

**EFFECT OF PARENTAL EDUCATION, OCCUPATION AND SOCIOECONOMIC STATUS ON DENTAL CARIES IN ADOLESCENTS**

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**ABSTRACT**

**Introduction:** Dental caries is one of the most prevalent oral diseases of public health concern affecting adolescents. Investigations have reported that family income and parental education directly affects the oral health of children. However, the trend is not obvious in adolescents. **Objective:** To determine the effect of parental education, occupation and socioeconomic status on dental caries in adolescents. **Methods:** This cross-sectional study was conducted on 350 adolescent students of government and private schools. Dental caries was measured and assessed by DMFT index. Statistical associations were confirmed by chi-square, independent sample t-test and analysis of variance (ANOVA) test. Binary logistic regression was performed to calculate odds ratios. **Results:** Overall frequency of dental caries was 72%. Dental caries and DMFT was significantly higher 89% in adolescents with illiterate father, 84.3 in adolescents with illiterate mother, 90.9% in adolescents with unemployed father, 75.2% in adolescents with unemployed mother and 87.1% in lower class. The odds of developing dental caries were higher in adolescents of illiterate, unemployed and economically deprived parents. **Conclusion:** Dental caries was inversely associated with parental education, occupation and socioeconomic status. The problem is severe, affecting three-quarter of the adolescent population.

**Keywords:** Dental caries, Adolescents, Students, Parental education, Occupation, Socioeconomic status, Nawabshah (SBA).

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**INTRODUCTION**

Dental caries is one of the most prevalent oral diseases of public health concern affecting adolescents. It forms over time through a complex interaction between fermentable carbohydrates and acid-producing bacteria, including multiple host linked factors, such as saliva and teeth<sup>1</sup>. The problem linked to tooth decay leads to a decreased quality of life of the affected individuals and high financial expenses for evenly society and individuals, alongside disparities associated with recognised issues of dietary changes, socioeconomics, inadequate preventive efforts and immigration<sup>2</sup>.

Despite more than a hundred years of cumulated knowledge on the process and pathology of dental caries, it is still a severe public health issue throughout the world affecting 60-90% of school-going children and nearly 100% of adults, leading to discomfort and pain and till date persists as a challenge to dental and medical profession<sup>2-4</sup>.

Most of the studies describing caries' risk

factors have focused on behavioural and biological factors, such as cariogenic microorganisms colonisation, fluoride use, oral health behaviours and dietary habits<sup>5</sup>. Nevertheless, there is an undeniable need to investigate the impacts of family factors on caries in children since their oral health and behaviours related to oral health are either indirectly or directly affected by their family<sup>6</sup>.

Furthermore, investigations have reported that family income and parental education directly affects oral health of children<sup>7</sup>. Low levels of education, low socioeconomic status and low monthly family incomes are associated with inconsiderable access to oral hygiene products, dental health facilities, sparser knowledge about dental and oral health and consequently, higher severity and frequency of dental caries<sup>8</sup>.

A cross-sectional study conducted on 6315 Japanese children concluded that the caries experience was high to a serious concern in children of unemployed and less educated parents with low household income<sup>5</sup>. The trend

of high occurrence of caries was also evident among 3-6 years old children of parents with lower education, occupation and socioeconomic status in a study conducted in Sri Ganganagar city, India<sup>9</sup>.

Numerous variations have been observed in risk factors regarding dental caries over wide geographical areas. Various studies have revealed the association between parental determinants and dental caries in children, but the trend is not thoroughly studied in adolescents passing through their lives' critical phase. It is unclear whether this trend persists when childhood transforms into adolescence. With a 57.2% youth dependency ratio and 34% below 30-years population, Pakistan still lacks comprehensive data on parental risk factors concerning oral health and diseases. The current study was conducted to rule out any possible association between dental caries and parental education, occupation and socioeconomic status.

## **MATERIAL AND METHODS**

### **Study Duration, Design and Settings.**

This descriptive cross-sectional study was conducted between September 19th, 2019 to February 19th, 2020, on adolescent students from one private and two government schools of district Shaheed Benazirabad.

### **Sample Size, Selection and Sampling Technique**

Cochran's formula was used to calculate the sample size by taking 70% prevalence of problem for a 95% confidence interval, keeping z-score at 1.96 and 5% margin of error. The computed sample size was 328, which was further extended to 350, considering inconsistencies and losses. Consenting adolescents having permanent dentition aged 12-18 years of both genders were conveniently selected in the study. Nonconsenting and adolescents having mixed dentition, cleft palate and cleft palate patients were omitted.

