

Impact of Comprehensive Dental Health Program on the Oral Health-related Quality of Life among Socially Handicapped Children

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ABSTRACT

Aim: Socially handicapped children face a number of challenges including limited access to basic health including oral healthcare. The aim of this study is to determine the oral health status and treatment needs of socially handicapped children and to assess the effectiveness of the Comprehensive Dental Health Program (CDHP) on their oral health-related quality of life (OHRQoL).

Materials and methods: A total of 97 children in the age-group of 7–14 years were enrolled in the study. Prior to the implementation of CDHP, the collection of baseline data including basic demographic data, dentition status, decayed, missing, and filled teeth (DMFT), and treatment needs [World Health Organization (WHO) 1997] was done. CDHP was instituted based on their assessment and treatment needs. The evaluation of OHRQoL was done at baseline as well as a postintervention intervention at the end of 12 months.

Statistical analysis: Kolmogorov–Smirnov test was applied to find normality. Paired *t*-test and Wilcoxon sign rank tests were applied for item analysis in the questionnaire. The value of $p < 0.05$ was considered statistically significant.

Results: The mean domain scores of OHRQoL at baseline and following CDHP showed a statistically significant difference. There was a consistent overall increase in the postintervention domain scores with respect to all the components.

Conclusion: The oral health status of socially handicapped children was found to be fair requiring minimal dental treatment. CDHP instituted among them was beneficial in improving their OHRQoL.

Clinical significance: Assessing the impact of oral diseases using a multidimensional constraint and planning appropriate interventional measures that improve the general well-being of socially handicapped children.

Keywords: Comprehensive dental health program, Oral health-related quality of life, Socially handicapped children.

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INTRODUCTION

Detecting high-risk groups early and implementing robust health programs could aid in preventing and managing diseases in their initial phases. Among these groups are socially disadvantaged children.¹ An orphan or a socially handicapped child is an individual who has lost one or both parents. Asia holds the largest number of orphaned children and India alone is home to 31 million orphans.² Vulnerable children, such as orphans, encounter various obstacles, including restricted or nonexistent access to essential services like oral healthcare, highlighting one of their unaddressed healthcare requirements.³

Health is a state that allows an individual to adequately cope with all the demands of daily life.⁴ As a fundamental aspect of overall health, oral health significantly influences an individual's overall well-being. It encompasses oral and related tissue health that enables individuals to eat, communicate, and socialize without experiencing disease, embarrassment, or discomfort, thus contributing to their general state of wellness.⁵

Oral disease patterns are dependent on various socioeconomic characteristics of the individuals.⁶ Understanding how individuals perceive the impact of oral diseases on their quality of life is crucial. Clinical indicators like dental caries and periodontitis often fail to fully capture the multidimensional concept of health outlined by the World Health Organization (WHO), especially regarding mental and social well-being. Therefore, there has been a call for new measures of health status, leading to the development of alternative

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standards, such as oral health-related quality of life (OHRQoL). This concept has emerged from extensive observations and research into how oral diseases affect various aspects of life.⁷

At the community research level, emphasizing the concept of OHRQoL is particularly important for advancing oral healthcare and ensuring access to care.⁸ Oral health status can vary across socioeconomic divisions, leading to disparities in dental health outcomes.⁷ Children from disadvantaged backgrounds often lack the essential guidance, encouragement, and oversight typically

provided by parents, particularly during their early childhood years.⁹ Being orphaned is a significant predictor of poor oral health, as these children often lack the opportunity to access dental care. In Indian families, dental services are primarily sought for pain relief, with mothers playing a key role in prevention efforts, resulting in limited access for orphaned children. Recognizing their needs is crucial to ensuring optimal oral health for these disadvantaged children. Integrating both preventive and curative treatments can significantly enhance the overall health of orphaned children and other disadvantaged populations.

Therefore, the current intervention study, conducted within institutional settings, aimed to enhance the oral health status of socially disadvantaged orphaned children through the implementation of a Comprehensive Dental Health Program (CDHP). Additionally, the study sought to evaluate the OHRQoL following the implementation of the program.

MATERIALS AND METHODS

The current study was carried out among institutionalized children who are under the guidance of Government/NGO homes in West Godavari District, Andhra Pradesh, India. Ethical clearance was obtained from the Institutional Ethics Board (Serial no. CEC/19/2018-19), before the commencement of the study.

