

The Correlation Analysis Of Dental Caries, General Health Conditions And Daily Performance In Children Aged 2–5 Years

by Taufan Bramantoro

Submission date: 31-Jan-2022 01:36PM (UTC+0800)

Submission ID: 1751723728

File name: Conditions_And_Daily_Performance_In_Children_Aged_2_5_Years.pdf (126.15K)

Word count: 3381

Character count: 17934

Research Report

The correlation analysis of dental caries, general health conditions and daily performance in children aged 2–5 years

Darmawan Setijanto,¹ Taufan Bramantoro,¹ Nanissa Dyah Anggraini,² Ardhyana Dea Maharani,² Dwita Angesti,² Dani Susanto Hidayat³ and Aulia Ramadhan¹

¹ Department of Dental Public Health,

² Dental Profession Program,

³ Postgraduate Program,

Faculty of Dental Medicine, Universitas Airlangga,
Surabaya – Indonesia

ABSTRACT

Background: Oral health is important for general health and quality of life. One of the oral diseases with a high prevalence in Indonesia is dental caries. Dental caries can cause limiting disturbances of daily activities such as biting, chewing, smiling and talking, and of psychosocial well-being, including development and general health of children. **Purpose:** This study aims to analyze the correlation of dental caries incidence rate with general health conditions and daily performance of children aged 2–5 years. **Methods:** This was an analytical observational cross-sectional study. The study sample was 103 pairs of children and their mothers, selected using cluster random sampling technique. Intra-oral examination was conducted on the children to obtain decay, missing, filled-teeth (DMF-T) index score. Information about oral impacts on daily performance (OIDP) of the children was collected through a questionnaire distributed to the mothers. The data obtained were statistically analysed with a regression test ($p < 0.05$). **Results:** It was found that dental caries had a significant correlation with general health ($p = 0.00$) and daily performance, including chewing function disorder ($p = 0.00$), difficulties in maintaining oral health ($p = 0.039$), sleep disorders ($p = 0.00$), and emotional instability ($p = 0.00$). **Conclusion:** The incidence rate of dental caries has a significant effect on the general health conditions and daily performance of children aged 2–5 years.

Keywords: child health; daily performance; dental caries; oral impact on daily performance

Correspondence: Taufan Bramantoro, Department of Dental Public Health, Faculty of Dental Medicine, Universitas Airlangga, Jl. Mayjen Prof. Dr. Moestopo No. 47, Surabaya 60132, Indonesia. Email: taufan-b@fkg.unair.ac.id

INTRODUCTION

Oral and dental health is important for general health. Unfortunately, children seem to be vulnerable to oral and dental diseases because they generally have poor oral and dental care habits. Eating sweet food and drinking sweet drinks are some examples of their bad habits.¹ Based on the 2018 Basic Health Research data, dental caries prevalence in Indonesia was 81.5% in children aged 3–4 years and as high as 92.6% in those aged 5–9 years. Indonesia's decay, missing, filled-teeth (DMF-T) index in 2018 was 7.1, an increase of 54% from RISKESDAS 2018.²

Oral health is also considered fundamental to public health since a healthy mouth allows individuals to talk,

eat, and socialise without experiencing pain, discomfort, or embarrassment.³ However, without adequate care, dental caries may occur and eventually lead to tooth decay. Dental caries is the main cause of toothache and tooth loss. Everyone is susceptible to dental caries throughout their lives.⁴ Nonetheless, dental caries is one of the many childhood diseases that can be prevented.

Dental caries can also interfere with the chewing system in general or become a focal infection, thus affecting the health and development of children.⁵ For instance, dental caries greatly affects the quality of life of children in America, Canada and England. In Aboriginal children in Western Australia, dental caries is the fifth most common disease causing preschool children to be hospitalised (ages

1–4 years).⁶ Toothache caused by dental caries causes a loss of 50 million school hours per year, affecting school attendance and future adult life.

In Indonesia, toothache has caused 62.4% of the population to experience discomfort at work/in school for an average of 3.86 days per year. This condition indicates that dental disease, although not fatal, reduces work productivity. A research in Medan even reveals the impact of dental caries on four dimensions of quality of life, namely, limited function, pain, psychological discomfort and physical ability. In addition, Sheiham⁷ highlights three effects of untreated dental caries on the growth and development of preschool children. First, pain caused by dental caries can interfere with children's food intake. Second, pain caused by dental caries can trigger sleep disturbances and subsequently leads to glucocorticoid production and growth disturbances. Third, chronic inflammation caused by dental caries can suppress haemoglobin and lead to anaemia, since the production of erythrocytes in the bone marrow is reduced. Thus, it is essential to treat dental caries in preschool children to improve not only their growth and development but also their quality of life.^{8–10}

A preliminary survey of 30 respondents conducted in pre-kindergarten schools in Kenjeran Health Center working area found a 50% incidence rate of caries severity. For the problems outlined earlier, this study is focused on the dental caries incidence rate and the general health conditions of children aged 2–5 years in some pre-kindergarten and kindergarten schools around the Kenjeran Health Center, Surabaya City. This study aims to analyse the correlation of the dental caries incidence rate with the general health conditions and the daily performance of children aged 2–5 years.

