ORIGINAL ARTICLE

Differences in oral health knowledge, attitudes, and practices among orphaned residents: a cross-sectional study

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ABSTRACT

Introduction: Oral health is essential to the general health and well-being of all children and adults. Oral health behaviors are typically established early in life within the family environment, however, orphaned children are often overlooked. This study aimed to analyze differences in oral health knowledge, attitudes, and practices among orphaned residents. **Methods:** This analytical study used a cross-sectional method, comprising 346 orphaned residents from 27 orphanages in Makassar City. A 24-item closed-ended structured questionnaire was administered to assess oral health knowledge, attitudes, and practices among the participants. Furthermore, stratified random sampling was used for participant selection. Data analysis was conducted using the Mann-Whitney U test. **Results:** The results showed that 65% of orphaned residents had sufficient knowledge, 80% possessed a good attitude, and 53.8% had adequate practices regarding oral health. Significant differences were observed in oral health knowledge, attitudes, and practices based on age groups ($p<0.05$). Notably, there were also significant differences in knowledge and attitude ($p<0.05$) related to oral health among the participants. **Conclusion:** Differences were observed in knowledge and practices, while attitudes towards oral health were generally positive. Moreover, orphanage caregivers should receive education and training in oral health practices.

KEYWORDS

Oral health, orphaned residents, knowledge, attitudes, practices

INTRODUCTION

Dental caries remains one of the most prevalent oral diseases and a major public health concern. According to the WHO report on the Status of Dental and Oral Health in 2022, approximately 3.5 billion people worldwide, or nearly half of the population, suffer from dental and oral diseases. In Indonesia, the 2023 Indonesian Health Survey conducted by the Ministry of Health of the Republic of Indonesia reported that the prevalence of dental and oral problems among the population aged <15 years and over reached 56.9%, while only 11.2% sought professional dental care.[1]

Oral health behaviors of children and adolescents are significantly influenced by their families. Parents play a crucial role in promoting oral health, as they are primarily responsible for teaching their children proper hygiene skills and helping them develop effective oral hygiene habits.[1-4] Childhood is an essential period in a person's life when beliefs, attitudes, and practices are established, often lasting a lifetime.[4-6,7] However, in certain segments of society where many children live without parents due to death or inability of caregivers to provide adequate care; these children are referred to as orphans [6,8,9]

Orphaned residents are a particularly vulnerable group that requires special attention. In this study, the term "orphaned" refers to children under the age of 18 years who have lost one or both parents or are living without parental care and are residing in orphanages.[6,10-13] Among this population, the absence of family support may negatively influence oral health behaviors and contribute to poorer quality of life.[9,11-15] Being an orphan is one of the most significant predictors of poor oral health because of limited access to dental care services. Health issues of children residing in orphanages can be complicated.[11,13,14]

Orphans include adolescents under 19 years of age who have lost one or both parents, are abandoned, and require special attention. Orphanages may not always provide an environment conducive to optimal growth and development, thereby increasing the risk for poor oral health. This is due to factors such as limited and inequitable access to oral health care, inadequate health literacy, mental stress, lack of attention among caretakers, poor diet, and poor living conditions. [9,15-17] The experience of living in an orphanage differs from that of a family environment. Orphans are at a greater risk for dental and gingival problems due to psychological factors and a lack of parental supervision. The challenges faced by children in an orphanage vary significantly and are frequently related to environmental conditions, with oral health education being neglected.[18-21]

Therefore, to improve health indices, this vulnerable group should be identified, and the causes of oral disease should be eliminated. Numerous studies have shown that the oral health knowledge, attitudes, and practices of orphanage children are generally inadequate.[15,22-24.] However, there has been limited investigation focusing specifically on orphaned children and oral health knowledge, attitudes, and practices. This study aimed to assess oral health knowledge, attitudes, and practices among orphaned residents in Makassar.

METHODS

A descriptive cross-sectional study was conducted from January to February 2025 in 27 orphanages located across 6 sub-districts of Makassar City, Indonesia. All procedures were conducted in accordance with the ethical standards of human research. Participation was voluntary, and confidentiality of participants was ensured. The cross-sectional approach was chosen to describe the distribution of variables at a single point in time without inferring causality.

