ORIGINAL ARTICLE

Differences of oral health knowledge, attitude, and practice among orphan 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. The implementation of oral health behaviour is expected to start at an early age in the family environment, although the orphaned are often neglected. This study aimed to analyze differences of oral health knowledge, attitude, and practice differences of oral health knowledge, attitude, and practice among orphan residents. **Methods:** This analytical study used a cross-sectional method, comprising 346 orphaned residents from 27 orphanages in Makassar City. A total of 24 items; a closed-ended structured questionnaire was used to assess oral health knowledge, attitude, and practice among orphans. Furthermore, a stratified random sampling method was used for sample selection. Data analysis was conducted with the Mann-Whitney U statistical test. **Results:** The results showed that 65% of orphan residents had sufficient knowledge, 80% possessed a good attitude, and 53.8% had sufficient behaviours regarding oral health. Significant differences were observed in oral health knowledge, attitude, and practice 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 orphan residents. **Conclusion:** There were differences in knowledge and practices, and generally good attitudes towards oral health. Moreover, orphanage caretakers should be educated and trained in oral health practice.

KEYWORDS

Oral health, orphan resident, knowledge, attitude, practice

INTRODUCTION

Dental caries remains one of the 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 world-wide, 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 Indonesian 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 behaviours 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 sections of society where many children have to live without parents because of death or inability to raise their children, they 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 these orphaned, the absence of family support might influence oral health behaviours, which leads to a poor quality of life.[9,11-15] Being an orphan is one of the most significant predictors of poor oral health because of a rare opportunity to search for dental care. Health issues of children residing in orphanages can be complicated.[11,13,14]

Orphans include adolescents under 19 years old who have lost one or both parents, are abandoned, and require special attention. Orphanages may not provide an environment conducive to healthy growth and development, posing a potential risk for poor oral health. This is due to factors such as inequitable and limited 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 problems and a lack of parental supervision. The challenges faced by children in an orphanage vary significantly and are frequently related to surrounding 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, attitude, and practice of orphanage children are not to be classified as good.[15,22-24.] However, there has been limited investigation focusing specifically on orphaned children and oral health knowledge, attitude, and practice. This study aimed to assess knowledge, attitude, and practice concerning oral health 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 is 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 causality.

The study population consisted of children living in orphanages. In this study, "orphaned residents" refers 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 were divided into three categories, namely children (9 years and below), adolescents (10 to 19 years) and young adults (over 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 managing personnel.

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, attitude, and practice 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.

The questionnaire was given to orphans at the orphanage and was completed under supervision to ensure clarity in their responses and minimise 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 were assigned a score of 0. Knowledge levels were categorized as follows: good 75-100% (9-10 points), sufficient 56-74% (5-8 points), and poor ≤ 50% (0-4). While oral health attitude was measured using 10 items on a 4-point Likert scale: strongly agree (4), agree (3), disagree (2), and strongly disagree (1). Thus, attitude scores were classified as: good: 75-100% (24-32 points), fair: 56-74% (12-23 points), and poor: ≤ 50% (0-11points). Oral health practice was 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%, sufficient: 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 acceptable internal consistency for exploratory research.

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 were assigned a score of 0. The total knowledge score ranged from 0 to 10 and was categorized as good (75 -100%; 9-10 points), adequate (56-74%; 5-8 points), and poor (≤50%; 0- 4 points).

Oral health attitude was measured using 10 items on a 4-point Likert scale: strongly agree (4), agree (3), disagree (2), and strongly disagree (1). Thus, the total attitude score was classified as: good (75-100%; 30-40 points), fair (56-74%; 22-29 points), and poor (≤ 50%; 10-21 points). Oral health practice was assessed using 10 items a 4-point Likert scale ranging from very often (4) to never (1). The total practice levels were scores categorized as good: 75-100%, fair :56-74%, and poor: ≤50 %.

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, involving 346 participants who met the inclusion criteria, yielded the following results.

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 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 2. Frequency Distribution of Oral Health Knowledge, Attitude, and Practice (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, attitude, and practice 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 24 (7.0%) with good knowledge. Regarding attitude, most participants demonstrated a good attitude 277 (80.0%), while 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 (5.5%).

Table 3. Distribution of Oral Health Knowledge Based on Participant Characteristic

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 Attitude Based on Participant Characteristic

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 attitude 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 participants (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 Practice Based on Participant Characteristic

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 (51.1%) and male (56.4%), were categorized as having fair oral health practice. 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, Attitude, and Practice 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, attitude, and practice 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 practice (p = 0.663; r = 0.02).