Study Design

This intervention-based research was undertaken at institutionalized homes meant for orphan children. Written permission was acquired from the concerned authorities and the head of the orphanages. Consent was also obtained from the caretakers of the orphanages before conducting the assessment and evaluation. A total of 97 children between the ages of 7 and 14 years were enrolled in the study (Tables 1 and 2).

Sample Size

G*Power of 3.1.9.2 software was used for calculating sample size. From the reference article, the mean decayed, missing, and filled teeth (DMFT) at baseline was noted to be 1.01 with a standard deviation (SD) of 1.52, and at secondary evolution mean DMFT was 0.71 with SD 1.09.¹¹ Based on this information, effect size was calculated as 0.2763. Later in the matched pair method, alpha was taken as 5%, power was 80%, the effect size was 0.2763 then the final sample size was determined as $n = 83$.

Prior to the implementation of CDHP, the collection of baseline data including basic demographic data (Figs 1 and 2), dentition

status, DMFT, and treatment needs according to WHO 1997 criteria was done.¹¹ A preintervention questionnaire regarding OHRQoL was also assessed and documented.¹² The children were instructed to fill in the four-item questionnaire.

OHRQoL questionnaire—Child Oral Health Impact Profile (SF19) (as experienced in the past 3 months).

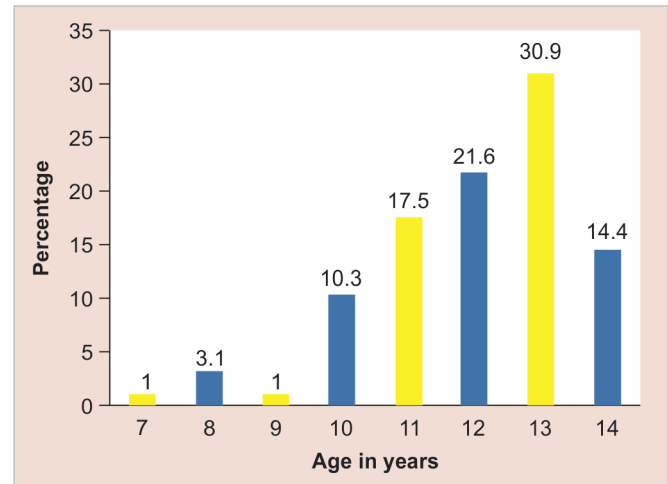


Fig. 1: Sample distribution based on age

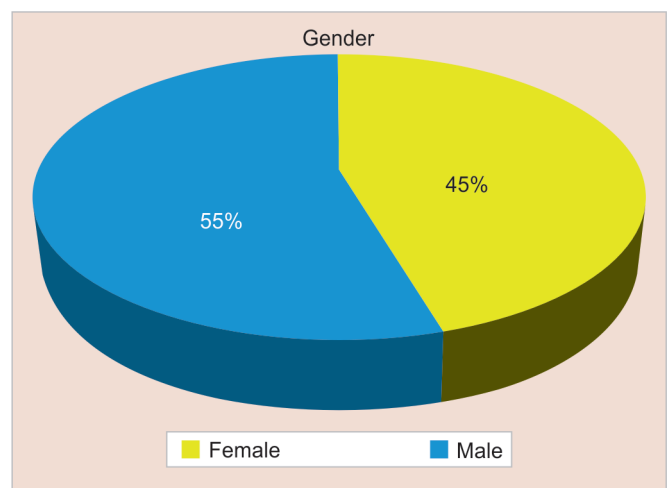


Fig. 2: Distribution of sample with respect to gender

Table 1: Mean total scores of OHRQoL at baseline and following CDHP

Variable	N	Minimum	Maximum	Mean	SD	Median	IQR	p-value
Preintervention	97	31	143	92.43	22.811	95.00	24	<0.001
Postintervention	97	80	136	117.28	9.613	119.00	12	

*, paired t-test; Bold value indicates statistically significant value ($p < 0.05$)

Table 2: Mean total scores of OHRQoL based on age

Age	Period	Minimum	Maximum	Mean	SD	Median	IQR	p-value
7–10	Pre	31	132	89.67	25.44	95.00	9	0.001
	Post	108	131	121.00	6.23	121.00	7	
11–14	Pre	34	143	92.94	22.43	95.00	29	<0.001
	Post	80	136	116.60	9.99	118.00	12	

*, paired t-test; Bold values indicate statistically significant values ($p < 0.05$)

- Domain I—oral health well-being: (6 items).
- Domain II—functional well-being: (7 items).
- Domain III—emotional well-being: (6 items).
- Domain IV—social problems: (10 items).