The study population consisted of children living in orphanages. In this study, "orphaned residents" referred to all orphans residing in registered orphan care institutions, regardless of their parental status. A total sampling technique was employed. The inclusion criteria were orphaned residents enrolled in formal

education and willingness to participate in the study. The exclusion criteria were orphaned residents who were not yet enrolled in school. **A stratified random sampling method** was used, and a total of 346 participants were included in the study. Participants were categorized based on gender (male and female), age groups (children: ≤9 years; adolescents: 10–19 years; young adults: >19 years), and education level (primary, junior high, senior high school)

The questionnaire was administered directly to participants at their respective orphanages under supervision to ensure comprehension and to minimize response bias. Prior to data collection, explanations regarding the purpose and procedure of the study were provided to orphanage authorities, caretakers, and participants. Written informed consent was obtained from all participants and institutional authorities.

The questionnaire consisted of four sections. The first section collected demographic information including name, gender, age, and level of education. The second, third, and fourth sections assessed oral health knowledge, attitudes, and practices respectively. The instrument was adapted from a previously published oral health Knowledge, Attitude, and Practice (KAP) questionnaire. Minor modifications were made to adjust the wording to the study population without altering the core constructs of the instrument.

All questionnaires were completed under supervision to ensure clarity of responses and minimize potential misunderstandings. All data used in this study were primary data collected specifically for this research through a structured questionnaire administered to children and adolescents living in orphanages. The study did not utilize any publicly available large datasets or secondary databases; therefore, no database accession number is applicable

Oral health knowledge was assessed using 10 items based on the Guttman scale. Each correct response was assigned a score of 1, and incorrect responses a score of 0, yielding a total score range of 0–10. Knowledge levels were categorized as good (75-100%; 9-10 points), adequate (56-74%; 5-8 points), and poor (≤ 50%; 0-4). Oral health attitudes were measured using 10 items on a 4-point Likert scale: strongly agree (4), agree (3), disagree (2), and strongly disagree (1), with a total possible score of 10–40. Attitude levels were classified as good (75–100%; 30–40 points), fair (56–74%; 22–29 points), and poor (≤50%; 10–21 points). Oral health practices were assessed using 10 items on a 4-point Likert scale, ranging from very often (4) to never (1). Practice levels were categorized as good (75–100%), fair (56–74%), and poor (≤50%).

Internal consistency reliability was assessed using Cronbach's alpha coefficient. A value of ≥0.70 was considered acceptable. In this study, Cronbach's alpha values were 0.673 for knowledge, 0.616 for attitude, and 0.601 for practice, indicating moderate internal consistency acceptable for exploratory research.

Collected data were entered and analyzed using SPSS version 20.0 for Windows (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics were calculated using frequencies and percentages for categorical variables. Non-parametric statistical tests were applied due to the non-normal distribution of the data. The Mann–Whitney U test was used to assess differences between two groups, while the Kruskal–Wallis test was applied for comparisons among more than two groups. The Chi-square test was used to evaluate associations between categorical variables. Statistical significance was set at $p < 0.05$.

RESULTS

This study included 346 participants who met the inclusion criteria and yielded the following results. Table 1 presents the characteristics of the participants. The gender distribution was nearly equal, with 174 (50.3%) females and 172 (49.7%) males. The majority of participants were adolescents (296; 85.6%), followed by children (27; 7.8%) and young adults (23; 6.6%). Regarding education level, most participants were in senior high school (131; 37.9%),

followed by junior high school (128; 37.0%) and primary school (87; 25.1%).

Table 1. Characteristics of participants (n=346)

Variable	n (%)
Gender	
Female	174 (50.3)
Male	172 (49.7)
Age Group	
Children	27 (7.8)
Adolescents	296 (85.6)
Young Adults	23 (6.6)
Educational Level	
Primary School	87 (25.1)
Junior High School	128 (37.0)
Senior High School	131 (37.9)

Table 2. Frequency distribution of oral health knowledge, attitudes, and practices (n = 346)

Variable	Category	n (%)
Knowledge		
	Poor	97 (28.0)
	Adequate	225 (65.0)
	Good	24 (7.0)
Attitude		
	Poor	4 (1.2)
	Adequate	65 (18.8)
	Good	277 (80.0)
Practice		
	Poor	19 (5.5)
	Fair	186 (53.8)
	Good	141 (40.8)

