Gingival Health Status of 12-Year-Old School Children in Jakarta: A Cross-Sectional Study

Robbykha Rosalien
Oral Epidemiology and Clinical Studies in Dentistry Research Cluster, Faculty of Dentistry, Universitas Indonesia, Jakarta 10430, Indonesia, robbykha@gmail.com

Dina F. Hutami
Oral Epidemiology and Clinical Studies in Dentistry Research Cluster, Faculty of Dentistry, Universitas Indonesia, Jakarta 10430, Indonesia

Ary Agustanti
Oral Epidemiology and Clinical Studies in Dentistry Research Cluster, Faculty of Dentistry, Universitas Indonesia, Jakarta 10430, Indonesia

Annisa Septalita
Department of Dental Public Health and Preventive Dentistry, Faculty of Dentistry, Universitas Indonesia, Jakarta 10430, Indonesia

Melissa Adiatman
Department of Dental Public Health and Preventive Dentistry, Faculty of Dentistry, Universitas Indonesia, Jakarta 10430, Indonesia

See next page for additional authors

Follow this and additional works at: https://scholarhub.ui.ac.id/mjhr

Recommended Citation
Gingival Health Status of 12-Year-Old School Children in Jakarta: A Cross-Sectional Study

Authors
Robbykha Rosalien, Dina F. Hutami, Ary Agustanti, Annisa Septalita, Melissa Adiatman, and Diah A. Maharani

This article is available in Makara Journal of Health Research: https://scholarhub.ui.ac.id/mjhr/vol22/iss2/7
Gingival Health Status of 12-Year-Old School Children in Jakarta: A Cross-Sectional Study

Robbykha Rosalien¹, Dina F Hutami¹, Ary Agustanti¹, Annisa Septalita²,³, Melissa Adiatman¹,², Diah A Maharani¹,²*  

1. Oral Epidemiology and Clinical Studies in Dentistry Research Cluster, Faculty of Dentistry, Universitas Indonesia, Jakarta 10430, Indonesia  
2. Department of Dental Public Health and Preventive Dentistry, Faculty of Dentistry, Universitas Indonesia, Jakarta 10430, Indonesia  
3. Faculty of Dentistry, Universitas Moestopo, Jakarta 12330, Indonesia  

*E-mail: diah.ayu64@ui.ac.id

Abstract

Background: Epidemiological data on gingival status in children is important because periodontal disease is one of the most prevalent diseases in Indonesia. This study aimed to assess the gingival health status and its associated factors among 12-year-old schoolchildren in Jakarta. Methods: This was a cross-sectional study of 12-year-old schoolchildren. There were 481 students who were recruited from 24 public and private junior high schools in Jakarta using multistage cluster proportional-to-size random sampling. Periodontal status was recorded using the community periodontal index (CPI) based on World Health Organization standards. A self-completed questionnaire was given to the parents to collect information on children’s backgrounds and oral health-related behaviours. Results: Only 3 of 478 participating children had healthy gums (no bleeding gums and no calculus). 99% of the children had bleeding gums and 84% had calculus. The prevalence of calculus was higher in girls than in boys. Periodontal status was not significantly related to tooth brushing habits or dental check-ups. Conclusions: Poor periodontal conditions were highly prevalent among 12-year-old schoolchildren in Jakarta. Oral health promotion and prevention strategies are urgently required.

Keywords: children; epidemiology; gingiva; Jakarta; periodontal status

Introduction

Dental caries and periodontal diseases have historically been considered the most important global oral health burdens.¹ Data from the 2013 National Household Health Survey showed that only 2.3% of 12-year-old children brush their teeth correctly and regularly twice a day.² Brushing twice a day, compared to once a day, significantly decreases the prevalence of caries.³ Despite this clear scientific evidence, a study conducted in Jakarta revealed that the mean daily tooth brushing frequency was below recommended levels.⁴ Therefore, all oral health stakeholders must address this issue and reach out to those who do not normally seek oral health care to help them brush effectively twice a day.

In terms of population, Indonesia (capital city, Jakarta) is the fourth largest country in the world, after China, India and the United States.⁵ The prevalence of periodontal diseases among children still remain high in Indonesia.⁶ Gingivitis is a periodontal condition that is a local response developed from dental plaque. It can be seen on presence of clinical signs and symptoms, including gingival bleeding and dental calculus. Moreover, poor oral hygiene and behaviour impact on gingival status.⁷ However, there is limited epidemiological data on the gingival status among Indonesian children.

Gingival status is as part of periodontal health. The risk factors of periodontal health are socially patterned. The social gradient and inequalities in periodontal health exists all over the world.⁸⁹ Children from disadvantage socio-economic status tend to have worse oral health. In Indonesian these inequalities are also persist.¹⁰¹¹¹⁵ The present study aimed to examine gingival health status and its associated factors among 12-year-old schoolchildren living in Jakarta. Based on The World Health Organization (WHO), 12-year-old are as the indicator for international benchmarking of children’s oral health.¹²

Methods

This was a cross-sectional epidemiological study of 12-year-old children recruited through a multistage cluster proportional-to-size random sampling from 24 of the 1,346 junior high schools officially listed on the
Indonesian Department of Education’s website. All listed
schools (public and private) had an equal opportunity to
participate in this study, and all 12-year-old children
were invited to participate.

