

Parental knowledge on prevention of caries in children and the efficacy of a leaflet intervention.

Rawan Elkarmi (✉ rawankarmi@yahoo.com)

The University of Jordan <https://orcid.org/0000-0002-7514-9649>

Ahmad AlJafari

The University of Jordan Faculty of Dentistry: The University of Jordan School of Dentistry

Sarah Haddad

The University of Jordan Faculty of Dentistry: The University of Jordan School of Dentistry

Dina ALSoud

The University of Jordan Faculty of Dentistry: The University of Jordan School of Dentistry

Research article

Keywords: Caries prevention, parental knowledge, education, leaflet

Posted Date: February 15th, 2022

DOI: <https://doi.org/10.21203/rs.3.rs-1317416/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background

Parental education on child oral health has an important role in caries prevention. Leaflets are a means of delivering educational messages. The study aims to evaluate the efficacy of leaflets in improving parental knowledge on prevention of caries in children.

Methods

A cross-sectional study. Parents attending with their children to a pediatric clinic at a large hospital were asked to complete a questionnaire that noted their sociodemographic characteristics, oral hygiene practices, and knowledge on prevention of caries in children. Their knowledge on caries prevention in children was given a score out of 20. After reading an educational leaflet covering the main aspects of caries prevention, a follow up phone interview was conducted one month later to evaluate any improvement in parental knowledge. ANOVA and McNemar's tests were used for statistical analysis.

Results

391 parents participated in the study. The average knowledge score pre-intervention was 6.4 out of 20. There was no significant association between any of the sociodemographic variables and pre-intervention knowledge scores. 10.8% of parents were regular dental attenders. Around 12% of parents were aware of the age of the child at the first dental visit and the correct age to start toothbrushing; 20.5% knew about fluoride varnish; 7.2% understood that sugar containing snacks should be consumed at once; and less than 50% believed that regular dental visits prevent caries. After reading the leaflet there was a statistically significant improvement in almost all variables evaluating parents' knowledge on caries prevention in children.

Conclusion

Knowledge on prevention of caries in children among this sample of parents is very poor. Leaflets were successful in improving parental knowledge. There is a need to implement such leaflets in healthcare centers and hospitals and to further evaluate their efficacy by comparison with other means.

Background

Tooth decay is one of the most prevalent diseases in humans, affecting 97% of the population worldwide (Berg 2006). It is defined as a "biofilm-mediated, sugar-driven, multifactorial, dynamic disease that results in the phasic demineralization and remineralization of dental hard tissues" (Berg 2006). Early childhood caries (ECC) is the term adopted to describe any carious lesion in a child younger than 6 years of age (<http://www.AAPD.org/policies>). ECC is considered the most common chronic infectious disease in childhood (Tinanoff and Reisine 2009). In recent years, the main emphasis in dentistry has shifted from treatment and repair to prevention (Lee 2013), hence the importance of oral health education and diet

advice incorporation into each child's developmental visit from the age of 12 months and at any appropriate opportunity that arises (<http://www.AAPD.org/policies>).

In the Jordanian population, caries prevalence was found to be 76.4% and 45.5% in 6 and 12-year-olds respectively (Rajab et al., 2014). This could be attributed to multiple factors especially the socio-economic status of families as well as the educational level of caregivers (Rajab et al., 2014). Poor oral hygiene practices, irregular dental attendance, and caries conducive habits in infants and children are all factors that were shown to be correlated with the high levels of caries among Jordanian children (Sayegh et al., 2005).

The environment in which a child develops tremendously affects their habits including their oral hygiene and oral health practices. It has been shown that poor oral health related knowledge and attitudes of parents were associated with higher caries experience in infants and young children (Naidu and Davis 2008). On the other hand, parental education on oral health was effective in reducing caries incidence in their children (Kulkarni 2013; Plutzer and Spencer 2008).

In a previous study conducted in one of the largest hospitals in Jordan, expectant mothers lacked basic knowledge on ECC prevention (ElKarmi et al., 2019).. In the same study mothers suggested leaflets as their favored means for oral health education delivery. Traditional education leaflets were shown to be more effective than E-applications in improving oral health knowledge and oral hygiene among 10–11-year-old Syrian children (Al Bardaweel and Dashash 2018).

Our study aimed to evaluate parental knowledge on prevention of caries in children, and to evaluate the efficacy of an oral health education leaflet in improving this knowledge.