MATERIALS AND METHODS

This was an analytical observational cross-sectional study. The DMF-T index of children aged 2–5 years was collected along with questionnaire results distributed to their mothers. The study sample was 103 pairs of pre-kindergarten and kindergarten school children and their mothers, around Kenjeran Health Center, Surabaya, selected using the cluster random sampling method. This research has received a certificate (628/HRECC.FODM/X/2019) from the Ethics Commission of the Faculty of Dental Medicine, Universitas Airlangga. Each respondent's parent was asked to provide informed consent before participating in this study.

The severity of children's caries was observed through direct primary tooth examination (intra oral). Next, DMF-T index measurement was conducted to observe the dental health conditions of children by observing cavities (decay), teeth lost due to caries (missed), and teeth that had been filled. Based on the data collected, the DMF-T score was obtained and analysed statistically to find any correlation with the general health conditions and the daily performance

of the children collected through questionnaires distributed to their mothers.

The questionnaire used in this study was concerned with oral impact daily performance (OIDP) of the children involving a) eating and enjoying food, b) talking and pronouncing clearly, c) cleaning teeth, d) sleeping and relaxing, e) smiling, laughing and showing teeth without embarrassment, f) keeping emotions so as not to be easily offended, g) performing main work or social roles, and h) being able to understand conversations with people around them. In addition, a question instrument was added to analyse the general health conditions of the participants. The data obtained were statistically analysed using a regression test with the Statistical Package for Social Science (SPSS, IBM corporation, Illinois, US) software version 22, with a p-value of 0.05%.

RESULTS

This research was conducted in pre-kindergarten and kindergarten schools in Surabaya on 103 pairs of children aged 2–5 years and their mothers. The dependent variable in this study is caries, while the independent variable is the general health conditions of children aged 2–5 years. The data were statistically analysed with a regression test to find correlation between these variables. The regression test results showed significant correlation between the incidence rate of dental caries and the general health conditions of those children. The distribution of respondents in this study can be seen in Table 1.

Based on Table 1, the results show that 53.4% of the respondents had a high caries index of >6.6. Similarly, the data of the children's general health conditions indicate that 72.8% of the respondents had experienced illness in the last two months. The correlation of dental caries incidence rate with the children's daily performance was statistically analysed using the results of the OIDP questionnaire. The results of this analysis can be seen in Table 2. Table 2 also shows the correlation of the incidence rate of dental caries with OIDP of each respondent. The table also illustrates that there was a significant correlation between the incidence rate of dental caries and chewing function disorders, with a p-value of 0.000 ($p < 0.05$). However, there was no significant correlation between the incidence rate of dental caries and speech difficulties, with a p-value of 0.195 ($p > 0.05$).

The OIDP index scores indicate a significant correlation between the incidence rate of dental caries and difficulties in maintaining oral hygiene, with a p-value of 0.039 ($p < 0.05$). There was also a significant correlation between the incidence rate of dental caries and sleep disorders due to oral and dental health problems, with a p-value of 0.000 ($p < 0.05$). There was a significant correlation between the incidence rate of dental caries and emotional instability, with a p-value of 0.005 ($p < 0.05$). There was no significant correlation between the incidence rate of dental caries and

difficulties in smiling due to oral health problems, with a p-value of 0.078 ($p > 0.05$).

In other words, the incidence rate of dental caries had a significant correlation with the general health conditions of children aged 2–5 years, related to chewing function disorders, difficulties in maintaining oral hygiene, sleep disorders due to oral and dental health problems, and emotional instability due to oral and dental health problems. However, the incidence rate of dental caries had no significant correlation with speech difficulties, avoiding meeting people, and difficulties in smiling. However, the statistical test using a regression test shows that the incidence rate of dental caries has a significant effect on the general health conditions of children aged <5 years, with a p-value of 0.000 ($p < 0.05$).

