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Parents and guardians perceptions of primary school students accessibility to dental health services in Riyadh City, Saudi Arabia: A cross-sectional study

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ABSTRACT

The success of healthcare delivery systems depends on accessibility. This study aimed to assess parental and guardian perceptions of dental health service accessibility among primary school students in Riyadh, Saudi Arabia. A descriptive cross-sectional survey was conducted among the parents and guardians of primary school students. A 23-item questionnaire was developed on the basis of previous studies. Demographic information, accessibility details, and barriers to dental services were recorded. A total of 385 participants responded to the questionnaire. Approximately 46.2 % of students encountered barriers to accessing dental services. Eighty (20.8 %) male students visited dental facilities more often than female students (72 [18.7 %]) within a 6-month period. Approximately 21 % of students had never visited a dental facility. The lowest number of preventive treatments were administered (15.4 %). Parents and guardians reported that private dental facilities were more accessible (185 [48 %]) than government dental facilities. There was an association between dental facilities and difficulties in accessing dental care services ($\chi 2(4) = 42.753$; $p < 0.001$). In conclusion, parents and guardians reported experiencing difficulties accessing dental services. However, parents and guardians must change their perspectives on accessibility, particularly for preventative care, because primary school children received the lowest.

1. Introduction

Access to health services is a core element of any health system worldwide and is defined as a population's ability to utilize health

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services when needed [1]. Many countries face significant issues with healthcare quality, affordability, and universal access. The optimal delivery of dental health services requires consideration of the two dimensions of healthcare accessibility and availability. Accessibility is related to the distance or travel time between a patient's location and the dental clinic, whereas availability refers to the clinic's location [2].

Saudi Arabia's healthcare services are free for the general public, including dental services provided by the Ministry of Health (MOH), military hospitals, and other government-sponsored hospitals [3]. The Saudi Commission for Health Specialties (SCFHS) regulates Saudi Arabia's health professions, including dentistry, and supervises registration, licensing, and residency programs. In the past two decades, the number of dental graduates in Saudi Arabia has increased, owing to the growth of dental institutes. The country's current dentist population ratio is 1:1288. It has also been reported that the private sector employs 66.15 % of all dental professionals compared to the public government sector, which employs only 33.85 %. Among the 13 provinces of Saudi Arabia, Riyadh City has the highest proportion of the dental workforce [4].

Primary school is an important aspect of dental health. Deciduous-to-permanent dentition transitions occur during this time, and numerous changes occur in the oral cavity. This increases the risk of dental caries in children. Regular dental visits can detect active diseases and preventive services can be provided to improve oral health [5,6]. Children's dental health may be compromised by parental knowledge, awareness, and attitudes toward dental health [7]. Parents' health decisions regarding their children, especially those of their mothers, are crucial for child development. Consequently, parental dental health awareness is necessary to prevent oral and dental diseases among their children [8]. Moreover, the crucial distinction between the roles of parents and guardians in medical and dental care is that parents and guardians are usually responsible for taking their children to a physician for medical treatment, while parents' responsibility for their children's oral and dental health starts by helping them brush their teeth at a younger age, supervising their oral hygiene regimens, and monitoring their sugar intake before taking them to the dentist [9]. Unfortunately, most parents in the 21st century do not have enough time to care for their children's dental health because of busy schedules and working environments [10].

Al Agili et al. applied the Andersen's Predisposing, Enabling, and Need-based Behavioral Models to predict Saudi children's oral health service use. The study concluded that one in four children had not previously visited a dentist because of dental health illiteracy and financial and transportation barriers [11]. Another study conducted by Aqeeli et al. in Saudi Arabia found that over 25 % of participants never sought dental care. Dental pain was the main reason individuals visited dentists. The study results confirm that the major factor for dental-care utilization is symptomatic dental care [12]. According to a study by Montazeri et al. insufficient dental insurance, long waiting times, and expensive dental costs were the biggest barriers to dental care [13].

