

Parents' Awareness towards First Permanent Molars and Its Effect on Caries Experience among Children

Mustafa W. Al-Kubaisi¹, Basma Abdulbari Aziz², Huda M. Al-Badri³, Zainab M. Mansi¹

¹College of Dentistry, Dijlan University, Baghdad, Iraq

²College of Dentistry, Aliraqia University, Baghdad, Iraq

³College of Dentistry, AlShaab University, Baghdad, Iraq

Abstract

The first permanent molars (FPMs) are important for the establishment of occlusion and long-term oral health, but they are also very susceptible to early caries because of their early emergence and the frequent confusion by parents. This study aimed to assess parents' knowledge of FPMs and how it correlated with their level of education and their children's caries experiences in Baghdad, Iraq, between ages of 6 and 9. 305 students and their parents were surveyed in a cross-sectional study that carried out in Baghdad's public and private schools. A uniform Arabic questionnaire measuring sociodemographic traits was used for collecting data. Oral health behaviours, and FPM-related knowledge. The DMFT index was used in clinical tests to evaluate FPMs' caries experience. Using logistic and multivariate linear regression models, associations were investigated. While 19.4% of parents were able to identify the anatomical position of FPMs, only 39.1% were able to accurately determine when they would erupt. Lower DMFT scores in children were significantly associated with higher levels of parental education ($p < 0.05$). The associations between parental education and FPM-specific knowledge and oral health behaviors were insignificant, nevertheless. There were significant gaps in specific knowledge about FPMs, despite the fact reported tooth-brushing was common. The lack of a strong association between parental knowledge of FPMs and educational attainment highlights the importance of school-based oral health programs to minimize the risk of early caries and enhance children's future outcomes.

Open Access

Citation: Al-Kubaisi MW et al. (2026) Parents' Awareness towards First Permanent Molars and Its Effect on Caries Experience among Children. Dentistry 3000. 1:a001
doi:10.5195/d3000.2026.1599

Received: July 14, 2026

Accepted: September 18, 2026

Published: September 22, 2026

Copyright: ©2026 Al-Kubaisi MW et al. This is an open access article licensed under a Creative Commons Attribution Work 4.0 United States License

Email: Zainab.mah@duc.edu.iq

Introduction

Functional occlusion as well as good oral health in longevity are brought up by the first permanent molars (FPMs) [1]. Their an essential part in guiding occlusal development, preserving arch integrity, and promoting craniofacial growth are made apparent by the fact that they are the first permanent teeth to erupt, usually between the ages of 5 and 6 [2]. Their vertical occlusion, masticatory efficiency, and space maintenance for subsequent permanent dentition are significantly affected by

their anatomical position, occlusal morphology, and root structure. Therefore, children's nutritional situation and systemic health have a significant association with the functional integrity of FPMs [3]. During the early post-eruptive stage, FPMs are at greater risk to dental caries, despite the vital part of these teeth [4]. This higher risk is caused by a combination of factors. When first premolars grow in, it is during the mixed dentition phase, when the majority of individuals lack enough attention to

their oral hygiene and ingest a lot of desserts [5].

Deep fractures and pits on the occlusal surfaces additionally promote bacteria to colonize and build up plaque [6]. Because of their posterior position, they are considerably more difficult for carers to locate early and clean properly. Premature tooth loss, malocclusion, midline discrepancies, and impaired mandibular development are some of the adverse effects that can occur from untreated caries in FPMs. This risk can be particularly significant

for approximal surfaces during the first four to five years after eruption [7]. These results show just how vital it is to commence preventative measures and clinical management promptly. Key factors in the prevention and early management of FPM caries include parental awareness and knowledge [8]. The duration, location, and clinical effects of FPM eruptions are not well-known by many parents, according to the results of the study. Because of their posterior position and early eruption, these teeth are frequently misinterpreted for primary teeth [9]. The impact of preventative care decreases because people with these misconceptions generally delay dental consultation until they have pain or have developed advanced disease. While it appears that children from families with higher socioeconomic status and levels of education tend to have better dental health outcomes [8,10]. It is also evident that formal education cannot ensure proper oral health literacy, especially when it comes to developmental milestones like the eruption of the first premolar tooth. Dietary modifications, fluoride therapy, and fissure sealants are some of most well-established and evidence-based methods for preventing dental caries [11,12]. However, it is essential for parents to be aware of them, participate, and consider the use of dental services when necessary to allow them to be effective.