Table 2 presents the distribution of oral health knowledge, attitudes, and practices among the participants. For oral health knowledge, the majority of respondents were categorized as having adequate knowledge (225; 65.0%), followed by poor (97; 28.0%), and good (24; 7.0%) knowledge. Regarding attitude, most participants demonstrated a good attitude (277; 80.0%), while a smaller proportion showed fair (65; 18.8%) and poor attitudes (4; 1.2%). In terms of oral health practices, more than half of the respondents had fair practices (186; 53.8%), followed by good (141; 40.8%) and poor practices 19 (19; 5.5%).

Table 3. Distribution of oral health knowledge based on participant characteristics

Characteristic	Poor n (%)	Adequate n (%)	Good n (%)
Gender			
Female (n=174)	31 (17.8)	128 (73.6)	15 (8.6)
Male (n=172)	66 (38.4)	97 (56.4)	9 (5.2)
Age Group			
Children (n=27)	11 (40.7)	16 (59.3)	0 (0.0)
Adolescents (n=296)	83 (28.0)	193 (65.2)	20 (6.8)
Young Adults (n=23)	3 (13.0)	16 (69.6)	4 (17.4)
Educational Level			
Primary School (n=87)	33 (37.9)	53 (60.9)	1 (1.1)
Junior High School (n=128)	46 (35.6)	73 (57.0)	9 (7.0)
Senior High School (n=131)	18 (13.7)	99 (75.6)	14 (10.7)

Table 3 shows the distribution of oral health knowledge based on participant characteristics. Most participants were categorized as having adequate knowledge, particularly among females (73.6%) and adolescents (65.2%). A higher proportion of poor knowledge was observed in males (38.4%) and

participants with lower education levels. In contrast, a greater proportion of good knowledge was found among participants with higher education, especially those in senior high school.

Table 4. Distribution of oral health attitudes based on participant characteristics

Characteristic	Poor n (%)	Fair n (%)	Good n (%)
Gender			
Female (n=174)	0 (0.0)	26 (14.9)	148 (85.1)
Male (n=172)	4 (2.3)	39 (22.7)	129 (75.0)
Age Group			
Children (n=27)	1 (3.7)	10 (37.0)	16 (59.3)
Adolescents (n=296)	3 (1.0)	55 (18.6)	238 (80.4)
Young Adults (n=23	0 (0.0)	0 (0.0)	23 (100.0)
Educational Level			
Primary School (n=87)	1 (1.1)	27 (31.0)	59 (67.8)
Junior High School (n=128)	3 (2.3)	28 (21.9)	97 (75.8)
Senior High School (n= 131)	0 (0.0)	10 (7.6)	121 (92.4)

Table 4 presents the distribution of oral health attitudes based on participant characteristics. Based on gender, the majority of both female (148; 85.1%) and male participants (129; 75.0%) demonstrated a good attitude toward oral health. In terms of age group, most participants across all groups showed a good attitude. Among children, (16; 59.3%) were categorized as having a good attitude, while a higher proportion was observed among adolescents with (238; 80.4%). All participants in the young adult group demonstrated a good attitude at (23; 100%). Regarding educational level, the proportion of participants with a good attitude increased with higher levels of education.

Table 5. Distribution of oral health practices based on participant characteristics

Characteristic	Poor n (%)	Fair n (%)	Good n (%)
Gender			
Female (n=174)	11 (6.3)	89 (51.1)	74 (42.5)
Male (n=172)	8 (4.7)	97 (56.4)	67 (39.0)
Age Group			
Children (n=27)	7 (25.9)	11 (40.7)	9 (33.3)
Adolescents (n=296)	12 (4.1)	163 (55.1)	121 (40.9)
Young Adults (n=23)	0 (0.0)	12 (52.2)	11 (47.8)
Educational Level			
Primary School (n=87)	9 (10.3)	45 (51.7)	33 (37.9)
Junior High School (n=128)	6 (4.7)	68 (53.1)	54 (42.2)
Senior High School (n= 131)	4 (3.1)	73 (55.7)	54 (41.2)

Table 5 shows the distribution of oral health practice based on participant characteristics. Most participants, both female and male (51.1% and 56.4%, respectively), were categorized as having fair oral health practices. A similar pattern was observed across age groups, particularly among adolescents (55.1%), while a higher proportion of poor practice was found in children (25.9%). Across all education levels, participants were predominantly in the fair category, with a slightly higher proportion of good practice among those with higher education.