Additionally, 70 % of children in Saudi Arabia have dental caries, which has increased in recent decades [14]. Research studies argue that parental behavioral patterns, financial constraints, and dental-care accessibility may prevent dental-care utilization [15]. This study makes a valuable contribution to the field because very few studies have been conducted in Saudi Arabia regarding the accessibility of dental health services by parents and guardians of primary school children. Our study included additional factors such as dental insurance, waiting time, distance, cost, and economic barriers. This information may be useful for healthcare planning strategies. Therefore, this study assessed the parents' and guardians' perceptions of dental health service accessibility among primary school students in Riyadh.

2. Materials and methods

2.1. Participants and design

A cross-sectional study was conducted to explore parents' and guardians' perceptions of the accessibility of dental care services among primary school students in Riyadh City, Saudi Arabia.

2.2. Eligibility criteria

The inclusion criteria were as follows: i) parents/guardians whose children attended primary school, and ii) who provided informed consent. The exclusion criteria were as follows: i) parents or guardians who were not Saudi nationals and ii) parents or guardians working in the field of dentistry, such as dentists or dental hygienists.

2.3. Sample size estimation

The sample size was determined using G-Power 3.1.1 [16]. Sample size estimation was carried out based on the prevalence obtained from the pilot study. The sample size was calculated to be 385 by considering an effect size of 0.2, an alpha error probability of 0.05, and a study power of 0.8. A convenience sampling technique was used to collect responses.

2.4. Instrument development

A pre-validated questionnaire from a previously published study was used to create a 23-item questionnaire used in this study [11]. A few modifications and additions related to the accessibility of dental care services among primary school students were made to the questionnaire. The questionnaire was written in English language and comprised three parts. The first part was a cover letter that started with gratitude for the acceptance of participation in this study, followed by the research topic, what the study measured, and

why. In addition to the time for completing the survey, all answers will be treated with complete confidentiality and will be collected for this research study only with the assurance that participation is optional. The second part comprised the demographic details. The third part comprised questions about accessibility to dental care services; all questions were closed-ended except for questions that needed more specific information, where an "other" option was provided with a space to fill it out as an open question.

2.5. Validity and reliability of the questionnaire

The content validity of the questionnaire was assessed by five faculty members of the College of Dentistry at King Saud bin Abdulaziz University for Health Science, who had good research backgrounds in dental public health. Aiken's V test was used to calculate consistency among the panelists for each question. The validity of the questionnaire was greater than 0.89. The internal consistency of the questionnaire was assessed using the Cronbach Alpha coefficient and the value obtained were greater than 0.82.

A pilot study was conducted over two weeks. Data were collected from 5 % of the study sample to assess the feasibility and practicality of the study. It required 5 min to complete and was sent through social media platforms. A proficient translator in each language performed the forward translation from Arabic to English, and another translator completed the backward translation. The investigators discussed and resolved any differences between the translators. All 23 items were included in the final version of the questionnaire because the pilot research outcomes showed no need for additional modifications.

2.6. Ethical consideration

Institutional review board approval was obtained from King Saud University in February 2022 (Ref No: KSU-HE-22-043). The parents and guardians provided informed consent on the first page of the questionnaire.

2.7. Data collection

The data-collection process was scheduled from February 1, 2022 to April 1, 2022. The questionnaire was distributed to parents and

Table 1
Study participant's sociodemographic data.