Analysis of the data was done and subsequently, a CDHP was instituted for all the participant children according to their treatment needs. The intervention included oral prophylaxis, application of topical fluoride, oral health education, sealant placement, and necessary curative services including restorations, pulp therapy, and extractions. All necessary preventive treatments were performed in the institutional premises utilizing a mobile dental unit. Curative services were carried out at the pediatric and preventive dentistry departmental clinic.

The evaluation was performed 1 year after initiating the CDHP. A structured questionnaire regarding OHRQoL was administered and recorded postintervention at the end of 12 months following the initiation of the CDHP. The pre- and postintervention data were then compared and statistically analyzed.

Statistical Analysis

The data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences V25. Descriptive statistics were presented as percentages for categorical variables, and for continuous variables, either mean with SD or median with interquartile range (IQR) were used, depending on the distribution of the data. Normality was assessed using the Kolmogorov–Smirnov test. For item analysis of the questionnaire, paired *t*-tests were used for normally distributed data, while the Wilcoxon signed-rank test was used for nonnormally distributed data. A significance level of $p < 0.05$ was considered statistically significant.

DISCUSSION

The most common oral problems among school children include dental caries, malocclusions, and traumatic dental injuries (TDIs). These issues often have a detrimental effect on children's OHRQoL, leading to experiences, such as oral pain, difficulty with chewing, anxiety or distress related to their mouth, missed school days, and changes in emotional and social behaviors due to dental malocclusions and TDIs.¹³

There are numerous scales developed to measure an individual's quality of life-based on various domains.¹² To address the limitations of conventional measures, an OHRQoL indicator was developed, emphasizing broader sociodental aspects of oral health. It assesses the frequency and impact of oral health issues across different domains. Responses are scored on a scale of five: never (5), once or twice (4), sometimes (3), often (2), and every day or almost every day (1). Therefore, the scale ranges from 31 to 155, where a higher OHRQoL score indicates better OHRQoL.⁵ The OHRQoL tool was utilized in the present study due to its ability to capture the relationship between subjective and clinical measures. Additionally, it serves as a valuable screening tool for clinical measures.

Before the implementation of the CDHP, the caries status of the teeth was assessed based on the criteria set forth by the WHO. This assessment utilized the indices of "decayed, missing, and filled teeth/surfaces" (DMFT/DMFS) for permanent teeth and "decayed, missing, and filled teeth/surfaces" (dmft/dmfs) for primary teeth.¹⁴ Evaluation of scores showed a maximum of score 5. The mean DMFT of the total sample was found to be 0.89 (Fig. 3). Nearly 26 children needed restorations among them only 5% needed the maximum number of restorations, that is, 4 per individual (Fig. 4). Experience