DISCUSSION

This study shows a significant correlation between the incidence rate of dental caries and the general health conditions of children aged 2–5 years. This may be due to several factors that can increase the severity of dental caries, such as education level; thus, the higher the education level, the higher the awareness of maintaining one’s own general health.⁵ In addition, it can also be assessed from how dental and oral health is maintained, such as not eating carcinogenic foods, use of toothbrushes, brushing teeth frequently, and using proper brushing technique.¹¹ Similarly, Wening *et al.*⁸ argue that although there is no significant correlation between the severity of dental caries and the nutritional status of children, a decrease in desire

Table 1. Distribution of respondents

Variables		N*	Percentage (%)
Sex	Male	49	47.6%
	Female	54	52.4%
Age	2–3 years old	18	17.5%
	4–5 years old	85	82.5 %
Caries severity	Low (0-6.6)	48	46.6%
	High (>6.6)	55	53.4%
Toothache	Never experienced	53	51.5%
	Had experience	50	48.5%
Daily brushing habit	1x a day	17	16.5%
	2x a day	79	76.7%
	3x a day	7	6.8%
General health conditions in the last two months	Never sick	28	27.2%
	Ever sick	75	72.8%
Having toothache	Often	62	60.2%
	Never	41	39.8%
Chewing function disorders	No	38	36.9%
	Yes	65	63.1%
Sleep disorders	No	71	68.9%
	Yes	32	31.1%
Difficulties in maintaining oral hygiene	No	71	68.9%
	Yes	32	31.1%
Avoid meeting people due to oral and dental health problems	No	93	90.3%
	Yes	10	9.7%
Emotional instability due to oral and dental health problems	No	80	77.7%
	Yes	23	22.3%
Difficulties in smiling due to oral and dental health problems	No	93	90.3%
	Yes	10	9.7%

* number of respondents

Table 2. Regression test results on the correlation of the dental caries incidence rate with the children’s daily performance using the oral impact on daily performance (OIDP) questionnaire

Risk Factor	N	Sig.
Chewing function disorders	103	*0.000
Speech difficulties	103	0.195
Difficulties in maintaining of oral hygiene	103	*0.039
Avoiding meeting people due to oral and dental health problems	103	0.077
Sleep disorders due to oral and dental health problems	103	*0.000
Difficulties in smiling due to oral and dental health problems	103	0.078
Emotional instability due to oral and dental health problems	103	*0.000

* significant at p-value <0.05

to eat still can be triggered by discomfort felt when eating when having a toothache. Decreased appetite can also have an impact on children's general health as nutrient intake decreases and causes decreased endurance. Ramayani *et al.*⁹ state that children suffering from dental caries are lighter in weight than those without dental caries. The findings of the previous studies strengthen the results of this study, which revealed a significant correlation between dental caries and children's general health.

This study also evaluates the severity of dental caries in children aged <5 years, using the DMF-T index and ODP. It is known that severe dental caries can affect quality of life intrinsically and extrinsically. Intrinsically, a severe dental cavity can penetrate the pulp chamber and cause inflammation of the pulp tissue, causing pain and discomfort leading to sleep disorders, which can also reduce immune function. Extrinsically, dental caries can cause poor oral hygiene (OH) and tooth morphology, which can interfere with chewing function, leading to reduced nutrient intake, which can also reduce immune function. The decline in immune function can cause general health problems in toddlers. Dental health is ²⁰ of several oral health factors that are important for child development especially. Dental caries is the most common dental health problem found in children, which is caused by food residue that sticks to the teeth. Calcification of teeth causes teeth to become porous, hollow, and even fractured (broken). Dental caries can also cause children to experience loss of chewing power and disruption of digestion, which results in less optimal growth.^{12,13}

This study found that age and gender of children aged <5 years had no significant effect on the incidence rate of dental caries. The ODP questionnaire results consists of eight items evaluating the impacts of oral health on children's ability to perform their daily activities, including the measurement of physical, psychological and social dimensions. This questionnaire instrument focuses on ten basic daily activities, namely, eating, talking, cleaning the mouth, performing light physical activities, sleeping, relaxing, smiling, having emotional states, going out, and enjoying interacting with others.^{14–16}

In addition, the influence of daily life performance on oral caries aims to provide alternative sociodental indicators, focusing on measuring a person's ability to carry out the indicated daily activities with the condition of the oral caries. The results of the ODP questions concerned with the general health conditions of children aged <5 years who often have toothache and dental caries indicated a significant correlation between the incidence rate of dental caries and the frequency of having toothache. There was a significant correlation between the incidence rate of dental caries and the behaviour of avoiding meeting people due to oral and dental health problems. There was also a significant correlation between the incidence rate of dental caries and emotional instability due to oral and dental health problems. In other words, the incidence rate of dental caries had a significant effect on the emotions of children.