### **Ethical Considerations**

The study was carried out with the approval of the Ethical Review Committee PUMHSW Shaheed Benazirabad. Students were briefed about the procedures and purpose of the study, and written consent was obtained. Instruments were either sterilised or discarded after examining the study subjects. Information was used for research purposes only.

### **Data Collection Procedure**

Following the Ethical Review Committee's approval, the study methods and questioners were tested through a pilot study and modified accordingly. Students fulfilling the eligibility standards were asked to wash their mouths with mineral water, and the teeth were dried with the help of cotton rolls. Students were directed to sit on a stool, and the researcher conducted an examination with a 0.5mm ball-ended probe and mouth mirror under artificial light. The presence of decay (cavity, chalky white and brown spot on surface of the tooth), missed and filled tooth because of caries, was labelled as the case of dental caries. DMFT index was used to measure and assess dental caries. Severity of dental caries was assessed by categorising decayed

component into four strata, i.e. very mild, mild, moderate and severe caries denoting 1, 2-3, 4-5 and 6 or more decayed teeth.

Socioeconomic status was categorized into four classes based on monthly income (Lower class < 20,000, lowermiddle class 20,000-40,000, uppermiddle class 41,000-60,000, upper class > 60,000 rupees/month). Parental education levels were classified based on years of education and stratified into six categories (illiterate, primary 1-5 years, middle 5-8 years, high 9-10 years, intermediate 11-12 years, graduation 14 or more years of education). Parental occupation was assessed by the nature of the profession and stratified into seven categories (unemployed government employee, private employee, private business, landowner, farmer, unemployed and others).

### **Statistical Analysis**

Data entry and analysis was performed using Statistical Package for Social Sciences (SPSS) version 25.0. Data was expressed in percentage (%), number (No), mean and standard deviation ( $X \pm SD$ ). Chi-square test was applied to confirm the association of dental caries with parental education, occupation and socioeconomic status. An independent sample t-test and Analysis of Variance ANOVA test were performed to assess the mean difference of DMFT among various strata of parental education, occupation and socioeconomic status. Binary logistic regression was performed to calculate odds ratios and their 95% confidence interval estimates. All these analyses were performed at a confidence level of 95% and the threshold of significance was set at 0.05.

## **RESULTS**

Total of 350 participants, 275 boys and 75 girls, were analysed in the study. Among them, 252 (72%) adolescents were found to be carious with mean DMFT of  $3.28 \pm 3.05$ . The severity of caries varied from very mild in 9.5%, mild in 31.5%, moderate in 29% and severe in 30.2% of adolescents (Table: 1).

Prevalence of dental caries and DMFT was significantly lower 60.1% (p-value = <0.01,  $\chi^2 = 27.413$ ) with mean DMFT 2.75 (p-value <0.05, F= 2.569) in adolescents whose fathers had done graduation compared to 89% with mean DMFT 4.27 and 90% with mean DMFT 2.90 in adolescents whose fathers were either illiterate or had middle education (Table: 1). Compared to graduate father adolescents with illiterate and primary educated father had 5.38 (CI 95%, 2.39-12.09) and 3.59 (CI 95%, 1.49-8.63) times more risk of developing dental caries (Table: 2).

Caries experience and DMFT was significantly lower 41.5% (p-value < 0.01,  $\chi^2 = 44.319$ ) with mean DMFT 1.3 (p-value < 0.01, F= 8.850) in adolescents whose mothers had done graduation compared to 84.3% with mean DMFT 4.12 and 89.5% with mean DMFT 4.42 in adolescents whose mothers were illiterate or had middle education (Table: 1). Compared to graduate mother adolescents with illiterate, primary and middle educated mother had 7.58 (CI 95%, 3.60-15.96), 3.12 (CI 95%, 1.28-7.57), 12 (CI 95%, 2.44-58.93) times more risk of developing dental

caries (Table: 2).

Prevalence of dental caries and DMFT was significantly higher 90.9% (p-value <0.05,  $\chi^2=14.541$ ) with mean DMFT 4.18 (p-value <0.01, F= 3.611) in adolescents whose fathers were unemployed to 50% with mean DMFT 2.31 in adolescents whose fathers were private employees (Table: 1). Compared to private job, adolescents with government-employed, farmer and unemployed father had 2.54 (CI 95%, 1.07-5.99), 4.85 (CI 95%, 1.58-14.87), 10 (CI 95%, 1.11-89.77) times more risk of developing dental caries (Table: 2).