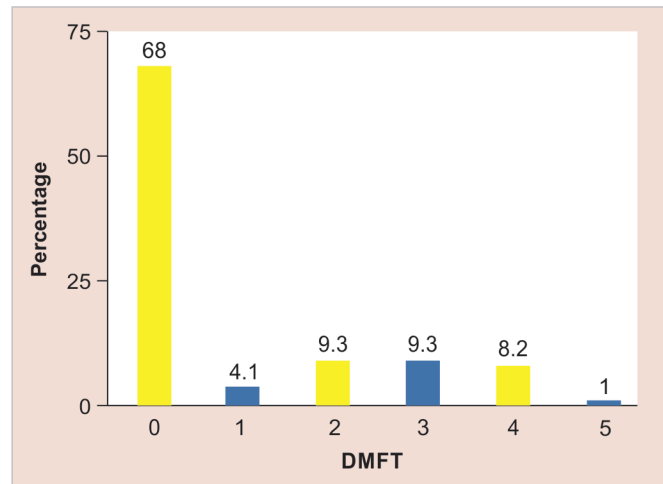


Fig. 3: Caries status of children at baseline

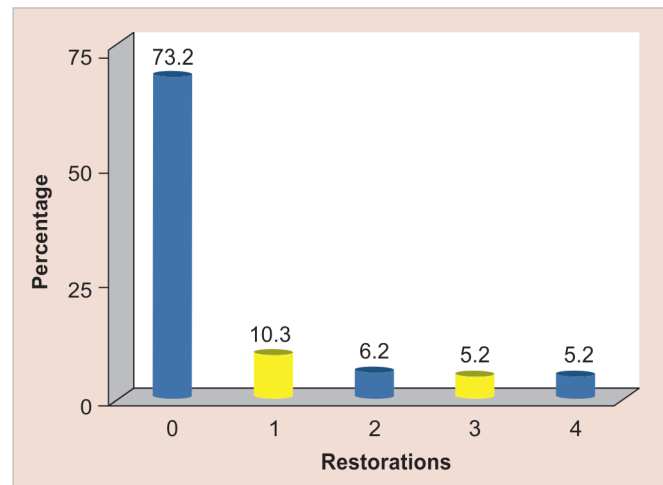


Fig. 4: Proportion of sample requiring restorations

of past caries has been shown to be the strongest predictor of future dental caries. Though only 26.9% of children had caries at baseline before the intervention, they pose a risk of developing caries further in the future. Consistent with these findings, Al-Maweri et al. reported that institutionalized children in orphanages exhibited a low prevalence of dental caries, despite demonstrating poor oral hygiene practices.¹⁵

However, the assessment of treatment needs in the current study revealed that only 33% of the participants needed oral prophylaxis (Fig. 5). The findings suggest that the inmates adhered to good oral hygiene practices, which contrasts with earlier reported studies.^{9,16}

Very few participants required a tooth extraction, which accounted for 4% of the study sample (Fig. 6). Similarly, reports by Alsayeh et al., who examined orphans in Riyadh city revealed that 8.1% of participants needed extraction among other treatment needs.¹⁷

The relationship between gender, age, and OHRQoL was also analyzed in this study. The assessment of mean domain scores of OHRQoL based on sample distribution by age showed a strong statistical correlation (Table 1). Among the 7–10 years age-group and 11–14 years age-group, the mean posttotal scores were significantly higher than the preintervention scores (Table 2). The sample

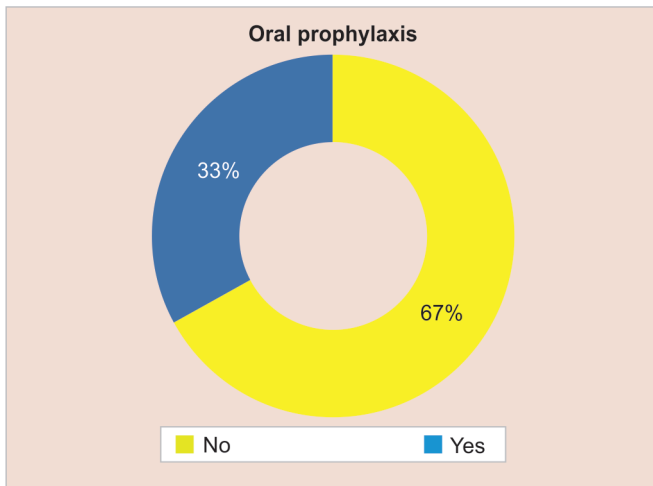


Fig. 5: Proportion of sample requiring oral prophylaxis

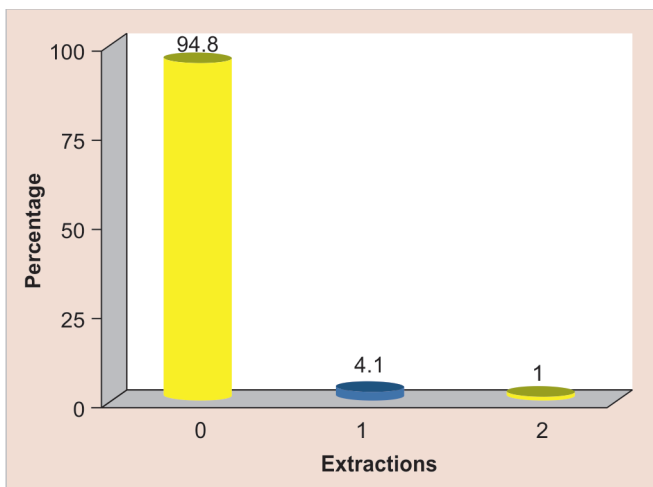


Fig. 6: Proportion of sample requiring extractions

distribution by gender showed a positive statistical correlation with both males and females showing higher mean postintervention scores (Table 3). This shows that variables like age and gender did not affect the outcome and a comprehensive dental program was uniformly beneficial to all participants.