Children's sociodemographic data			
Variable		n	%
Age	Less than 6	6	1.6
	6–7 years	104	27
	8–9 years	139	36.1
	10–11 years	96	24.9
	12 years	31	8.1
	>12 years	9	2.3
Gender	Male	212	55.1
	Female	164	42.6
	Don't want to disclose	9	2.3
Grade	First grade	86	22.3
	Second grade	71	18.4
	Third grade	67	17.4
	Fourth grade	60	15.6
	fifth grade	46	11.9
	sixth grade	55	14.4
Parents' and Guardian's sociodemographic data			
Marital Status	Married	333	86.5
	Don't want to disclose	21	5.5
	Single unmarried/separated/Widow	31	8.0
Occupation	Unemployed including student	110	28.6
	School and other teaching institutions	38	9.9
	Civil Servant/Army/governmental institution	119	30.9
	Private employee	70	18.2
	Self-employed/Entrepreneur	17	4.4
	Retired	31	8.0
Highest Education	Never went to school	2	0.5
	Did not finish elementary school	3	0.8
	Graduated from elementary school	3	0.8
	Graduated from Junior High School	19	4.9
	Graduated from Senior High School/Vocational School	84	21.9
	Graduated from Diploma/Bachelor/Master/PhD/University level	274	71.1
Socioeconomic Status	Upper class	4	1
	Upper middle class	157	40.8
	Lower middle class	191	49.6
	Lower class	33	8.6

guardians of primary school children in Riyadh through social media platforms (Twitter and Telegram) containing a link to Google. To prevent multiple responses from the same participant, only one IP address was allowed for each response.

2.8. Statistical analysis

SPSS version 25 (IBM, Armonk, NY) was used for statistical analysis. Descriptive and chi-squared analyses were performed.

3. Results

3.1. Sample characteristics

All 385 questionnaires were analyzed. The demographic characteristics of the parents' and guardians' are presented in Table 1.

The participants were asked to add their children's age, sex, and grade level as well as their responses (Table 1). Most children were between 8 and 9 years old (36.1 %), there were more males (55.1 %) than females, and the distribution of students at the grade level was almost similar, with most students in the first grade (22.3 %) and the minority in the fifth grade (11.9 %).

3.2. Accessibility to dental care services

Table 2 shows that the association between sex and accessibility to dental care facilities was significant ($\chi2$ (4) = 19.372; $p < 0.001$). Male students (80 [20.8 %]) visited dental facilities more than female students (72 [18.7 %]) in the previous 6 months. Additionally, there was no association between sex and dental care needs ($\chi2$ (4) = 7.936; $p = 0.094$). The perceived need for dental care was greater in male students (147 [38.2 %]) than in female students (122 [31.7 %]). Regarding the association between occupation and dental insurance there was significant association. ($\chi2$ (5) = 55.487; $p < 0.001$).

Most parents and guardians with dental insurance for their children were private employees (41 [10.6 %]) and most of those who did not have dental insurance were civil servants or in army/governmental institutions (102 [26.5 %]). Table 2 shows the association between occupation and dental facilities ($\chi2$ (5) = 23.192; $p < 0.001$). Most students were treated in private dental facilities (258 [67 %]), which were most used by unemployed parents and guardians (74 [19.2 %]).

Fig. 1 shows the type of treatment the students received, with preventive treatment being the least common (15.4 %). The study results indicated that 52.5 % of the students visited a dental office less than one year ago, and 21 % never had dental visits. However, only a minority (9.6 %) of students visited dental facilities in the past three or four years, and 16.9 % visited dental facilities one to two

Table 2
Association between gender with child visit dental facilities and child in need of dental care. Parent occupation with dental insurance and where treatment was done.

What is your child's gender?	Your child visited dental facilities in the past six months?				*P*-value
	Yes	No	Don't know	Total	
Male	80 (20.8 %)	130 (33.8 %)	2 (0.5 %)	212 (55.1 %)	<0.001
Female	72 (18.7 %)	86 (22.3 %)	6 (1.6 %)	164 (42.6 %)	
Don't want to disclose	4 (1.0 %)	3 (0.8 %)	2 (0.5 %)	9 (2.3 %)	
Total	156 (40.5 %)	219 (56.9 %)	10 (2.6 %)	385 (100 %)	
What is your child's gender?	Does your child need dental care?				*P*-value
	Yes	No	Don't know	Total	0.094
Male	147 (38.2 %)	29 (7.5 %)	36 (9.4 %)	212 (55.1 %)	
Female	122 (31.7 %)	22 (5.7 %)	20 (5.1 %)	164 (42.6 %)	
Don't want to disclose	3 (0.8 %)	3 (0.8 %)	3 (0.8 %)	9 (2.3 %)	
Total	272 (70.7 %)	54 (14.0 %)	59 (15.3 %)	385 (100 %)	