Methods

This is a prospective cross-sectional study with an intervention that took place in the pediatric clinics of x x x x x x x x x x x x x x x x. Ethical approval was obtained from the ethics Committee at x x x x x x x x x. Data collection was done over 4 consecutive weeks. Participants were parents of children aged 3-8 years attending the pediatric clinic for assessment and management of general health conditions. According to a sample size calculation equation, a sample of 380 participants has been determined to achieve a 95% confidence level in the participants' answers with a 5% margin of error. Four hundred twenty-eight parents were approached and consented to take part in the study. Those who agreed signed a consent form and filled a questionnaire evaluating their knowledge on caries prevention in children.

The questionnaire was based on a previous study by one of the authors (ElKarmi et al., 2019) and slightly modified to fit the new sample. The questionnaire included 6 sections. Section 1: educational and socioeconomical levels of parent and their oral hygiene habits; section 2: parental knowledge on child's dental development, first dental visit, and fluoride varnish; section 3: parental knowledge of oral hygiene habits in children; section 4: parental knowledge of caries conducive dietary practices; section 5: parental attitudes towards child's oral and dental health; section 6: parental attitudes towards treats and rewards.

Twenty questions from the questionnaire were used to generate a knowledge score. Each question was given a score of either 1 or 0 being consistent or not with the current American Academy of Pediatric Dentistry (AAPD) guidelines and pediatric dental literature related to ECC (Public Health England 2014). A highest knowledge score would be 20 and a lowest score would be 0. After completing the questionnaire participants were provided with a leaflet designed by the research team to cover the main aspects of ECC prevention in a simple and easy to read manner. The leaflet was piloted by a group of parents and modified accordingly. It included information about the recommended age at the first dental visit, and proper oral hygiene and dietary practices. One month later, all participants were contacted by phone and asked to participate in a follow up interview to re-evaluate their child related oral health knowledge. Eleven knowledge questions from the original questionnaire were asked over the phone to cover the main aspects of ECC prevention.

Data was processed and analyzed using SPSS statistical program (version 22). ANOVA test was used to study the correlation between knowledge scores and sociodemographic variables. McNemar's test was used to study the difference in parental knowledge before and after reading the leaflets. The level of significance was set at $P \leq 0.05$.

Table 1 shows all the questions included in the questionnaire. The questions used for the knowledge score are highlighted and those re-evaluated over the phone interview are underlined.

Table 1
The questionnaire

<p>1- Demographic data and self-reported oral hygiene practices of parents</p> <ul style="list-style-type: none">● Relationship to child● Age● Educational level● Area of residence● Number of children● Presence of children with special health care needs● Frequency of toothbrushing● Knowledge of fluoride concentration in toothpaste● Frequency of dental visits● Reason for the last dental visit
<p>2- Parental knowledge on child's dental development, first dental visit, and fluoride varnish.</p> <ul style="list-style-type: none">● Knowledge of eruption time of first primary tooth● Knowledge of eruption time of first permanent tooth● Are all permanent teeth preceded by primary teeth?● Knowledge of fluoride varnish● Knowledge of the child's age at the first dental visit
<p>3- Parental knowledge of oral hygiene habits in children.</p> <ul style="list-style-type: none">● Age to start brushing with a toothpaste● Frequency of brushing /day● Amount of toothpaste used for a 3 year-old or younger● Best time to brush● Age up to which toothbrushing should be supervised

4- Parental knowledge of caries conducive dietary practices

- Ideal number of sugar-containing foods per day
- Best time to eat sugary snacks
- Is it better to divide snacks or have them all at once?
- Recommended age to stop bottle feeding
- Is giving the child a baby bottle throughout the night a cariogenic behavior?
- Is consuming fresh juice from a bottle a cariogenic behavior?
- Does breast milk contain sugar?

5- Parental attitudes towards child's oral and dental health.

- Does regular toothbrushing prevents caries?
- Do regular dental visits prevent caries?
- Are primary teeth important for the child?

6- Parental attitude towards treats and rewards

- Methods to reward children after dental visits.
- Parents' response to child wanting sugary snacks.
- Knowledge of sugar containing foods/drinks (Chocolate/ biscuit/ soda/natural juices/artificial juices) and non-cariogenic alternatives.

Results

Four-hundred and twenty-eight parents were approached and 391 agreed to participate in the study and completed the questionnaire giving a response rate of 91.4%. Of the participants, 293 (74.9%) were mothers, 86 (22%) were fathers, and the rest N=12 (3.1%) was either grandparents or uncles/aunts who are the primary caregivers of the child.