Dental caries experience and DMFT was significantly higher in adolescents whose mothers were unemployed 75.2% (p-value < 0.01,  $\chi^2= 19.877$ ) with mean DMFT 3.45 (p-value < 0.01, t= -3.536) compared to 35.7% with mean DMFT 1.36 in adolescents whose mothers were government employees (Table: 1). Compared to graduate mother adolescents with unemployed mother had 5.44 (CI 95%, 2.41-12.28) times more risk of developing dental caries (Table: 2).

Prevalence of dental caries and DMFT significantly increased as adolescents' socioeconomic status decreased, varying from 87.1% (p-value <0.01,  $\chi^2= 30.711$ ) with mean DMFT 4.21 (p-value <0.01, F= 6.310) in lower class to 55.7% with mean DMFT 2.42 in upper class (Table: 1). Compared to adolescents from upper class, adolescents from lower and lower middle class had 5.39 (CI 95%, 2.39-10.82), 3.38 (CI 95%, 1.80-8.15) times more risk of developing dental caries (Table: 2).

## DISCUSSION

Adolescence is the period in human life when the relationships between biological, behavioural, socioeconomic, and psychological conditions have a very strong effect on caries etiology<sup>1</sup>. Several habits linked to future health, both bad and good, are built throughout adolescence. However, parents yet play a decisive role in promoting adolescents' well-being through positive support by which they can explore changes in their identity<sup>10</sup>. Like other emerging economies, Pakistan has strong familial values and a higher youth dependency ratio, i.e. 57.2%, depicting the strong impact of parental factors on adolescents' health<sup>11</sup>. The current study was conducted to highlight the impact of parent education occupation and socioeconomic status on the prevalence of dental caries among adolescents.

Education plays an indispensable role in determining the socioeconomic status, occupation, and lifestyle, which dramatically influences housing, income, and other material resources<sup>12</sup>. The caries experience and DMFT was significantly lower 60.1% with mean DMFT 2.75 in adolescents whose fathers had done graduation compared to 89% with mean DMFT 4.27 and 90% with mean DMFT 2.90 in adolescents whose fathers were either illiterate or had middle education (Table:1). Compared to graduate father, adolescents with illiterate and primary educated father are 5.38 (CI 95%, 2.39-12.09) and 3.59 (CI 95%, 1.49-8.63) times more

likely to suffer from dental caries (Table: 2). It was also reported in Lithuania that parents with a high level of education pay more attention to the dental care of children and maintain their teeth healthy<sup>1</sup>.

Maternal education in developing countries is ascertained to play an essential role in improving child health and survival<sup>12</sup>. In light of the current study results, caries frequency and DMFT significantly was lower 41.5% with mean DMFT 1.3 in adolescents whose mothers had done graduation and higher 84.3% with mean DMFT 4.12 and 89.5% with mean DMFT 4.42 in adolescents whose mothers were either illiterate or had middle education (Table:1). Compared to graduate mother, adolescents with illiterate, primary and middle educated mother are 7.58 (CI 95%, 3.60-15.96), 3.12 (CI 95%, 1.28-7.57), 12 (CI 95%, 2.44-58.93) times more likely to suffer from dental caries (Table: 2). Results are parallel to the studies conducted in Japan, East Timor, and UAE, which resulted in an inverse relationship between parental education and dental caries<sup>5,13,14</sup>. Whereas Santha et al., in Bhopal and Abdullah et al., in Islamabad failed to find any statistical association between parental education and dental caries, possibly because of lack of awareness of parents about dental education and oral hygiene practices in area under study<sup>15,16</sup>. These lower levels of caries in children of educated mothers can be explained by the fact that educated mothers have a better knowledge about nutrition, health care and may provide a safer environment and healthy sanitary habits to their children. Studies on parental occupation and dental caries are relatively limited<sup>5</sup>. Our analysis found a significant inverse relationship between dental caries as well as DMFT and occupation of the father. Adolescents with unemployed fathers were more affected by dental caries 90.9% with mean DMFT 4.18, followed by adolescents whose fathers were farmers 82.9% with mean DMFT 4.49, whereas the prevalence was low 50% with mean DMFT 2.31 in adolescents whose fathers run private business (Table: 1). Compared to private job, adolescents with government-employed, farmer and unemployed father are 2.54 (CI 95%, 1.07-5.99), 4.85 (CI 95%, 1.58-14.87), 10 (CI 95%, 1.11-89.77) times more likely to suffer dental caries (Table: 2). Globally a splitting theorem is found on the association between dental caries and parental occupation; some studies reject while others support the inverse relationship<sup>15,9,17,18</sup>. We do not know the exact mechanism of how the occupation affects the disease and its outcome. However, it is probably because the occupation is one of the strongest determinants of socioeconomic status, affecting income, housing, schooling, luxuries of life, affordability, and health services utilisation.