What is your occupation?	Does your child have a dental insurance?			*P*-value
	Yes	No		<0.001
Unemployed including student	21 (5.5 %)	89 (23.1 %)	110 (28.6 %)	
School and other teaching institutions	6 (1.6 %)	32 (8.3 %)	38 (9.9 %)	
Civil Servant/Army/governmental institution	17 (4.4 %)	102 (26.5 %)	119 (30.9 %)	
Private employee	41 (10.6 %)	29 (7.5 %)	70 (18.1 %)	
Self-employed/Entrepreneur	6 (1.6 %)	11 (2.9 %)	17 (4.5 %)	
Retired	5 (1.2 %)	26 (6.8 %)	31 (8.1 %)	
Total	96 (24.9 %)	289 (75.1 %)	385 (100 %)	
What is your occupation?	Which dental care facility your child was treated?			*P*-value
	Public	Private		<0.001
Unemployed including student	36 (9.4 %)	74 (19.2 %)	110 (28.6 %)	
School and other teaching institutions	11 (2.9 %)	27 (7.0 %)	38 (9.9 %)	
Civil Servant/Army/governmental institution	54 (14.0 %)	65 (16.9 %)	119 (30.9 %)	
Private employee	9 (2.3 %)	61 (15.8 %)	70 (18.1 %)	
Self-employed/Entrepreneur	4 (1.0 %)	13 (3.4 %)	17 (4.4 %)	
Retired	13 (3.4 %)	18 (4.7 %)	31 (8.1 %)	
Total	127 (33.0 %)	258 (67.0 %)	385 (100 %)	

years ago.

3.3. Barriers in accessing dental care services

Regarding accessibility and availability, most parents and guardians reported that private dental facilities were more accessible than government facilities. Table 3 reveals an association between accessibility and socioeconomic status ($\chi 2$ (9) = 21.753; $p = 0.010$). Table 3 shows that there was an association between availability and socioeconomic status ($\chi 2$ (9) = 18.867; $p = 0.026$).

There was an association between dental facilities and difficulties in accessing dental care services ($\chi 2$ (4) = 42.753; $p < 0.001$). Participants who encountered difficulties in accessing dental facilities were willing to bring their child to dental facilities at school (163 [42.3 %]), and those who did not encounter barriers were also willing to bring their child to dental facilities at school (77 [20 %]). In total, 46.2 % of parents and guardians encountered barriers to accessing dental care services.

Fig. 2 indicates that most participants were in the lower middle class and encountered cost and financial constraints (23.1 %). Additionally, most of the lower-class group encountered costs and financial constraints (6.5 %). However, the upper class group did not encounter barriers (1 %). Similarly, most upper-middle class members did not encounter barriers (11.4 %).

Fig. 3 shows that most students visited dental care facilities 1–2 times (37 %). However, a minority (28 %) had never visited a dental facility in the previous year. The study results revealed that most parents and guardians knew that maintaining their children's oral and dental status in good condition was important. However, 36.1 % of the parents and guardians had never examined their children's teeth to ascertain whether they were in good condition.

4. Discussion

The current study assessed primary school students' access to dental care services in Riyadh City, whereas earlier studies concentrated on the prevention, prevalence, and improvement of oral health [11,17]. The key findings of this study showed that most students had never attended dental care facilities 6 months prior to the study, and males represented the highest proportion. Most students, especially males, require dental treatment. Most students with dental insurance had privately employed parents and guardians. In contrast, civil servants and those employed by the army and governmental institutions had the least coverage.