The average knowledge score was 6.4 out of 20. The highest score was 15 and the lowest score was 2. Table 2 shows the demographic distribution of parents in relation to their knowledge scores on prevention of caries in children. There were no statistically significant associations between any of the sociodemographic variables of the participants and their knowledge scores. The participants' attitudes towards their own oral health were reported as follows; 51.2% of parents (N=203) brushed twice or more per day, 2.6% (N=10) were aware of the fluoride concentration in the toothpaste they used; 84% (N=329) visited the dentist only when problems occurred, 10.8% (N=42) were regular dental attenders, 5% (N=20) have never been to the dentist before; 91.6% (N=340) reported pain/infection as the reason for the last dental visit and 8.4% (N=31) attended for checkup. Table 3 shows the questions used for generating the knowledge score, the correct answers, and the number and percentage of parents with correct answers.

Table 2
Distribution of socio-demographic variables of parents by their knowledge score.

Variable	N (%)	Average Knowledge score	P value
Age group	1 (0.3%)	5.4	0.59
o <20	91 (23.3%)	5.9	
o 20-29	180 (46%)	6.5	
o 30-39	98 (25%)	6.8	
o 40-49	21 (5.4%)	6.1	
o >50			
Education	68 (17.4%)	6	0.13
o Did not finish high school	185 (47.3%)	6.4	
o High school	127 (32.5%)	6.7	
o Collage education	11 (2.8%)	6.3	
o Postgraduate education			
Area of residence	147 (37.6%)	4.9	0.99
o North	119 (30.4%)	8.1	
o Capital	107 (27.4%)	6.7	
o Middle	18 (4.6%)	5.8	
o South			
Number of children	35 (9%)	5.9	0.48
o 1	90 (23%)	6.5	
o 2	76 (19.4%)	6.6	
o 3	190 (48.6%)	6.8	
o 4 or more			
Having a child with special healthcare needs	58 (14.8%)	6.3	0.99
o Yes	333 (85.1%)	6.4	
o No			

Table 3
Distribution of parents (N=391) according to their answers to each knowledge question

Question Number	Question	Correct answer [‡]	Number of parents with correct answers (%)
1	Child's first dental visit	At 1 year	46 (11.7%)
2	Age to start brushing	With eruption of the first primary tooth	45 (11.5%)
3	Frequency of brushing /day	Twice daily or more	265 (67.8%)
4	Amount of toothpaste used for a 3 year-old or younger	Smear or rice size	198 (50.6%)
5	Best time to brush	At night (before bedtime)	201 (51.4%)
6	Toothbrushing should be supervised up to which age	At least 7 years	111 (28.4%)
7	Ideal number of sugar-containing foods per day	3-4 times daily	72 (18.4%)
8	Best time to eat sugary snacks	Right after main meals	61 (15.6%)
9	Is it better to divide snacks or have them all at once	All at once	28 (7.2%)
10	First primary tooth eruption time	0-6 months.	220 (56.3%)
11	First permanent tooth eruption time	6-7 years of age.	128 (32.7%)
12	Are all permanent teeth preceded by primary teeth?	No	78 (19.9%)
13	Knowledge of fluoride varnish	Yes	80 (20.5%)
14	Recommended age to stop bottle feeding	12-18 months of age	132 (33.8%)
15	Regular tooth brushing prevents caries	Yes	233 (59.6%)
16	Regular dental visits prevent caries	Yes	192 (49.1%)
17	Primary teeth are important for the child	Yes	121 (30.9%)
18	Breast milk contains sugar	Yes	84 (21.5%)
19	Giving the child a baby bottle throughout the night is a cariogenic behavior	Yes	95 (24.3%)

[‡]References 2, 12

Question Number	Question	Correct answer ^d	Number of parents with correct answers (%)
20	Consuming fresh juice from a bottle is a cariogenic behavior	Yes	100 (25.6%)
References 2, 12			

The questionnaire also included questions related to parental attitude towards rewarding their children after dental visits (section 6 in the questionnaire). The methods used by parents were as follows: 228 (58.3%) would give sugar containing snacks, 98 (25.1%) would buy toys, 42 (10.7%) would take them to play areas and 23 (5.9%) would use encouraging words. When children asked for a snack between meals 367 (93.8%) parents reported giving their children either confectionery, juice, or chips. As an alternative 214 parents (54.7%) would offer fruits, 132 (33.8%) would offer vegetables, and 45 (11.5%) would give them popcorn. Participants were asked whether some foods/drinks contained sugar or not and figure 1 shows the percentage of parents with correct knowledge in this regard.