Table: 1 Prevalence, Severity and Association of Dental Caries with Parental education, Occupation and Socioeconomic status.

Variables	N	Dental Caries		P-Value	Mean DMFT	P-Value
		Frequency	Percentage			
Overall Prevalence	350	252	72%		3.28±3.05	
<u>Severity of Caries</u>						
Very Mild	24	24	9.5%		1±0.000	
Mild	79	79	31.3%		2.50±0.677	
Moderate	73	73	29%		4.38±0.517	
Severe	76	76	30.2%		8±1.592	
<u>Father's Education</u>						
Graduation	138	83	60.1%		2.75±3.099	
Intermediate	65	42	64.6%		3.15±3.383	
High	19	15	78.9%	< 0.01*	3.42±3.237	< 0.05**
Middle	10	9	90%	χ <sup>2</sup> = 27.413	2.90±2.234	F= 2.569
Primary	45	38	84.4%		3.53±2.492	
Illiterate	73	65	89%		4.27±2.844	
<u>Mother's Education</u>						
Graduation	41	17	41.5%		1.32±1.929	
Intermediate	51	27	52.9%		2.27±2.793	
High	22	15	68.2%	< 0.01*	2.68±2.868	< 0.01**
Middle	19	17	89.5%	χ <sup>2</sup> = 44.319	4.42±3.097	F= 8.850
Primary	45	31	68.9%		2.84±2.796	
Illiterate	172	145	84.3%		4.12±3.114	
<u>Father's Occupation</u>						
Private Employee	26	13	50%		2.31±3.069	
Private Business	63	41	65.1%		2.52±2.583	
Land Owner	33	23	69.7%	< 0.05*	2.73±3.095	< 0.01**
Government Employee	131	94	71.8%	χ <sup>2</sup> = 14.541	3.16±3.028	F= 3.611
Farmer	41	34	82.9%		4.49±3.131	
Others	45	37	82.2%		4.36±3.262	
Unemployed	11	10	90.9%		4.18±2.316	
<u>Mother's Occupation</u>						
Government Employee	28	10	35.7%	< 0.01*	1.36±2.059	<0.01***
Unemployed	322	242	75.2%	χ <sup>2</sup> = 19.877	3.45±3.071	t= -3.536
<u>Socioeconomic Status</u>						
Upper Class	106	59	55.7%		3.28±2.943	
Upper Middle Class	79	52	65.8%	< 0.01*	3.15±3.270	< 0.01**
Lower Middle Class	64	53	82.8%	χ <sup>2</sup> = 30.711	3.42±2.833	F= 6.310
Lower Class	101	88	87.1%		4.21±2.892	

\* Chi-square test \*\* ANOVA test \*\*\* Independent sample t-test

Table:2 Odds ratio and their 95% Confidence Interval Estimates for Dental Caries relating to Parental Education, Occupation and Socioeconomic Status.

Government Employee	N	Prevalence	Odds Ratio	Odds Ratio 95% CI	P-Value
<u>Father's Education</u>					
Graduation	138	60.1%	1.00	1.00	
Intermediate	65	64.6%	1.21	0.65 - 2.23	0.541
High	19	78.9%	2.48	0.78 - 7.88	0.122
Middle	10	90%	5.96	0.73 - 48.40	0.095
Primary	45	84.4%	3.59	1.49 - 8.63	<0.01
Illiterate	73	89%	5.38	2.39 - 12.09	<0.01
<u>Mother's Education</u>					
Graduation	41	41.5%	1.00	1.00	
Intermediate	51	52.9%	1.58	0.69 - 3.64	0.274
High	22	68.2%	3.02	1.01 - 9.00	0.47

