control to improve the sample power.

Statistical Analysis

All data was analyzed using SPSS v. 20.0 (IBM Corp., Armonk, NY). Frequencies and percentages were calculated for categorical variables, and groups were compared using the Chi-square test. Means and standard deviations (SD) were calculated for continuous variables.

RESULTS

The study included 70 children living in governmental orphanage centers and 155 children living with both their parents. The mean age in years of all the subjects was 7.47 ± 2.26, and most (44; 62.9%) were males. Of the children living in governmental orphanage centers, only 13 (15.7%) joined the centers after three years of age. The characteristics of children living in governmental orphanage centers are presented in Table 1.

Table 2 represents the case and control distribution according to the medical conditions reported by their guardians. Medical and systematic problems were reported to be significantly less frequent among children living in governmental orphanage centers (34; 48.6%) compared to non-orphan children living with their parents (121; 78.1%) ($p < 0.001$, OR: 0.265 and 95% CI: 0.145-0.485). On the other hand, more children living in governmental orphanage centers were reported to be diagnosed with congenital/hereditary diseases, sickle cell anemia, cardiac conditions, sensory problems, and mental/cognitive/psychologic and behavioral disorders compared to non-orphan children living with their parents. However, the differences were statistically significant only for cardiac conditions ($p = 0.029$) and mental/cognitive/psychologic and behavioral disorders ($p = 0.005$).

Table 1. Characteristics of children living in governmental orphanage centers. (N=70)

Variable		N (%)
At what age did the child join the orphanage? (Year)	0-1	23 (32.9)
	>1 to3	23 (32.9)
	> 3	11 (15.7)
	NA	13 (18.6)
Sex of the foster parent	Male	15 (21.4)
	Female	55 (76.8)

Table 2. Distribution of the subjects according to medical conditions. (N=225)

Medical Condition N (%)		Case N=70 N (%)	Control N=155	Total	*p* value	OR (95% CI)
Did the child have any medical/ systemic problems?	Yes	34 (48.6)	121 (78.1)	155 (68.9)	**<0.001***	**0.265 (0.145-0.485)**
	No	36 (51.4)	34 (21.9)	70 (31.1)		
Congenital/hereditary disease	Yes	6 (8.6)	4 (2.6)	10 (4.4)	0.074*[a]	3.54 (0.97-12.97)
	No	64 (91.4)	151 (97.4)	215 (95.6)		
Epilepsy	Yes	2 (2.9)	2 (1.3)	4 (1.8)	0.410[a]	2.25 (0.31-16.31)
	No	68 (97.1)	153 (98.7)	221 (98.2)		
Congenital Cardiac conditions	Yes	3 (4.3)	0 (0.0)	3 (1.3)	**0.029[a]**	**16.13 (0.82-316.5)**
	No	67 (95.7)	155 (100.0)	222 (98.7)		
Sickle cell anemia	Yes	2 (2.9)	0 (0.0)	2 (0.9)	0.096	11.35 (0.54-239.6)
	No	68 (97.1)	155 (100)	223 (99.1)		
Renal conditions	Yes	1 (1.4)	0 (0.0)	1 (0.4)	0.136[a]	6.71 (0.27-166.8)
	No	69 (98.6)	155 (100.0)	224 (99.6)		
Asthma and allergies	Yes	7 (10)	30 (19.4)	33 (14.7)	0.08	0.44 (0.17-1.13)
	No	63 (90)	125 (80.6)	192 (5.3)		
Sensory impairment	Yes	5 (7.1)	6 (3.9)	9 (4.0)	0.342[a]	1.82 (0.47-6.99)
	No	65 (92.9)	149 (96.1)	216 (96.0)		
Mental/cognitive/psychologic and behavioral disorders	Yes	8 (11.4)	3 (1.9)	11 (4.9)	**0.005[a]**	**6.54 (1.68-25.46)**
	No	62 (88.6)	152 (98.1)	214 (95.1)		

**Statistically significant; [a] Fisher's exact test, [b] Chi-square test*

Discussion

The study aimed to assess the medical health conditions that might affect oral and dental health care among 6- to 12-year-old children living in governmental orphanage centers compared to non-orphan children living with their parents in Jeddah, Saudi Arabia. The orphanage's nurse or foster parents reported a lower incidence of medical/systemic problems among children living in governmental orphanage centers (48.6%) compared to those living with parents (78.1%). Also, more children living in governmental orphanage centers were diagnosed with congenital cardiac conditions and psychological conditions compared to those living with their parents, which suggests that these children may require more specialized and continuous care.