One-hundred five parents (27% of the original sample) were available and agreed to participate in the phone interview. They were asked 11 questions from the original questionnaire to cover the main aspects of ECC prevention. Figure 2 shows the difference in the percentage of parents with correct knowledge before and after reading the leaflet. The difference in the knowledge was statistically significant for all questions except for the knowledge of the frequency of tooth brushing and the knowledge of the amount of toothpaste used for a child aged 3 years and younger where the knowledge improved but not to a statistically significant level.

At the end of the phone interview parents were asked to report their preferred method for delivering oral health education messages. Forty-four (42%) chose leaflets, 30 (28.5%) preferred social media, 15 (14.3%) preferred face-to-face visits, 11(10.4%) preferred television shows, and 5 (4.8%) preferred phone calls.

Discussion

The results of this study show that the group of participating parents lack basic child related oral health knowledge. The results are consistent with findings from countries around the world conducting similar research (AlYahya 2016; Niadu and Nunn 2020).

The response rate is high (91.4%) indicating that parents are willing to participate in research and enthusiastic about improving their knowledge. Most caregivers accompanying children to their healthcare visits are mothers (74.9%). The majority of mothers in Jordan (86%) were never employed making most of them housewives responsible for most educational and medical issues of their children (Department of statistics (2018)).

The average knowledge score is 6.4 out of 20 which is very low and not even close to a passing score. Parents' knowledge is poor in most aspects of child related oral health; for example, only 11.7% of parents know that a child's first dental visit should be around his/her first birthday and a similar percentage know that tooth brushing should start with the eruption of the first tooth (Public Health England 2014). Although 67.8% of parents realize that children's teeth should be brushed twice a day, only half are aware that night-time is the best time for toothbrushing (<http://www.AAPD.org/policies>). Surprisingly, only 28.4% of parents recognize that tooth brushing should be supervised up to at least 7 years of age and most parents think that their children can efficiently brush on their own from about 3 years of age. Only 20.5% of participants are aware of fluoride varnish and its well-established role in caries prevention (Marinho et al., 2009). Parental knowledge regarding anticariogenic dietary practices is not better. Only 18.4% of parents recognize that 3-4 sugar intakes per day is ideal. Most parents believe that 1-2 sugar containing foods or drinks per day is ideal. This result might be affected by social desirability bias where participants will answer questions in a way they think will be favored by others. What is even worse is that only a few parents (15.6%) understand that the best time to have a sugar containing snack is after a main meal and fewer parents (7.2%) believe that sugary foods/drinks should be consumed at once. Most parents think that sugar containing foods/drinks should be divided into portions and consumed over the day and between meals. It is well known that frequent in-between meal consumption of sugar-added snacks or drinks (e.g., juice, formula, soda) increase the risk of caries (Tinanoff and Palmer 2000). Avoiding frequent consumption of juice or other sugar-containing drinks and limiting cariogenic foods to mealtimes are among the recommendation for preschool children based on the principles of cariology (Tinanoff and Palmer 2000). Only 33.8% of parents think that bottle feeding should stop between 12 and 18 months of age. The majority believe that children can safely continue bottle feeding, even at night, until 3 years of age. Moreover, only 21.5% of parents believe that breast milk contains sugar, and around a quarter understand that consuming milk throughout the night or consuming fresh juice from a bottle are cariogenic behaviors. It is well documented that bottle feeding at night, frequent bottle feeding during the day, and late weaning can lead to caries (Harris et al., 2004).

Regarding dental development, a little more than half (56.3%) know that the first primary tooth erupts at around 6 months of age. This percentage drops to (32.7%) when it comes to the eruption time of the first permanent tooth. Unfortunately, only 19.9% of parents understand that not all permanent teeth are preceded by primary teeth. This combined with the poor knowledge of the eruption time of the first permanent tooth explains the high percentage of caries seen in first permanent molars in 7- 8-year-old children (Al Dossary et al., 2018). Parents are usually surprised that their child has caries in a permanent molar when they are sure that no primary molar has exfoliated before. Improving parental knowledge in this regard is very important to help prevent caries in newly erupting first permanent molars.

Parental attitudes towards child's oral health are generally unfavorable. Around 60% of parents believe that regular tooth brushing prevents caries. Half think that regular dental visits can prevent caries and only 31% agree that primary teeth are important to the child.