Table 6. Differences in oral health knowledge, attitudes, and practices based on gender

Variable	Gender	Mean Rank	p-value	Effect size (r)
Knowledge	Female	192.05	0.001 *	0.22
	Male	154.74		
Attitude	Female	182.45	0.016 *	0.13
	Male	164.45		
Practice	Female	175.55	0.663	0.02
	Male	171.42		

* Significant at $p < 0.05$

Table 6 presents the results of the Mann–Whitney test comparing oral health knowledge, attitudes, and practices between female and male participants.

Significant differences were observed in knowledge (p = 0.001; r = 0.22) and attitude (p = 0.016; r = 0.13), with females showing higher mean ranks than males. No significant difference was found in oral health practices (p = 0.663; r = 0.02).

Table 7. Differences in oral health knowledge, attitudes, and practices based on age

Variable	Age	Mean Rank	p-value	Effect size
Knowledge	Children	144.41	0.021 *	0.017
	Adolescents	173.27		
	Young adult	210.65		
Attitude	Children	137.06	0.001 *	0.003
	Adolescents	174.14		
	Young adult	208.00		
	Children	140.43	0.092	0.008
	Adolescents	175.18		
	Young adult	190.70		

* Significant at $p < 0.05$

Table 7 presents the results of the Kruskal–Wallis test comparing these variables across age groups (children, adolescents, and young adults). Significant differences were observed in knowledge (p = 0.021; η^2 = 0.017) and attitudes (p = 0.001; η^2 = 0.033), although the effect sizes were small. No significant difference was found in oral health practices (p = 0.092; η^2 = 0.008), indicating a negligible effect.

Table 8. Differences in Oral Health Knowledge, Attitude, and Practice Based on Educational Level.

Variable Level	Educational	Mean Rank	p-value	Effect size
Knowledge	Primary School	150.36	0.001 *	0.032
	Junior High School	160.89		
	Senior High School	201.18		
Attitude	Primary School	152.57	0.001 *	0.030
	Junior High School	165.78		
	Senior High School	194.95		
Practice	Primary School	163.91	0.503	0.004
	Junior High School	176.67		
	Senior High School	176.77		

* Significant at $p < 0.05$

Furthermore, Table 8 shows the results of the Kruskal-Wallis test assessing differences in oral health knowledge, attitudes, and practices based on educational level. Significant differences were observed in knowledge and attitude ($p < 0.05$), with higher mean ranks among participants with a senior high school background. No significant difference was found in oral health practices ($p > 0.05$).

DISCUSSION

This study evaluated oral health knowledge, attitudes, and practices (KAP) among 346 orphaned residents in Makassar, Indonesia. Most participants were adolescents (85.5%), with a small proportion of young adults aged over 19 years who were still pursuing high school education. This study is in line with oral health knowledge, attitudes, and practices (KAP) among 346 orphaned residents in Makassar, Indonesia. Most participants were adolescents (85.5%), with a small group of young adults over 19 years who were still attending high school. Although orphanages typically provide care until the age of 18, some residents may remain due to educational reasons or other institutional factors [7,9,13]

Our results showed significant differences in oral health knowledge and attitudes among children, adolescents, and young adults, as indicated by Kruskal-Wallis analysis ($p < 0.05$). Most participants had sufficient oral health knowledge (65%), although some remained in the poor category. Female participants

(73.6%) scored higher than males (56.4%), which is consistent with previous studies reporting that females tend to demonstrate better oral health knowledge and engage more in preventive practices.[15]

Knowledge also increased with educational level, with senior high school students demonstrating higher scores than primary school students, highlighting the important role of formal education in improving oral health literacy. Similar trends have been reported in other institutionalized youth populations, suggesting that school-based interventions can effectively improve knowledge and awareness.[7,24-26] Overall, most participants had adequate oral health knowledge (225; 65.0%), although a proportion remained in the poor category. Female participants (73.6%) demonstrated higher knowledge levels than males (56.4%), consistent with previous studies showing greater engagement of females with health education and preventive practices. Knowledge also increased with educational attainment, with senior high school students exhibiting higher knowledge level compared to primary school students, emphasizing the role of formal education in oral health literacy.[7, 24-26]