Middle	19	89.5%	12.00	2.44 - 58.93	<0.01
Primary	45	68.9%	3.12	1.28 - 7.57	<0.05
Illiterate	172	84.3%	7.58	3.60 - 15.96	<0.01
<u>Father's Occupation</u>					
Private Employee	26	50%	1.00	1.00	
Private Business	63	65.1%	1.86	0.73 - 4.70	0.188
Land Owner	33	69.7%	2.30	0.79 - 6.69	0.127
Government Employee	131	71.8%	2.54	1.07 - 5.99	<0.05
Farmer	41	82.9%	4.85	1.58 - 14.87	<0.01
Others	45	82.2%	4.62	1.56 - 13.67	<0.01
Unemployed	11	90.9%	10.00	1.11 - 89.77	<0.05
<u>Mother's Occupation</u>					
Government Employee	28	35.7%	1.00	1.00	
Unemployed	322	75.2%	5.44	2.41 - 12.28	<0.01
<u>Socioeconomic Status</u>					
Upper class	106	55.7%	1.00	1.00	
Upper middle class	79	65.8%	1.53	0.84 - 2.80	0.164
Lower middle class	64	82.8%	3.83	1.80 - 8.15	<0.01
Lower class	101	87.1%	5.39	2.39 - 10.82	<0.01

The current study also unveiled statistically significant association between dental caries as well as DMFT and occupation of the mother. Compared with having an unemployed mother, having a working mother was significantly associated with a lower prevalence of dental caries and mean DMFT (Table: 1). Compared to graduate mother adolescents with unemployed mother are 5.44 (CI 95%, 2.41-12.28) times more likely to develop dental caries (Table: 2). Kato et al., and Narang et al., have reported similar statistical associations in Japan and Rajasthan, India<sup>5,9</sup>. The maternal occupation seems to have a greater impact on dental caries than that of the father, which can explain the reality that the mother spent more time with children, play a central role in the family, develop good habits and healthy behaviours in the child during early years of life that persist for years to come, plan better nutrition/diet for child and these effects are more likely to intensify when a mother work as a professional and have higher education.

Multiple studies have confirmed an inverse relationship between dental diseases and socioeconomic status. The prevalence and incidence of dental diseases decrease as the socioeconomic status increases. Individuals with low socioeconomic status are more likely to suffer from poor oral health conditions<sup>8</sup>. Two recent systemic reviews conducted in 2012 and 2016 revealed that parental socioeconomic status was inversely associated with dental caries in children aged 0-6 years and 6-12 years<sup>19,6</sup>. The current study showed a statistically significant inverse relationship between dental caries experience as well as DMFT and socioeconomic status (Table: 1). Compared to adolescents from upper class, adolescents from lower and lower middle class are 5.39 (CI 95%, 2.39-10.82), 3.38 (CI 95%, 1.80-8.15) times more likely to suffer from dental caries (Table: 2). This was also observed in Japan, where prevalence was associated with the socioeconomic status being low in high-income

individuals and high in low-income individuals<sup>5</sup>. The lower class is an omitted section of society, and the reasons that the poor suffer more from diseases is due to the environment in which they live, ignorance and illiteracy keep them away from understanding and prevention, nutritional status compromises their immunity, material, social and financial disadvantages reduced their ability to self-care and access to health care

#### **Limitation of study**

The current study was initially planned to include adolescents from two private and two government schools. However, the refusal from school authorities, only one private school was included in the study, ending up in the sample's unequal variable distribution. Radiographs were not used, so the detection of early and interproximal lesions may be lowered. No renowned occupation and socioeconomic scales were used due to the inapplicability and unacceptability of such scales in study settings.

#### **CONCLUSION**

Dental caries was inversely associated with parental education, occupation and socioeconomic status. The problem is severe, affecting three-quarter of the adolescent population. The parental education, occupation and socioeconomic status must be given utmost importance in planning and implementing strategies targeting dental caries. Further studies should be conducted to highlight all possible dimensions of parental factors related to oral health and diseases.

**ETHICS APPROVAL:** The ERC gave ethical review approval

**CONSENT TO PARTICIPATE:** written and verbal consent was taken from subjects and next of kin

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**CONFLICT OF INTEREST:** No competing interest declared.