Global studies have found that parental education affects the utilization of dental services by children [18,19], along with socioeconomic status [20,21], parental perceptions of their children's oral health status [22,23], dental insurance [24], and dental fear [25]. Most children in our study visited dental care facilities for tooth removal, fillings, and general checkups. According to a study by Sabbagh et al., 72.4 % of respondents in Saudi Arabia claimed that their children had toothaches. Parents should utilize preventive dental health services more than treatment services.

The present study indicates that a longer waiting time and difficulty in appointments are factors for less dental service utilization. Many studies that have assessed the utilization of oral health services by applying Andersen's model have shown that parents and guardians who thought their children's oral health was worse used more dental services [26]. A previous study by Al Agili et al. found that difficulties in getting a dental appointment, shortage of dentists in the area, and long waiting times at the clinic were reasons for less utilization of services [11]. Another study evaluating barriers to accessing dental services in Saudi Arabia showed that long waiting lists, fundamental dental care provision, and perception of poor dental care in government dental clinics compared with private dentist offices were barriers [2]. Therefore, it is essential to implement strategies aimed at reducing waiting times and enhancing the accessibility of oral healthcare services.

This study showed that males perceived need for dental care services more than females. Similarly, Bahannan et al. [27] showed that the prevalence of dental decay was higher among boys (88.9 %) than girls (69 %) and that boys needed more dental services than girls. However, a previous study reported that females used more dental services than males [28], and it is essential to educate parents or guardians on the appropriate utilization of services, regardless of their child's sex.

More than half the parents and guardians treated their children in private facilities, which are more accessible than public dental facilities. However, private dentistry services in Riyadh City were not distributed equally but were concentrated in specific locations [29]. This may have been related to the use of private clinics by parents and guardians. Oral health-promoting programs and public

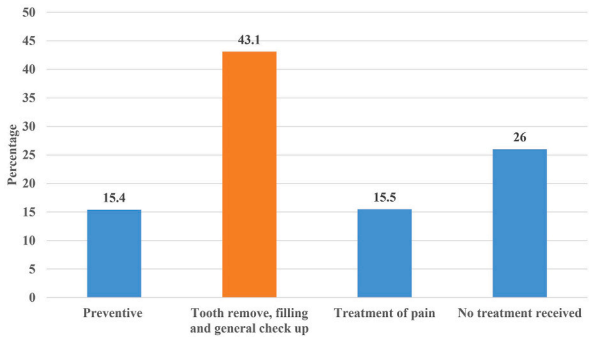

Fig. 1. Type of dental treatment received in the past 6 months.

Table 3
Association between socioeconomic status with the availability of dental facilities and most accessible dental facilities. Difficulties with access to dental care services with if dental facilities inside the child's school.

Socioeconomic status	Which are the most easily available dental facilities for you?					*P*-value
	Private hospital /Private clinic	Government hospital/public clinic	None	Don't know	Total	0.010
Upper-class	4 (1.0 %)	0 (0.0 %)	0 (0.0 %)	0 (0.0 %)	4(1.0 %)	
Upper middle-class	85 (22.1 %)	30 (7.8 %)	5 (1.3 %)	37 (9.6 %)	157(40.8 %)	
Lower middle-class	79 (20.5 %)	57 (14.8 %)	18 (4.7 %)	37 (9.6 %)	191(49.6 %)	
Lower-class	17 (4.4 %)	6 (1.6 %)	0 (0.0 %)	10 (2.6 %)	33(8.6 %)	
Total	185 (48 %)	93 (24.2 %)	23 (6.0 %)	84 (21.8 %)	385(100 %)	
Did you encounter difficulties to access dental care facility for your child?	Do you prefer your child's dental care facility to be in school?					<0.001
	Yes		No	Don't know	Total	
Yes	163 (42.3 %)		4 (1.0 %)	11 (2.9 %)	178(46.2 %)	
No	77 (20.0 %)		21 (5.5 %)	12 (3.1 %)	110(28.6 %)	
Don't know	70 (18.2 %)		6 (1.6 %)	21 (5.4 %)	97(25.2 %)	
Total	310 (80.5 %)		31 (8.1 %)	44 (11.4 %)	385(100 %)	