While the ODP focuses on ten basic daily activities, it does not mean that all of those ten basic daily activities necessarily affect dental caries in children.^{17–19} Finally, it can be concluded that the incidence rate of dental caries has a significant effect on the general health conditions and the daily performance of children aged 2–5 years.

REFERENCES

- Berwulo H. Gambaran tingkat karies berdasarkan status kebersihan gigi dan mulut pada siswa sekolah dasar di Desa Ranawangko II Kecamatan Kombi. Thesis. Manado: Universitas Sam Ratulangi; 2011. p. 23–24.
- Badan Penelitian dan Pengembangan Kesehatan. Riset Kesehatan Dasar 2018. Jakarta: Kementerian Kesehatan Republik Indonesia; 2018. p. 110.
- Alrmyal B, Assery M. Need of oral health promotion through schools among developing countries. *J Int Oral Heal*. 2018; 10: 1–3.
- Zou J, Meng M, Law CS, Rao Y, Zhou X. Common dental diseases in children and malocclusion. *Int J Oral Sci*. 2018; 10: 7.
- Smith L, Blinkhorn FA, Blinkhorn AS, Hawke F. Prevention of dental caries in Indigenous children from World Health Organization-listed high-income countries: A systematic review. *Health Educ J*. 2018; 77(3): 332–48.
- Boy H, Khairullah A. Hubungan karies gigi dengan kualitas hidup remaja SMA di Kota Jambi. *J Kesehat Gigi*. 2019; 6: 10–3.
- Sheiham A. Dental caries affects body weight, growth and quality of life in pre-school children. *Br Dent J*. 2006; 201(10): 625–6.
- Wening GS, Bramantoro T, Palupi R, Ramadhani A, Alvita D. Overview of dental caries severity and body mass index (BMI) on elementary school children. *J Int Oral Heal*. 2019; 11(7): 48–55.
- Ramayani MP, Nadhiroh SR. Relationship between dental caries and the level of consumption and nutritional status of primary school age children. *Media Gizi Indones*. 2012; 7(2): 1492.
- Nagarajappa R, Batra M, Sanadhya S, Daryani H, Ramesh G. Relationship between oral clinical conditions and daily performances among young adults in India - A cross sectional study. *J Epidemiol Glob Health*. 2015; 5(4): 347–57.
- Berniyanti T, Bramantoro T, Palupi R, Wening GS, Kusumo A. Epidemiological investigation of caries level in 2nd and 3rd grader primary school student. *J Int Oral Heal*. 2019; 11(7): 44–7.
- Bönecker M, Abanto J, Tello G, Oliveira LB. Impact of dental caries on preschool children's quality of life: An update. *Braz Oral Res*. 2012; 26(Spl. Iss.1): 103–7.
- Akbar FH, Pratiwi R, Multazam A. Hubungan status karies gigi dengan kualitas hidup terkait kesehatan mulut anak usia 8-10 tahun (Studi kasus SDN 3 dan SDN 5 Kota Parepare). Thesis. Makassar: Universitas Hasanuddin; 2014. p. 1–15.
- Rebouças AP, Bendo CB, Abreu LG, Lages EMB, Flores-Mir C, Paiva SM. Cross-cultural adaptation and validation of the Impact of Fixed Appliances Measure questionnaire in Brazil. *Braz Oral Res*. 2018; 32: e14.
- Nasia AA, Arumrahayu W, Rosalien R, Maharani A, Adiatman M. Child-oral impacts on daily performances index in Indonesia: Cross-cultural adaptation and initial validation. *Malaysian J Public Heal Med*. 2019; 19(2): 68–77.
- Duarte-Rodrigues L, Ramos-Jorge J, Drumond CL, Diniz PB, Marques LS, Ramos-Jorge ML. Correlation and comparative analysis of the CPQ8-10 and child-ODP indexes for dental caries and malocclusion. *Braz Oral Res*. 2017; 31: e111.
- Gilchrist F, Rodd H, Deery C, Marshman Z. Assessment of the quality of measures of child oral health-related quality of life. *BMC Oral Health*. 2014; 14: 40.
- Yusof ZYM, Jaafar N. A Malay version of the Child Oral Impacts on Daily Performances (Child-ODP) index: assessing validity and reliability. *Health Qual Life Outcomes*. 2012; 10: 63.
- Nurelhuda NM, Ahmed MF, Trovik TA, Åström AN. Evaluation of oral health-related quality of life among Sudanese schoolchildren using Child-ODP inventory. *Health Qual Life Outcomes*. 2010; 8: 152.