Dental visits for treatment of caries are likely to be a stressful experience to children and their parents as dental fear and anxiety are common among children and adolescent and is related to pain (Shim et al., 2015). To help children get through those visits successfully and achieve the desired outcome, parents sometimes use rewards. As a reward, more than half (58.3%) of parents in this study report giving their children a sugar containing snack. Although 79% and 65.2% of parents realize that chocolate and fizzy drinks contain sugar respectively, only 30.4% are aware of the cariogenic potential of biscuits. A little more than half (54%) think that artificial juice has sugar and only 5.6% recognize that fresh juice has sugar. Between meals, most parents (93.8%) report giving their children either confectionery, juice, or chips when they ask for something to eat. As an alternative, 54.7% of parents would give fruits and 33.8% would offer vegetables, while only a few (11.5%) would offer popcorn. It is very important that parents understand the importance of non-sugar containing snacks between meals and that the consumption of any sugar containing food/drink should ideally be within or immediately after a meal (Tinanoff and Palmer 2000).

Parental knowledge on prevention of caries in children significantly improved after reading the leaflet indicating the success of the used leaflet in delivering the intended educational messages. The difference in parental knowledge was not statistically significant in the knowledge of the frequency of tooth brushing or the amount of toothpaste used for a 3-year-old or younger. The percentage of parents with correct knowledge regarding the frequency of toothbrushing before reading the leaflet was high (78.1%) possibly again due to social desirability bias. Unfortunately, this does not necessarily reflect their behavior. Similarly, the percentage of parents with correct knowledge regarding the amount of toothpaste to be used for a child aged 3 or younger was high before reading the leaflet and improved slightly after reading the leaflet. This could be explained by the fact that most parents know that younger children are unable to spit and are afraid that they will swallow the toothpaste. Therefore, they correctly chose the least amount of toothpaste (Wright et al., 2014). Although the difference in parental knowledge before and after reading the leaflet was statistically significant, the percentage of parents with correct knowledge after the leaflet intervention was still less than 50% in some aspects including, knowledge of the age at the first dental visit, knowledge of the time to start brushing, knowledge of the best time to eat sugar containing snacks, and knowledge of whether sugar containing food is best consumed at once or divided. This means that important messages on caries prevention in children should be delivered by other means in addition to educational leaflets.

The relatively limited number of pediatric dentists available to deliver face to face child related oral health education combined by the low number of patients attending the pediatric dentist regularly makes it necessary to find other means of nationwide education. Moreover, general dental practitioners in Jordan demonstrated poor knowledge in terms of delivering caries preventive advice (AlJafari et al., 2021). Medical students in Jordan showed poor knowledge on caries prevention in children as well (Sonbol et al., 2020); which means that medical doctors are not likely to be part of oral health education, at least for the time being. Leaflets are a relatively cheap and easily accessible method of education. Having friendly, easy to read leaflets readily available in waiting rooms in all healthcare centers for children and adults to look at and read should be encouraged. However, one mode of education is not enough given the very

poor knowledge of parents as demonstrated by the results of this study. Leaflets should be supported by other methods including television and radio talk shows. Given the recent popularity of social media and the ease of access to smart devices here in Jordan (Pew research centre 2018), the option of delivering oral health education messages through social media should be investigated and compared to the more conventional use of leaflets.

Limitations

The sample was collected from a single center; however, it is likely to represent Jordanian parents with young children in terms of age and education according to the 2017-2018 Jordan Population and Family Health Survey (Department of statistics (2018)). The study was based on a questionnaire where the socially desirable effect may have affected the responses of some parents. Not all the parents were reachable for the follow up phone interview and some refused to participate because they did not have time, some said they did not get the chance to read the leaflet, and for other reasons. To make the follow up phone interview as short as possible and acceptable to the participants not all the questions from the original questionnaire were asked. Therefore, the knowledge scores before and after reading the leaflet could not be compared. However, the percentage of correct answers for the questions answered over the phone were compared with their percentage before reading the leaflet and most have shown a significant increase.

Conclusion

Parental knowledge on prevention of caries in children is very poor and leaflets were effective in improving this knowledge. To confirm the success of leaflets in improving parental knowledge, future research should compare this mode of intervention to other modes.