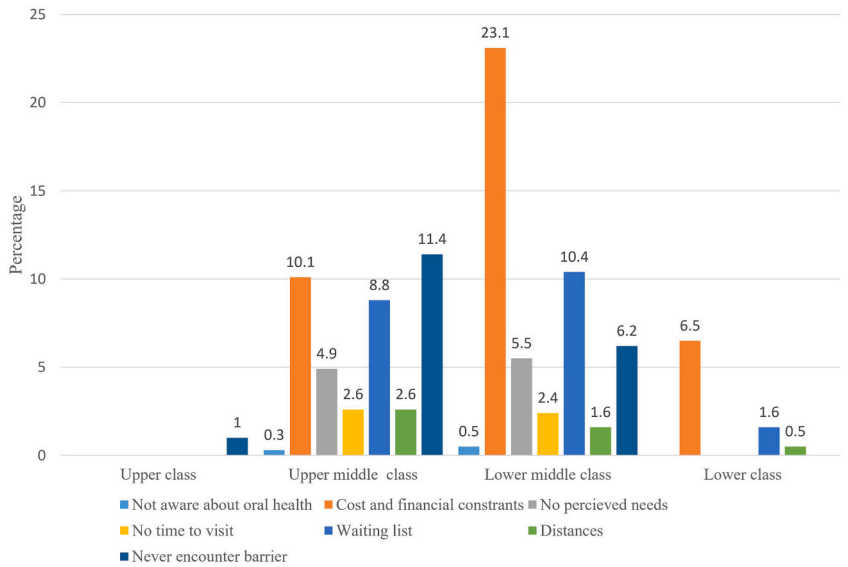

Fig. 2. Barrier to encountering access to dental health service according to socioeconomic status.

hospitals are needed to enhance dental care use; improve dental attitudes, accessibility, and affordability; and eliminate parental barriers.

This study found that different socioeconomic levels encountered different cost and financial constraints, except for the upper class. Parents with more children and less education experienced dental-care barriers more frequently. All socioeconomic status levels showed that private dental facilities were more accessible than public dental facilities. A recent press release from *The Lancet* claimed that billions of individuals lack access to even the most basic oral healthcare because of current dental care and public health approaches, which are insufficient, unfair, and expensive [30]. According to a previous study conducted in Saudi Arabia, socioeconomic status affects dental care usage. High household income, second and middle household income, and access to free government healthcare predicted the perceived need for dental treatment [31]. According to Saldūnaitė et al. parents with higher education and income have shown more concern for oral hygiene instruction and routine preventive dental checkups than parents with lower education and lower income [32]. Despite the availability of free dental care, Saudi adults have socioeconomic differences in the use of dental services. Increasing awareness and policy implications, including the promotion of preventive dental care over symptomatic care, may be useful [31].

Moreover, in this study, most students were not covered by dental insurance, which led to difficulties in accessing dental care services. In North Africa and the Middle East, low education, income, and health insurance are the main factors affecting dental-service utilization [33]. According to a study by Montazeri et al. [13], 94 % of parents face at least one dental care barrier. Dental insurance, long waiting times, and high costs are the greatest barriers. This study found that many students did not have dental insurance. Most parents and guardians were willing to visit dental facilities if the clinic was located inside school, regardless of whether they encountered difficulties. According to Hachey et al., it is challenging for caregivers to receive dental treatment for themselves and their