The Correlation Analysis Of Dental Caries, General Health Conditions And Daily Performance In Children Aged 2-5 Years

ORIGINALITY REPORT

10%

SIMILARITY INDEX

6%

INTERNET SOURCES

8%

PUBLICATIONS

%

STUDENT PAPERS

PRIMARY SOURCES

1	hdl.handle.net Internet Source	2%
2	MS Hopcraft, C Tan. "Xerostomia: an update for clinicians", Australian Dental Journal, 2010 Publication	1%
3	2medicalcare.com Internet Source	1%
4	www.ncbi.nlm.nih.gov Internet Source	1%
5	H Hikiji, N Koshikiya, H Fujihara, N Hatano, M Matsuzaki, A Matsuzaki, M Ohki, T Susami, T Takato, T Toyo-oka. "Changes in the awareness of oral health among new students newly enrolled at the University of Tokyo over the past 15 years", International Journal of Dental Hygiene, 2005 Publication	<1%
6	Seda Sönmez, Mehmet Top. "Quality of life and oral health impact profile in Turkish	<1%

dental patients", Health Policy and Technology, 2016

Publication

7	discovery.ucl.ac.uk Internet Source	<1 %
8	"Early childhood caries and overall health", Dental Abstracts, 200707 Publication	<1 %
9	Azza Tagelsir, Ahmed Eltigani Khogli, Nazik Mostafa Nurelhuda. "Oral health of visually impaired schoolchildren in Khartoum State, Sudan", BMC Oral Health, 2013 Publication	<1 %
10	Jéssica Copetti Barasuol, Pablo Silveira Santos, Bárbara Suelen Moccelini, Marcela Baraúna Magno et al. "Association between dental pain and oral health - related quality of life in children and adolescents: A systematic review and meta - analysis", Community Dentistry and Oral Epidemiology, 2020 Publication	<1 %
11	L. Ilha, A. B. Martins, C. Abegg. "Oral impact on daily performance: need and use of dental prostheses among Brazilian adults", Journal of Oral Rehabilitation, 2016 Publication	<1 %
12	f1000researchdata.s3.amazonaws.com Internet Source	<1 %

-
- 13 www.scielo.br Internet Source <1 %
-
- 14 Lin - Yang Chi, Po - Yen Lin, Jui Wang, Yu - Roo Chu, Yung - Ming Chang. "Can government - supported preventive fluoride varnish application service reduce pulp - involved primary molars?", Journal of Public Health Dentistry, 2019 Publication <1 %
-
- 15 Olubukola Olamide Olatosi, Afolabi Oyapero, Nneka Kate Onyejaka. "Disparities in Caries Experience and Socio-Behavioural Risk Indicators Among Private School Children in Lagos, Nigeria", Pesquisa Brasileira em Odontopediatria e Clínica Integrada, 2020 Publication <1 %
-
- 16 Sônia Saeger Meireles, Marilia Leão Goettems, Kaline Silva Castro, Fábio Correia Sampaio, Flávio Fernando Demarco. "Dental Fluorosis Treatment Can Improve the Individuals' OHRQoL? Results from a Randomized Clinical Trial", Brazilian Dental Journal, 2018 Publication <1 %
-
- 17 Tria Astika Endah Permatasari, Yudi Chadirin. "Assessment of Undernutrition Using Composite Index of Anthropometric Failure <1 %

(CIAF) and its Determinants: A Cross-Sectional Study in the Rural Area of Bogor District in Indonesia", Research Square Platform LLC, 2021

Publication

18

amotherfarfromhome.com

Internet Source

<1 %

19

bmcoralhealth.biomedcentral.com

Internet Source

<1 %

20

cyberleninka.org

Internet Source

<1 %

21

download.garuda.ristekdikti.go.id

Internet Source

<1 %

22

revista.uepb.edu.br

Internet Source

<1 %

23

www.mdpi.com

Internet Source

<1 %

24

Kumar, Santhosh, Jeroen Kroon, and Ratilal Lalloo. "A systematic review of the impact of parental socio-economic status and home environment characteristics on children's oral health related quality of life", Health and Quality of Life Outcomes, 2014.

Publication

<1 %

25

Şirin Özkan, Türkan Yıldırım. "General dentists staffing requirement based on workload in

<1 %

the public dental health centers in Turkey",
International Journal of Healthcare
Management, 2022

Publication

Exclude quotes Off

Exclude matches < 7 words

Exclude bibliography On