Abbreviations

ECC

Early Childhood Caries

AAPD

American Academy of Pediatric Dentistry

Declarations

- **Ethics approval and consent to participate**

Ethical approval was obtained from the research ethics committees at the Department of Dentistry/ Jordanian Medical Services and in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

- **Consent for publication:** NA
- **Availability of Data and material:** The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.
- **Competing interests:** The authors declare no conflict of interest
- **Funding:** NA
- **Authors' contributions:** All authors have made substantive contribution to this study and/or manuscript, and all have reviewed the final paper prior to its submission."
 - Rawan ElKarmi performed study supervision and design, data collection, data analysis, and manuscript writing; Ahmad AlJafari performed study design, data analysis, manuscript writing; Sarah Haddad and Dina Al Soud performed data collection and analysis.
- **Acknowledgements:** NA

References

1. -Joel H, Berg. The Marketplace for New Caries Management Products: Dental Caries Detection and Caries Management by Risk Assessment. *BMC Oral Health*. 2006;6:6.
2. -American Academy of Pediatric Dentistry. AAPD policies. Policy on Early Childhood Caries (ECC): Classifications, Consequences, and Preventive Strategies. https://www.aapd.org/globalassets/media/policies_guidelines/p_eccclassifications.pdf Accessed November 2021.
3. -Tinanoff N, Reisine S. Update on early childhood caries since the surgeon general's report. *Acad Pediatr*. 2009;9:396–403.
4. -Yoon Lee. Diagnosis and Prevention Strategies for Dental Caries. *J Lifestyle Med*. 2013;3:107–9.
5. Rajab -LamisD, Petersen PE, Baqain Z, Bakaeen G. Oral health status among 6- and 12-year-old Jordanian schoolchildren. *Oral Health Prev Dent*. 2014;12:99–107.
6. -Sayegh A, Dini EL, Holt RD, Bedi R. Oral health, sociodemographic factors, dietary and oral hygiene practices in Jordanian children. *J Dent*. 2005;33:379–88.
7. -Naidu RS, Davis L. Parents' views on factors influencing the dental health of Trinidadian pre-school children. *Community Dent Health*. 2008;25:44–9.
8. -Kulkarni G. Long-term effectiveness of parent education using the "baby oral health" model on the improvement of oral health of young children. *Int J Dent*. 2013(8):137048.
9. -Plutzer K, Spencer AJ. Efficacy of an oral health promotion intervention in the prevention of early childhood caries. *Community Dent Oral Epidemiol*. 2008;36:335–46.
10. -ElKarmi R, Aljafari A, Eldali H, Hosey MT. Do expectant mothers know how early childhood caries can be prevented? A cross-sectional study. *Eur Arch Paediatr Dent*. 2019;20:595–601.
11. -Al Bardaweel S, Dashash M. E-learning or educational leaflet: does it make a difference in oral health promotion? A clustered randomized trial. *Randomized Controlled Trial BMC Oral Health*. 2018;18:81.

12. -Public Health England. Delivering better oral health: an evidence-based toolkit for prevention. 3rd ed. London: Department of Health; 2017. Available via https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/605266/Delivering_better_oral_health.pdf.
13. -Alyahya L. Parental knowledge and practices regarding their children's oral health in Kuwait. *Eur J Paediatr Dent*. 2016;17:267–73.
14. -Rahul S, Naidu, June H, Nunn. Oral Health Knowledge, Attitudes and Behaviour of Parents and Caregivers of Preschool Children: Implications for Oral Health Promotion. *Oral Health Prev Dent*. 2020;18:245–52.
15. -Department of Statistics. (2018): Jordan Population and Family Health Survey 2018.
16. -Marinho VC, Higgins JP, Logan S, Sheiham A. Fluoride varnishes for preventing dental caries in children and adolescents. *Cochrane Database Sys Rev*. 2009;1:CD002279.
17. -Tinanoff N, Palmer CA. Dietary determinants of dental caries and dietary recommendations for preschool children. *J Public Health Dent*. 2000;60:197–206.
18. -Harris R, Nicoll AD, Adair PM, Pine CM. Risk factors for dental caries in young children: a systematic review of the literature. *Community Dent Health*. 2004;21:71–85.
19. -AlDossary M, Alamri A, Alshiha S, Hattan M, Alfraih Y, Alwayli H. Prevalence of Dental Caries and Fissure Sealants in the First Permanent Molars among Male Children in Riyadh, Kingdom of Saudi Arabia. *Int J Clin Pediatr Dent*. 2018;11:365–70.
20. Shim -Youn-Soo, Kim A-H, Jeon E-Y. So-Youn An. Dental fear & anxiety and dental pain in children and adolescents; a systemic review. *J Dent Anesth Pain Med*. 2015;15:53–61.
21. -Wright JT, Hanson N, Ristic H, Whall CW, Estrich CG, Zentz RR. Fluoride toothpaste efficacy and safety in children younger than 6 years. *J Am Dent Assoc*. 2014;145(2):182–9.
22. Aljafari -A, Kussad REIKarmi,J, Hosey MT. General dental practitioners' approach to caries prevention in high-caries-risk children. *Eur Arch Paediatr Dent*. 2021;22:187–93.
23. -Sonbol HN, Elkarmi R, Abu-Ghazaleh S, Aljafari A, Badran DH. Medical students' exposure, knowledge, and attitudes towards Early Childhood Caries etiology and prevention. *Jordan Medical J*. 54:67–78.
24. -Pew Research Center. (2018): *social media use continues to rise in developing countries, but plateaus across developed ones* (Available from: <https://www.pewresearch.org/global/2018/06/19/global-technology-use-appendix-d-detailed-tables/>).