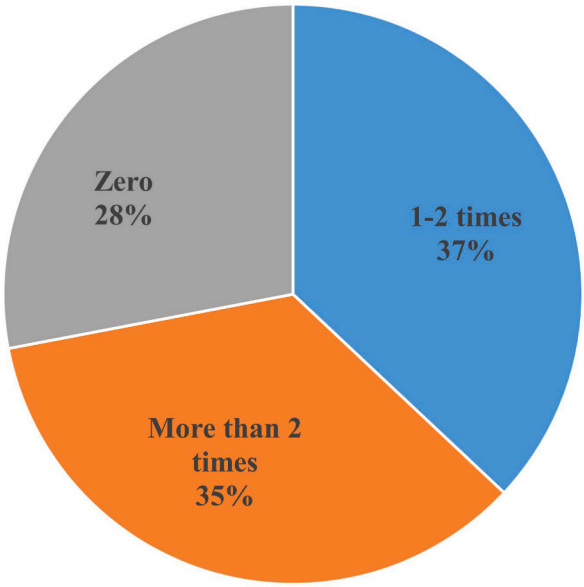

Fig. 3. Number of times students visited the dentist last year.

children. About 53.3 % of caregivers responsible for children's oral healthcare chose alternative provisions in a school, community, or primary healthcare environment [34]. Owing to their ability to overcome monetary and social barriers, school-based programs have great potential to reduce disparities [35].

According to Aqeeli et al. [36] 23.8 % of the individuals in their study did not receive dental care. In addition, 49.4 % of dentist visits were related to tooth-related issues. However, in this study, only 15.58 % of the participants visited dental facilities for pain relief. On the other hand, this study indicated that most students had not visited a dental facility within the previous 6 months. In addition, they revealed that the percentage of people using dental services was the highest in the high-income group.

4.1. Study limitations and strengths

It is difficult to generalize the findings to all of Saudi Arabia, as the participants were only from Riyadh. This cross-sectional survey could not draw causal conclusions regarding access to dental services. Third, the parents and guardians of students may have had more than one primary school student, which may have affected the accuracy of the sample size. These findings may not apply to parents and caregivers who are not involved with social media. Furthermore, parents and guardians were not separated in the study, as their perspectives may differ.

Despite these limitations, this study identified the major barriers encountered by primary school students and explored the accessibility of dental care services among students. This study was the first to be conducted in Riyadh City. Many associations have been found among accessibility, availability, and socioeconomic status. This study filled many gaps in the literature, such as difficulties in accessing dental care services among primary school children, willingness to receive dental care services in school, sex-based dental care needs, awareness of parents and guardians and their actions to examine children's oral health, associations between occupation and dental insurance coverage, and the type of dental facilities they visited based on the parents' and guardians' occupations.

4.2. Recommendations for further research

To improve dental care services in Riyadh, a multisectorial approach is required. Primary school children should be screened and educated for dental problems before they develop dental problems. This will ensure that children are free of caries and will prevent the development of caries. Dental-based school programs should be implemented by the Ministry of Health. This study should help the government provide superior dental services to primary school students in Riyadh.

5. Conclusions

The parents' and guardians' perceptions of accessibility indicated that they faced barriers to dental care services. Male students utilized dental care services more than female students. Most children use dental services for conditions such as tooth pain and tooth filling. Parents with higher socioeconomic status used more services. The high treatment cost serves as a barrier to the use of dental health services. Other factors affecting the use of dental services include time on the treatment waiting list, accessibility of dental facilities, and dental insurance. Parents and guardians must increase their understanding of the use of dental services, particularly

preventative services.

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Data availability statement

Data included in article/supp. Material/referenced in article.

CRediT authorship contribution statement

Khalid Alkhurayji: Writing – original draft, Project administration, Methodology, Investigation, Conceptualization. **Sultan Aldakhil:** Writing – original draft, Data curation, Conceptualization. **Abdulziz Alotaibi:** Writing – review & editing, Methodology, Investigation. **Rayan Aldalan:** Writing – original draft, Resources, Methodology. **Sachin Naik:** Writing – review & editing, Software, Formal analysis. **Abdulaziz Abdullah Al-Kheraif:** Writing – review & editing, Validation, Supervision. **Sara Kalagi:** Writing – review & editing, Validation, Software. **Sanjeev B. khanagar:** Writing – original draft, Visualization, Validation, Investigation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2023.e23277.

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