Therefore, strengthening parental knowledge remains a cornerstone in reducing early childhood caries, particularly in high-risk populations. Despite the well-documented importance of first permanent molars and the recognized role of parental awareness in caries prevention, there is a paucity of region-specific data assessing parental knowledge of FPMs and its direct association with children's caries experience, particularly in Middle Eastern populations. There is a lack of data in Iraq on the topics of parental education level, FPM eruption and care, and the impact of this knowledge on children's clinical outcomes. Furthermore, previous studies have often evaluated parental knowledge or caries prevalence independently, with insufficient integration of both factors within the same analytical framework. Therefore, this study aims to evaluating parental awareness of FPMs in relation to educational level and examining its association with the caries experience of their children in Baghdad.

Material and Methods

A total of 305 parents and children in Baghdad, Iraq, ranging in age from 6 to 9 years old, participated in this cross-sectional study. To get an appropriate cross-section of socioeconomic backgrounds, we surveyed students at one

public and two private primary schools. A clinical dental examination and a parent-driven questionnaire were the two components of the study.

Study Instrument

The questionnaire was designed in Arabic for linguistic clarity and cultural relevance to the target audience. It had 10 closed ended components divided into two groups.

Section 1: Sociodemographic and Behavioral Characteristics

In this part, we asked parents about their education level (college-educated vs. non-college-educated), the frequency that their children visited to the dentist, whether they had fluoride treated professionally, as well as how frequently they brushed their teeth.

Section 2: Parental Knowledge of First Permanent Molars (FPMs)

In this part, we assessed parents' knowledge of several topics, including whether they can identify the first permanent tooth to erupt, when those first molars are likely to erupt, whether or not the exfoliation of a primary tooth is necessary for their eruption, and where those teeth are anatomically located within the dental arch.

Dental Examination

Trained examiners examined all the children who participated in the study orally. School headmasters were properly informed and provided permission to write before the examinations. In a natural daylight condition, evaluations took place on regular classroom chairs. In accordance with guidelines given out by the World Health Organization in their Basic Methods for Oral Health Surveys (1987), the DMFT index was used to determine the extent of dental caries in the first permanent molars. We used a dental explorer and a plain mouth mirror for detection. In cases when the diagnosis failed to prove, the tooth was marked as sound. Primary care clinics and specialized oral health clinics in that region were made available to patients who needed treatment. Educating children how to care properly for their teeth was also a part of the study's preventative measures.

Statistical Analysis

With the aid of SPSS, version 17 (IBM Corp., Armonk, NY, USA), the data were analyzed. Parental education level, oral health practices of children, and parental knowledge of first permanent molars (FPMs) were summarized using descriptive statistics. The frequencies and percentages were used to report the categorical variables. Using a multiple linear regression analysis with the DMFT score of the first permanent molars as the dependent variable, we evaluated the association between parental educational level (college vs. non-college) and children's dental caries experience. The

unstandardized regression coefficients (B) and 95% confidence intervals (CI) were used to express the results. In addition, by using binary logistic regression analysis, the higher levels of parental education were associated with better oral health behaviors and knowledge, including more frequent dental examinations, prolonged periods of fluoride use, and a precise knowledge of the age, sequence, and anatomical position of FPM eruptions. With 95% confidence intervals, the results were provided as odds ratios (ORs). A p-value less than 0.05 was considered statistically significant.

Ethical Considerations

The study protocol was approved by the relevant ethics committee at (163) was obtained from the ethical committee at the dentistry department of Dijlah University College on October 2024. Oral informed consent was obtained from all participating parents prior to data collection. Confidentiality and anonymity of all participants were maintained throughout the study.

Results

The study sample consisted of 304 parents. The DMFT score of first permanent molars (FPMs) varied from 0 to 4 and most children (61.1%) had a DMFT score of 0 (Table 1). Only 7.5% of children had the maximum score of 4.

Table 2 shows the descriptive statistics of the questionnaire answers. Among the participants 29.9% of fathers and 63.3% of mothers had college level education. As far as preventive behaviours are involved, 56.6% of parents reported taking their child to the dentist, however just 34.8% reported fluoride application. 85.5% of respondents claimed that they brushed their teeth regularly.