Despite the vulnerability of these orphan children, studies on orphans' physical, mental, and social well-being concerning healthcare services are limited, and orphan populations around the world have been reported to be more vulnerable to various health problems, including gastrointestinal, urinary, cardiovascular, respiratory, and mental health problems[2,9-11].

The findings of this study disagree with a study previously published by Al Jobair et al. in 2013 to assess the medical and dental health status among orphans in comparison with children living with their parents in the city of Riyadh, Saudi Arabia, who reported that more orphans were diagnosed with chronic medical conditions[1]. This can be because living in institutional environments may protect against transmissible diseases due to structured health monitoring[12]. In addition, parents are usually more aware and know more about their children's general medical history than the center's nurse or foster parent. Finally, the age at which children are institutionalized in the orphanage centers is considered a critical factor, as children who enter the orphanage center at an older age were found to be potentially more exposed to adverse conditions that might affect their long-term health and well-being[13]. In the current study, over 15% of the children living in the orphanage centers joined the center after the age of three years old; therefore, the governmental

center's nurse and foster parents might not be aware of their general medical history and the potentially adverse conditions they were exposed to before joining the orphanage center.

Children with congenital cardiac conditions were found to have more developmental enamel defects, malocclusion, and periodontal disease, all of which can act as predisposing factors and contribute to higher caries prevalence and worse oral health, especially among children living in orphanage centers[8]. Similarly, children diagnosed with psychological and behavioral problems were found to have worse oral health and usually require more challenging behavioral management by the dental team, which can negatively affect treatment strategies[14].

Mental health status among orphans was investigated by multiple authors in different countries[1,2,9-11], and problems such as depression and anxiety were highly reported among orphans, especially those who had previously lived in orphanage centers. Low psychological support and the feeling of not being accepted within the community[9] were reported as the leading causes of high mental health problems among orphans. The findings of this study reported that mental health problems were significantly higher among children living in governmental orphanage centers, and around 11.4% were found to have some mental/cognitive/psychologic and behavioral disorders. This finding agrees with previous studies that evaluated the prevalence of emotional and developmental disorders among children living in orphanages in Jeddah, Saudi Arabia[1] and Egypt[2]. The prevalence of psychological disorders was reported to reach 8.8% among children living in orphanages in Jeddah, Saudi Arabia, and 58.5 % among children living in orphanages in Egypt[1,2].

In the current study, 25 (13.9%) of the examined children reported having asthma and allergies. This supports the evidence found by Al Frayh in 2001, who reported that the prevalence of asthma and allergic diseases among children in Jeddah, Saudi Arabia, was 14.1%[15]. However, the prevalence of asthma and allergic diseases among children living with their parents (19.4%) was found to be slightly higher when compared to children living in governmental orphanage centers (10%), which disagrees with what was reported previously by Jobair et al. in 2013[1], in which asthma and allergies were found to be slightly higher among orphans (13.3%) when compared to children living with their parents (14.4%).

The study was subjected to a few limitations, particularly recall bias, as the medical history was obtained from the legal guardians. For the children living in the orphanage center, some educators were not accompanied by the center's nurses, who have knowledge of and access to the children's medical history and records. Because the medical history was obtained from the educators, it might not have been accurate. Another limitation is the struggle to communicate with the government orphanage centers and have them bring the children to the scheduled dental appointments. Additionally, the study faced difficulty reaching the desired sample size due to the limited number and age variability among children in the governmental orphanage center in Jeddah, Saudi Arabia. This variability might influence the study's outcomes. While this study encompassed all children residing in orphanages in a major city in Saudi Arabia, its findings cannot be generalized to the Saudi population until children from all major cities across the country are included.

CONCLUSION

Children living in governmental orphanage centers are more likely to be affected by medical conditions that affect their dental health and treatment planning. Therefore, this population requires special dental care precautions and guidelines.

Declarations

Availability of data and materials. The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors have no conflicts of interest to declare. All co-authors have seen and agreed with the manuscript's contents, and there is no financial interest to report. We certify that the submission is original work and is not under review at any other publication.

Disclosure

The authors did not receive any form of commercial support, either in the form of compensation or financial assistance, for this case report. The authors have no financial interest in any of the products, devices, or drugs mentioned in this article.

Ethical Approval

The study was approved by the Ethics Committee of the KAUH in Jeddah, Kingdom of Saudi Arabia, also known as the Institutional Review Board of Hospitals.

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