Attitudes toward oral health were predominantly positive, with 277 (80.0%) reporting favorable attitudes. Female participants (85.1%) showed slightly higher positive attitudes than males (75.0%), and attitudes improved with age and education. Notably, young adults aged >19 years achieved 100% good attitude scores, reflecting how personal experience, autonomy, and responsibility influence health behaviors. These findings align with previous research showing that older adolescents and young adults are more likely to adopt proactive health behaviors due to greater understanding of long-term consequences and self-efficacy.[19,25,27,28]

Oral health practices were predominantly adequate (186; 53.8%), with 40.8% demonstrating good practice levels. Gender differences in practice were not statistically significant, indicating that knowledge and positive attitudes do not always translate into consistent behaviors. This finding is consistent with previous studies of institutionalized youth, where limited access to hygiene supplies and structured routines may restrict behavioral implementation.[27,29] Although practice tended to improve with education, Kruskal-Wallis analysis showed no significant differences across educational groups, suggesting that environmental and institutional factors strongly influence whether knowledge is translated into action.

Adolescents and young adults exhibited higher practice levels than younger children, likely due to greater manual dexterity, established routines, and understanding of hygiene importance. Although practice generally improved with education, no statistically significant differences were observed across educational groups, further suggesting that institutional constraints, including limited access to hygiene supplies and structured routine, may limit behavioral implementation.[27,29]

These findings highlight the influence of caretakers and the institutional environment on children's oral health. Orphaned residents often face limited supervision, insufficient oral health education, and inadequate resources, which may be exacerbated by overcrowding and low caretaker-to-child ratios. Caretakers play a crucial role as role models, and their inclusion in oral health education programs can improve both attitudes and practices among institutionalized children[20,29-30] Interactive educational approaches, such as animated videos, demonstrations, and visual aids, have been shown to enhance engagement and understanding. In this context, strengthening caretaker involvement is essential to improve oral health behaviors among orphaned residents. However, data on caretakers' own knowledge, attitudes, and practices remain limited, representing an important area for future research to support comprehensive oral health promotion in orphanages.[20,29-30]

Overall, orphaned residents demonstrated adequate oral health knowledge and practices, along with generally positive attitudes toward oral health. However, oral health practices showed limited variation across groups, indicating that adequate knowledge and positive attitudes were not consistently translated into

optimal daily behaviors. Significant differences in knowledge and attitudes across age groups and educational level suggest that both maturation and formal education contribute to oral health literacy.

These findings emphasize the need for targeted oral health promotion programs for both orphanage residents and their caretakers. Clinically, orphanages could benefit from structured oral health education programs, especially for younger children who showed lower knowledge and practice levels. Using interactive teaching methods and integrating oral hygiene into daily routines may help improve both adherence and outcomes. From a policy perspective, ensuring adequate caretaker-to-child ratios, providing sufficient hygiene supplies, and offering training for caretakers to act as role models could strengthen oral health support in these institutions. For future research, longitudinal studies would help clarify causal relationships between knowledge, attitudes, and practices, and including clinical oral assessments could validate self-reported behaviors. Additionally, examining the knowledge, attitudes, and practices of caretakers themselves may offer valuable insight into factors shaping children's oral health

This study has several limitations. First, its cross-sectional design does not allow for causal inferences regarding relationships between oral health knowledge, attitudes, and practices. Second, data were collected using self-reported questionnaires without clinical oral examinations, which may have introduced recall and social desirability biases, as participants may have reported behaviors they perceived as socially acceptable rather than reflecting their actual oral health practices.

CONCLUSION

This study found differences in oral health knowledge and practices among orphaned residents, while attitudes toward oral health were generally positive. Moreover, the findings highlight the importance of educating and training orphanage caretakers to support and reinforce oral health behaviors. The implication of this study is the need for policy-driven oral health programs in orphanages that strengthen daily oral hygiene practices and promote active caretaker involvement. For future research, longitudinal studies combined with objective clinical assessments are recommended to provide a more comprehensive evaluation of oral health outcomes.

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