Figures

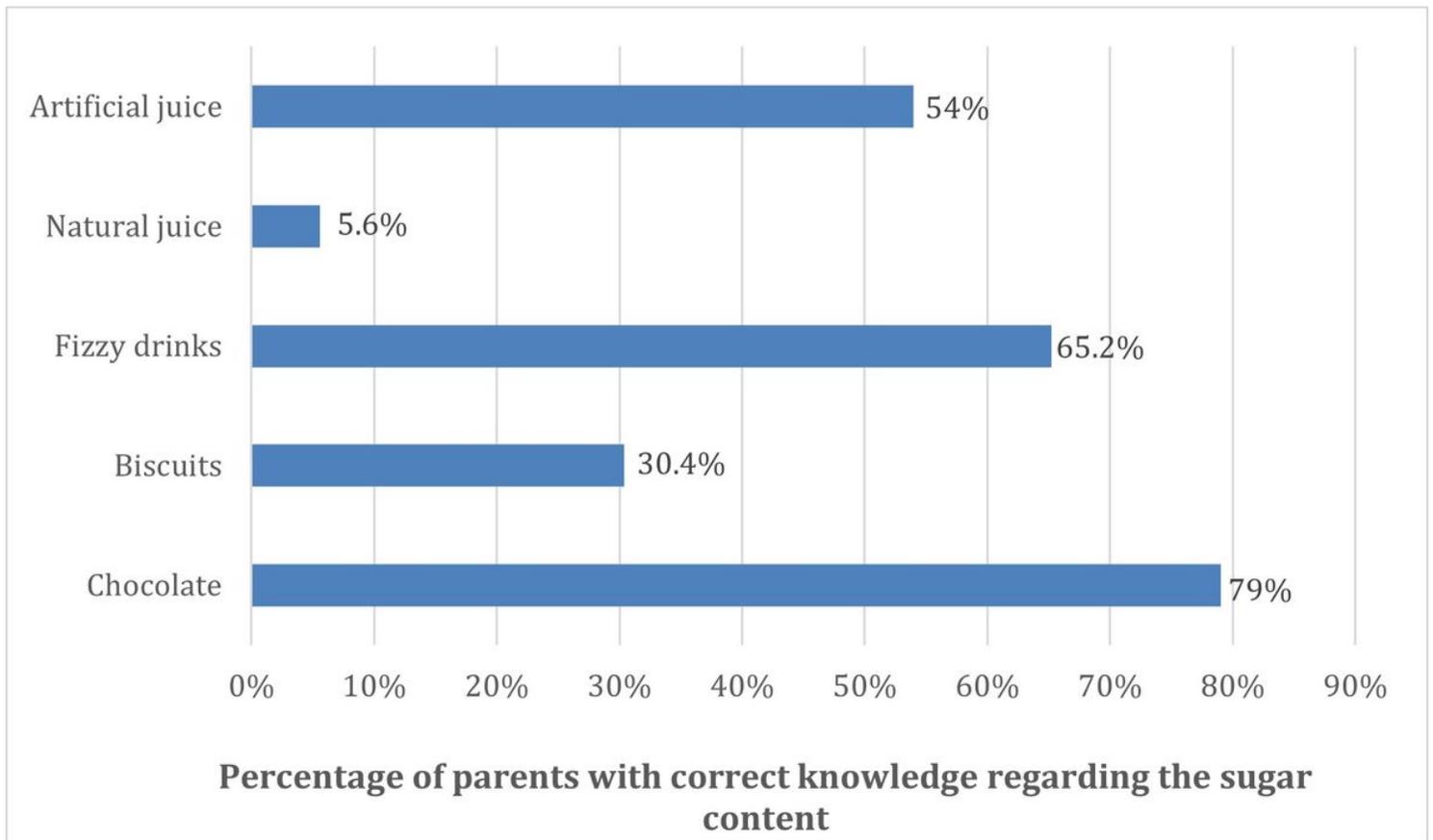


Figure 1

Knowledge of parents regarding the sugar content of some foods/drinks

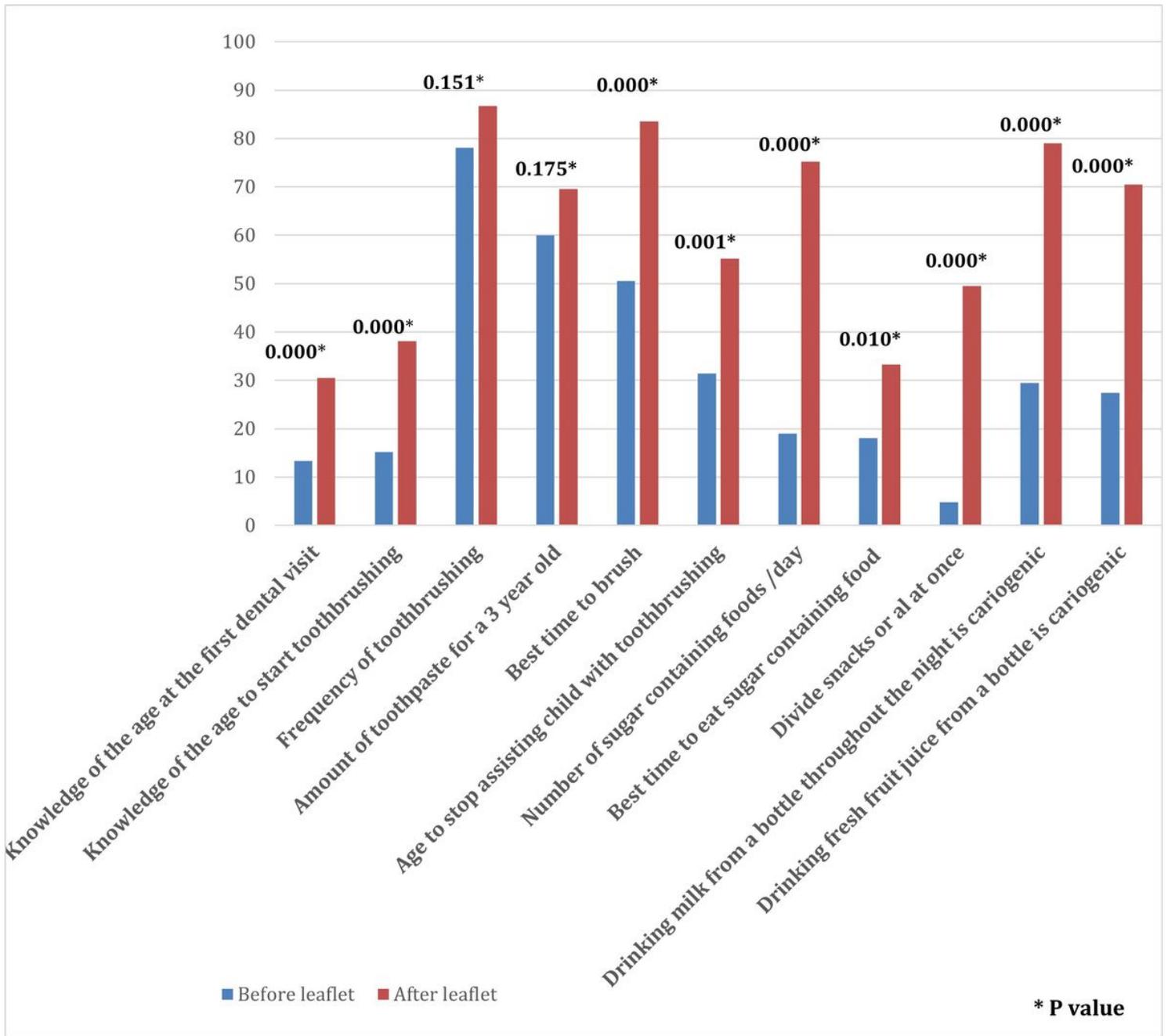


Figure 2

Comparison of the percentage of parents with correct knowledge on prevention of caries in children before and after reading the leaflet