Regarding knowledge of first permanent molars (FPMs), the age of eruption was accurately identified by only 39.1% of parents. Furthermore, 39.1% correctly mentioned that FPMs arise without shedding of a primary tooth. Knowledge of the eruption site was particularly low, as just 19.4% of participants provided the proper answer.

The multiple linear regression analysis (Table 3) demonstrated that maternal and father education had a significant relationship with DMFT scores. After mutual adjustment, maternal university education was linked with a significantly less DMFT score ($B = -0.84$, $p < 0.001$), while the reduction associated with paternal university education was smaller but still significant ($B = -0.38$, $p = 0.048$).

Table 4 presents correlations between parental education and oral health behaviours and knowledge. Logistic regression analysis showed that fathers with a college-level education were significantly more likely to correctly determine the eruption site of FPMs ($OR = 3.3$;

95% CI: 1.2–9.3; $p = 0.01$). However, no other variables such as dental visits, fluoride application or awareness of eruption age and timing were significantly associated with parental education ($p > 0.05$, for all).

Discussion

This study was designed to investigate the association between parents' knowledge about their children's first permanent molars (FPMs), their attitudes toward oral health, and the prevalence of caries in Baghdadi children ages 6 to 9. There is a significant gap between oral hygiene practices and actual parental knowledge regarding FPMs, which has significant implications for strategies to prevent the development of FPMs in children's oral health.

The result showed that although a high proportion of parents reported that their children practiced daily toothbrushing (85.5%), overall parental knowledge, attitudes, and practices (KAP) concerning FPMs were inadequate. Only 39.1% of parents correctly identified the typical eruption age of FPMs and recognized that these teeth erupt without the exfoliation of primary teeth. Furthermore, a notably smaller proportion (19.4%) were able to correctly identify the anatomical location of these teeth. These findings are consistent with previous studies conducted in similar contexts, which have documented widespread misconceptions about the timing, eruption pattern, and significance of FPMs [13]. These misdiagnose FPMs as deciduous teeth, which may postpone preventive measures and increase the possibilities of early caries, malocclusion, and loss of teeth [14].

Despite over half of the mothers in this study attaining a college-level education (63.3%), this did not uniformly equate with better knowledge of oral health or behavior. Father's education was the only significant factor associated with awareness in one focused area (responding correctly to the FPM eruption site). Previous studies demonstrated that general education may not be sufficient to improve parents' overall oral health literacy, and this limited relationship is in accordance with such findings. This finding supports the requirement for relationship education that involves a more targeted, dental-driven technique for linking general knowledge with behavior [15].

Most importantly, a multiple linear regression analysis demonstrated a significant relationship between lower levels of DMFT and both paternal and maternal education. Consistent with this result, Emmanuelli et al study found that parents with higher levels of education are more likely to encourage caries-protective factors like better nutrition, regular dental screenings, and early intervention (16). A significant

insight from the variation between reported and actual caries prevalence is that formal education may have a protective effect via more health-conscious decision-making and behaviors rather than just direct knowledge. Previous studies has indicated that parents with a higher level of education may be more willing to invest in high-quality oral hygiene products, make certain their children get periodic dental examinations, and provide a healthier diet [17].

Although preventive measures including administering fluoride and planning periodic oral examinations are known to reduce the incidence of dental caries [18]. Possible causes of these gaps in practice include an absence of knowledge about the necessity of preventive dental care, a lack of accessible and affordable dental services, or lack of awareness of a demand for such treatments. While many people brush their teeth daily, not enough people use fluoride or undergo specialized interventions, especially in low- and middle-income areas, according to studies by Tsang et al. [19] and Huang et al. [20]. Findings from this study provide support to the idea that programs aimed at improving oral health should be adopted in both the community and educational institutions. Parents can clarify the importance of FPM and the necessity to maintain them for a longer period of time through parent-directed educational interventions Dental caries is more common in primary school-aged children, but school dental programs that use fluoride, fissure sealants, and routine exams have successfully reduced the incidence of this condition [21]. Furthermore, cultural and social and economic factors influencing oral health should be addressed in public health strategies. Care and educational possibilities are more scarce for parents from lower socioeconomic origins [22]. Because of this, it's essential to focus programs for outreach on neglected communities. Oral health results may also be impacted by early life obstacles, as demonstrated by longitudinal studies [7,23].