## REFERENCES

1. Žemaitiene M, Grigalauskiene R, Vasiliauskiene I, Saldunaite K, Razmiene J, Slabšinskiene E. Prevalence and severity of dental caries among 18-year-old Lithuanian adolescents. *Med*. 2016;52(1):54–60.
2. Tafere Y, Chanie S, Dessie T, Gedamu H. Assessment of prevalence of dental caries and the associated factors among patients attending dental clinic in Debre Tabor general hospital: A hospital-based cross-sectional study. *BMC Oral Health*. 2018;18(1):1–7.
3. Vieira AR, Modesto A, Marazita ML. Caries: Review of Human Genetics Research. *Caries Res*. 2014;48(5):491–506.
4. Mahfouz M, Esaid AA. Dental Caries Prevalence among 12 – 15 Year Old Palestinian Children. *Int Sch Res Not*. 2014;2014:1–4.
5. Kato H, Tanaka K, Shimizu K, Nagata C, Furukawa S, Arakawa M, et al. Parental occupations, educational levels, and income and prevalence of dental caries in 3-year-old Japanese children. *Env Heal Prev Med*. 2017;22(80):1–7.
6. Kumar S, Tadakamadla J, Kroon J, Johnson NW. Impact of parent-related factors on dental caries in the permanent dentition of 6-12-year-old children: A systematic review. *J Dent*. 2016;46:1–11.
7. Sald K, Bendoraitien A, Vasiliauskien I, Andru V. The role of parental education and socioeconomic status in dental caries prevention among Lithuanian children. *Medicina (B Aires)*. 2014;50(3):156–61.
8. Siddiqui TM, Wali A, Azimi M, Salehi T, Siddiqui SM. Socioeconomic Status and Dental Caries: Exploring The Relation in Patients Visiting Dental Teaching Hospital, Karachi. *J Pak Dent Assoc*. 2017;28(1):27–32.
9. Narang R, Mittal L, Jha K. Caries Experience and Its Relationship with Parent's Education, Occupation and Socio Economic Status of the family among 3-6 Years Old Preschool Children of Sri Ganganagar City, India. *Open J Dent Oral Med*. 2013;1(1):1–4.
10. Shaw A. Research brief [Internet]. *Child Trends*. 2014 [cited 2020 Dec 3]. Available from: <https://www.childtrends.org/publications/the-family-environment-and-adolescent-well-being-2>
11. Contributors W. List of countries by dependency ratio [Internet]. *Wikipedia, The Free Encyclopedia*. 2020 [cited 2020 Dec 3]. Available from: [https://en.wikipedia.org/w/index.php?title=List\\_of\\_countries\\_by\\_dependency\\_ratio&oldid=980025725](https://en.wikipedia.org/w/index.php?title=List_of_countries_by_dependency_ratio&oldid=980025725)
12. Natarajan DV. Does Maternal Education Really Improve Child Health? *IOSR-JDMS*. 2013;4(4):7–9.
13. Crocombe LA, Allen P, Bettiol S, Babo Soares LF. Parental Education Level and Dental Caries in School Children Living in Dili, Timor-Leste. *Asia Pac J Public Heal*. 2018;30(2):128–36.
14. Hashim R, Thomson WM, Ayers KMS, Lewsey JD, Awad M. Dental caries experience and use of dental services among preschool children in Ajman, UAE. *Int J Paediatr Dent*. 2006;16(4):257–62.
15. Santha B, Hongal S, S V, Jain M, Tiwari V. The Association between Parental Age, Education and Occupation (Familial Status) and Oral Health Status among Pre-school Children of Bhopal City, India. *Acta Sci Dent Sci [Internet]*. 2018;2(1):23–8.
16. Abdullah S, Maxodd A, Khan N. Risk factors for dental caries. *PODJ*. 2008;28(2):257–65.
17. Piovesan C, Mendes FM, Ferreira F V., Guedes RS, Ardenghi TM. Socioeconomic inequalities in the distribution of dental caries in Brazilian preschool children. *JPHD*. 2010;70(4):319–26.
18. Ismail AI, Sohn W, Lim S, Willem JM. Predictors of dental caries progression in primary teeth. *J Dent Res [Internet]*. 2009;88(3):270–5.
19. Hooley M, Skouteris H, Boganin C, Satur J, Kilpatrick N. Parental influence and the development of dental caries in children aged 0-6 years: A systematic review of the literature. *J Dent*. 2012;40(11):873–85.