Table 7. Differences in Oral Health Knowledge, Attitude, and Practice 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 attitude (p = 0.001; η^2 = 0.033), although the effect sizes were small. No significant difference was found in oral health practice (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, attitude, and practice 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 practice ($p > 0.05$).

DISCUSSION

This study evaluated oral health knowledge, attitude, and practice (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]

Analysis revealed significant differences in oral health knowledge and attitude among children, adolescents, and young adults, as indicated by Kruskal-Wallis mean ranks and *p*-value <0.05. Knowledge also increased with educational level: senior high school students had higher scores than primary school students, highlighting the important role of formal education in building oral health literacy. Similar trends have been observed in other institutionalized youth populations, suggesting that school-based interventions can effectively improve knowledge and awareness.[7,24-26] Overall, most participants had sufficient oral health knowledge 225 (65%), though some remained in the poor category. Female participants (73.6%) demonstrated higher education 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 (80.1%) reporting favorable attitudes. Female participants (85.1%) showed slightly higher positive attitudes than males (75.0%), and attitudes improved with age and education. Attitudes toward oral health were generally good, with 80.1% of participants showing favorable attitudes. Female residents (85.1%) had slightly higher positive attitudes than males (75.0%), and attitudes improved with age and education. Notably, young adults over 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]

Notably, young adults aged >19 years achieved 100% good attitude scores, reflecting the influence of personal experience, autonomy, and responsibility on oral health behaviors. While these individuals are technically beyond childhood, their continued presence in orphanages underscores the role of institutional support and educational opportunities in shaping oral health attitudes.[19,25,27,28]

Oral health practices were mostly sufficient, 186 (53.8%), with 40.8% achieving good practice levels. Oral health practices were mostly sufficient, with 53.8% achieving adequate practice levels and 40.8% reaching 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 has also been reported in other studies of institutionalized youth, where limited access to hygiene supplies and structured routines can restrict behavior implementation[27,29]Although practice tended to improve with education, Kruskal-Wallis analysis did not show significant differences across educational groups, suggesting that environmental and institutional factors strongly influence whether knowledge is translated into action

Gender differences in practice were not statistically significant, indicating that knowledge and attitudes do not always translate into consistent behaviors, a trend observed in other institutionalized youth populations. 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 improves with educational, Kruskal-Wallis analysis showed no statistically significance across educational groups, suggesting that institutional constraints, including limited access to hygiene supplies and structured routine, may limit implementation.[27,29]

These results highlight the influences of caretakers and institutional context on children's oral health. These findings emphasize 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 can be compounded by overcrowding and low caretaker-to-child ratios. Previous studies have highlighted the crucial role of caretakers as role models, and including them in educational programs can improve both attitudes and practices among institutionalized children[20,29-30] Interactive educational methods, such as animated videos, narrated demonstrations, and visual aid have been shown to enhance engagement and understanding. Orphaned residents often lack adequate supervision, oral health education, and resources, which may be compounded by overcrowding and low caretaker-to-child ratios. In this context, caretakers serve as crucial role models, and including them in educational interventions can improve both attitudes and practices among orphaned residents. Effective methods for education include videos with animations, narration, and interactive visual elements, which have been shown to enhance engagement and understanding. However, data on caretakers' knowledge, attitudes, and practices remain limited, representing a critical area for future research to support comprehensive oral health promotion in orphanages.[20,29-30]

Orphaned residents demonstrated sufficient oral health knowledge and practices and generally good attitudes toward oral health. However, oral health practices demonstrated limited variation across groups, indicating that adequate knowledge and positive attitudes were not consistently translated into optimal daily behaviors. Analysis revealed significant differences in knowledge and attitudes across age groups and educational level, suggesting that both age-related maturation and formal education influenced oral health literacy. In contrast, oral health practice demonstrated less variability, indicating that adequate knowledge and good attitudes do not consistently translate into optimal behaviors.

These results emphasized the need for targeted oral health promotion programs for both orphanage residents and their caretakers. The implication of this study is the need for policy-driven oral health programs in orphanages that strengthen daily practices with caretaker involvement, while future research should conduct longitudinal designs and clinical assessments. These findings of this study have several important implications. 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, attitude, 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 were generally positive. Moreover, the findings highlight the importance of educating and training orphanage caretakers to support oral health behaviors. The implication of this study is the need for policy-driven oral health programs in orphanages that strengthen daily routine practices and active caretaker involvement. For future research, longitudinal studies combined with objective clinical assessments are suggested to provide a more comprehensive evaluation of oral health outcome.

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