Conclusion

The results indicate that parents lack knowledge sufficiently about oral health, which emphasizes the need to provide them with culturally appropriate knowledge on the significance of first permanent molars. A possible strategy to improve the long-term oral health of children and reduce the prevalence of preventative dental caries is to involve parents in school-based oral health activities.

Strengths and Limitations

Large sample size as well as focus on an underappreciated yet important part of children's dental health are two of the study's strongest aspects. The study provides insight to

understanding of parental involvement in oral health by including both knowledge-based and behavior-based variables. However, there are a few limitations that need to be mentioned. First, the cross-sectional design precludes causal inference. Secondly, as it involves responses on preventative actions like taking care of teeth, responses based on personal data could add social desirability bias. Thirdly, parents' knowledge and access to oral health information may have been under-or overestimated based on education level, which was used as an alternative for health literacy.

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.

Source of Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of Interests

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.

Authorship Contribution Statement

M.L.A.: conceptualization, methodology, software; B.A.A.: data curation, writing, original draft preparation; Z.M.M.: visualization, investigation; M.L.A.: Supervision, H.M.A.: software, validation; M.L.A.: writing, reviewing and editing.

Declaration of Generative AI in Scientific Writing

The author used ChatGPT solely for minor language editing and proofreading purposes. All scientific content, analysis, and conclusions were developed and verified by the author.

References

1. Taylor GD, Bulmer V. Advances in knowledge and practice benefiting the health and management of first permanent molars in children. *British Dental Journal*. 2025;238(2):92-8.
2. Hamza M, Chlyah A, Bousfiha B. Pathology and Abnormality of the First Permanent Molar among. *Human Teeth: Key Skills and Clinical Illustrations*. 2020:165.
3. Syukra A. Nutrition Status Correlated to the First Permanent Mandibular Molar Teeth of Elementary School Children in Lintau Buo, Tanah Datar Regency, West-sumatra.

Indonesian Journal of Biomedical Science. 2013;6(2):224784.

4. Nazir MA, Bakhurji E, Gaffar BO, Al-Ansari A, Al-Khalifa KS. First permanent molar caries and its association with carious lesions in other permanent teeth. *J Clin Diagn Res*. 2019;13(1):36-9.

5. Guerra BMdS, Reis PPGd, Jorge RC, Soviero VM. Risk factors associated with occlusal caries in first permanent molars in a school program: longitudinal study. *Brazilian Journal of Oral Sciences*. 2024;23:e243595.

6. Carvalho JC. Caries process on occlusal surfaces: evolving evidence and understanding. *Caries research*. 2014;48(4):339-46.

7. Lynch RJ. The primary and mixed dentition, post-eruptive enamel maturation and dental caries: a review. *International dental journal*. 2013;63:3-13.

8. Mohammed Al-Dahan H, Ali Ismael S. Early childhood caries: parents' knowledge, attitude and practice towards its prevention in refugee camps in Erbil, Iraq. *BMC Oral Health*. 2023;23(1):792.

9. Heydari A, Shahrabi M, Shafizadeh M, Anaraki EA, Aref M. Parental knowledge and awareness of the first permanent molar. *International journal of clinical pediatric dentistry*. 2018;11(5):382.

10. Theristopoulos A, Agouropoulos A, Seremidi K, Gizani S, Papaioannou W. The effect of socio-economic status on children's dental health. *Journal of Clinical Pediatric Dentistry*. 2024;48(4).

11. Wright JT, Crall JJ, Fontana M, Gillette EJ, Nový BB, Dhar V, et al. Evidence-based

clinical practice guideline for the use of pit-and-fissure sealants: a report of the American Dental Association and the American Academy of Pediatric Dentistry. *The Journal of the American Dental Association*. 2016;147(8):672-82. e12.

12. Al-Badri HM, Mansi ZM, Alhashimi RA. A Questionnaire-Based Survey Assessment of Iraqi Dentists Using Repair Versus Replacement of Defective Composite Restoration. *Indian Journal of Forensic Medicine & Toxicology*. 2020;14(2).

13. Mendoza-Hernández Y, Morales-Chávez M. Caries and premature loss of the first permanent molar in grade school children, and parents' knowledge level, in Vargas state, Venezuela. *J oral res(Impresa)*. 2019:166-72.

14. Cianetti S, Lombardo G, Lupatelli E, Rossi G, Abraha I, Pagano S, et al. Dental caries, parents educational level, family income and dental service attendance among children in Italy. *Eur J Paediatr Dent*. 2017;18(1):15-8.