The present study witnessed a significant rise in the mean domain scores of OHRQoL following CDHP compared to baseline, signifying a better OHRQoL following the intervention. Evaluation of individual components of OHRQoL included four domains. The observed difference between pre- and postintervention scores of domains 1, 2, 3, and 4, which analyze the various components of oral health well-being, functional well-being, emotional well-being, and social problems, respectively, were found to be statistically significant (Table 4). This indicates that the intervention in the form of CDHP had a positive impact, leading to an improvement in the oral health status and general well-being of the participants. With respect to individual item analysis, each question was scored according to the Likert scale. Regarding oral health well-being, a majority of the children responded that they sometimes experienced pain in their teeth, had bad breath, bleeding gums, and had food stuck between their teeth. Few respondents reported often experiencing pain or noticing crooked teeth or spaces between teeth.

In terms of functional well-being, only a small number of respondents reported frequently experiencing trouble sleeping or having difficulty saying certain words. Some of the participants experienced difficulty in eating hot/cold food and slow chewing once or twice. Mouth breathing was not reported among them to be present all the time, though few did report it to be present sometimes.

With respect to emotional well-being, not many participants felt upset irritable, or frustrated often. Few respondents felt nervous/afraid or shy/embarrassed sometimes. Most of the respondents never worried about their appearance or felt that he/she is different from other people.

Concerning social problems, only a few respondents reported frequently avoiding smiling or laughing with other children.

Table 3: Mean total scores of OHRQoL based on gender

Gender	Period	Minimum	Maximum	Mean	SD	Median	IQR	p-value
Female	Pre	65	137	98.91	15.94	98.50	22	<0.001
	Post	103	136	118.30	6.52	118.50	9	
Male	Pre	31	143	87.06	26.18	90.00	31	<0.001
	Post	80	132	116.43	11.57	119.00	18	

*, paired t-test; Bold values indicate statistically significant values ($p < 0.05$)

Table 4: Comparison of OHRQoL mean scores and their components

	Minimum	Maximum	Mean	SD	Median	IQR	p-value
I. Oral health well-being (pre)	6.00	30.00	17.22	6.04	17.00	8.00	<0.001
I. Oral health well-being (post)	12.00	30.00	24.20	3.63	25.00	4.50	
II. Functional well-being (pre)	7.00	35.00	22.51	7.42	23.00	8.50	<0.001
II. Functional well-being (post)	18.00	35.00	29.60	3.38	30.00	4.00	
III. Emotional well-being (pre)	6.00	30.00	19.27	6.32	20.00	8.50	<0.001
III. Emotional well-being (post)	16.00	30.00	25.00	2.81	26.00	3.00	
IV. Social problems (pre)	10.00	50.00	33.44	8.48	35.00	11.50	<0.001
IV. Social problems (post)	29.00	46.00	38.48	3.97	39.00	5.50	

*, paired t-test; Bold values indicate statistically significant values ($p < 0.05$)

None of them expressed worry about what other people think about them, but on occasion, some felt they looked different and experienced worry or anxiety. Most participants reported being often teased, bullied, or called names by other children. Some indicated occasionally not wanting to speak or read aloud in class, and a few admitted they had never felt confident.

The OHRQoL assessed after 1 year revealed the highest mean values recorded for the domain of social well-being, followed by functional, emotional, and oral health well-being. There was a consistent overall increase in the postintervention domain scores across all components.

CONCLUSION

The following conclusions were drawn from the study:

- Oral health status of socially handicapped children was fair with minimal requirement of therapeutic dental health services.
- The CDHP instituted among orphan children was uniformly beneficial to all participants and significantly improved their OHRQoL.

Limitations

While the present interventional study proved beneficial for socially handicapped children and enhanced their oral health status, it's noteworthy that the services provided did not include esthetic dental treatments, such as orthodontic care or prosthetic rehabilitation.

Clinical Significance

The impact of oral diseases is assessed using a multidimensional constraint that focuses on broader sociodental concepts of health aid in planning appropriate interventional measures that improve the oral health status as well as the general well-being of socially handicapped children.

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