15. Shields C. Startle and illuminate: Carol shields on writing: Random House Canada; 2016.

16. Emmanuelli B, Knorst JK, Menegazzo GR, Mendes FM, Ardenghi TM. Dental caries prediction and the indication of pit and fissure sealant in children first permanent molars: a prospective study. *Journal of Dentistry*. 2023;135:104557.

17. Bakar A, Ningrum V, Lee A, Hsu W-K, Amalia R, Dewanto I, et al. Structural equation modelling of the complex relationship between toothache and its associated factors among Indonesian children. *Scientific Reports*. 2020;10(1):13567.

18. Horri A, Poureslami HR, Jahanimoghadam F, Sharifi A. Preventive methods of dental caries is a problem of most general practitioners yet: A survey of knowledge, attitude and practice. *Journal of Oral Health and Oral Epidemiology*. 2016;5(4):198-204.

19. Tsang C, Sokal-Gutierrez K, Patel P, Lewis B, Huang D, Ronsin K, et al. Early childhood oral health and nutrition in urban and rural Nepal. *International journal of environmental research and public health*. 2019;16(14):2456.

20. Huang D, Sokal-Gutierrez K, Chung K, Lin W, Khanh LN, Chung R, et al. Maternal and child nutrition and oral health in urban Vietnam. *International journal of environmental research and public health*. 2019;16(14):2579.

21. Farjaminejad R, Farjaminejad S, Garcia-Godoy F, Jalali M. The Role of Bioactive Glasses in Caries Prevention and Enamel Remineralization. *Applied Sciences*. 2025;15(24):13157.

22. Almajed OS, Aljouie AA, Alharbi MS, Alsulaimi LM, Aljouie A, ALHARBI M, et al. The impact of socioeconomic factors on pediatric oral health: a review. *Cureus*. 2024;16(2).

23. Celeste RK, Eyjólfsson HS, Lennartsson C, Fritzell J. Socioeconomic life course models and oral health: a longitudinal analysis. *Journal of dental research*. 2020;99(3):257-63.

Table 1. The DMFT of the study participants.

DMFT of First Permanent Molar	N (%)
0	188 (61.1)
1	41 (13.4)
2	36 (11.8)
3	17 (5.6)
4	23 (7.5)

Table 2. The participants response to the questionnaire.

Questionnaire variables	Answers	N (%)
Father education	College	91 (29.9)
	Non-college	213 (70.1)
Mother education	College	193 (63.3)
	Non-college	112 (36.7)
Dental visits	Yes	172 (34.8)
	No	132 (43.4)
Fluoride application	Yes	106 (34.8)
	No	199 (65.2)
Regular toothbrushing	Yes	260 (85.5)
	No	43 (14.5)
First permanent tooth erupt	Right answer	119 (39.1)
	Wrong answer	185 (60.9)
The age of first permanent molar eruption	Right answer	119 (39.1)
	Wrong answer	185 (60.9)
Primary tooth shedding before Molar eruption	Right answer	158 (52)
	Wrong answer	146 (48)
First molar eruption area	Right answer	59 (19.4)
	Wrong answer	245 (80.6)

Table 3. Multiple linear regression analysis of parental education and DMFT scores.

Predictors	B	Std. Error	t		Lower Bound	Upper Bound
Fathers' education	-0.38	0.1	-1.9	0.04	-0.7	-0.003
Mothers' education	-0.84	0.1	-4.5	<0.001	-1.2	-0.4

Table 4. The association of parent's education with different behaviors.

	OR	95% CI	P-value*
Visiting the dentist			
Father Education (College level)	0.6	0.3-1.1	0.1
Mother Education (College level)	0.7	0.3-1.4	0.3
Fluoride application			
Father Education (College level)	0.6	0.3-1.3	0.2
Mother Education (College level)	0.8	0.4-1.6	0.6
Age of first molar eruption			
Father Education (College level)	1.8	0.9-3.7	0.09
Mother Education (College level)	1.5	0.8-3.1	0.1
Primary tooth shedding before Molar eruption			
Father Education (College level)	0.7	0.5-2.2	0.7
Mother Education (College level)	0.1	0.8-3.1	0.1
First molar eruption area			
Father Education (College level)	3.3	1.2-9.3	0.01
Mother Education (College level)	1.2	0.5-2.8	0.6

*Binary Logistic Regression.