Data were collected from September to October 2016
through a brief visual non-invasive clinical oral
examination and interviewer-administered questionnaire.
Ethical approval was obtained from the Ethical Committee
of the Faculty of Dentistry, Universitas Indonesia (No:
6/Ethical Approval/FKGUI/I/2016). Additionally, parents
provided written consent for their children to participate
in the study and interview as well as undergo a clinical
dental examination.

Sample size was calculated by dividing $Z_{\alpha}PQ$ with $d^2$;
P the prevalence of gingivitis, $d$ is precision, $Q$: $1–P$,
$Z_{\alpha}$: 0.05. The prevalence of gingivitis was 68% that
used from a population study in Jakarta.13 In order to
considering 10% for nonresponse, the minimum sample
was 479 children. Therefore, 481 students in this study
met the minimum required sample.

This study involved a dentist and an interviewer who
were trained and calibrated. Clinical examination was
performed at the schools using a 0.5-mm ball-ended
community periodontal index (CPI) probe, a disposable
dental mirror and a headlight. Periodontal status was
recorded using the CPI index based on World Health
Organization standards.12 Parents were given a question-
naire to collect information on their children’s backgrounds
and oral health-related behaviours.

Data were checked, cleaned, entered in Excel (Microsoft
Corporation, Redmond, WA, USA) and analysed with
SPSS. Non-parametric was tested in the analysis. Mann
Whitney test analyse the relationship between gingival
status and gender. Kruskal Wallis test analyse the
relationship gingival status with tooth brushing frequency,
chewing gum habit, and dental check-up.

**Results**

Of the 481 participating children, 403 (83.8%) had
calculus, 478 (99.4%) had bleeding gums and only one
had healthy gums (no bleeding gums and no calculus).
The prevalence of bleeding gums and calculus was 99%
and 84%, respectively. The prevalence of calculus was
higher in girls than in boys. However, the prevalence of
gingival bleeding was higher in boys than in girls
(Table 1). Parents were a factor significantly related to
periodontal status ($p < 0.01$; Table 2). Periodontal status
was not significantly related to tooth brushing frequency,
chewing gum frequency or dental check-ups (Table 3).

### Table 1. Average Numbers of Teeth with Gingival Bleeding and Dental Calculus According to Sex

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th>Median (min–max)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental calculus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys (n = 207)</td>
<td>4.5 (3.6)</td>
<td>4 (0–15)</td>
<td>0.772</td>
</tr>
<tr>
<td>Girls (n = 274)</td>
<td>4.6 (4.2)</td>
<td>4 (0–21)</td>
<td></td>
</tr>
<tr>
<td>Gingival bleeding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys (n = 207)</td>
<td>14.5 (6.4)</td>
<td>15 (1–28)</td>
<td>0.052</td>
</tr>
<tr>
<td>Girls (n = 274)</td>
<td>13.5 (6.9)</td>
<td>13 (0–28)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2. Prevalence of Sociodemographic Characteristics of Participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>N (%)</th>
<th>Median (min–max)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Jakarta</td>
<td>94 (19.5)</td>
<td>16.5 (3–28)</td>
<td>0.589</td>
</tr>
<tr>
<td>West Jakarta</td>
<td>76 (15.8)</td>
<td>15.5 (2–28)</td>
<td></td>
</tr>
<tr>
<td>East Jakarta</td>
<td>160 (33.3)</td>
<td>14 (1–27)</td>
<td>0.000*</td>
</tr>
<tr>
<td>South Jakarta</td>
<td>67 (17.5)</td>
<td>12 (0–27)</td>
<td></td>
</tr>
<tr>
<td>North Jakarta</td>
<td>84 (13.9)</td>
<td>10 (0–28)</td>
<td></td>
</tr>
<tr>
<td>Category of school</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>288 (59.9)</td>
<td>14 (2–28)</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>193 (40.1)</td>
<td>13.5 (0–28)</td>
<td></td>
</tr>
<tr>
<td>Father’s education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school or not going</td>
<td>46 (9.6)</td>
<td>17 (2–28)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Junior high school</td>
<td>92 (19.1)</td>
<td>15.5 (2–28)</td>
<td></td>
</tr>
<tr>
<td>Senior high school</td>
<td>240 (49.9)</td>
<td>14 (0–28)</td>
<td></td>
</tr>
<tr>
<td>Undergraduate or more</td>
<td>103 (21.4)</td>
<td>10 (0–28)</td>
<td></td>
</tr>
<tr>
<td>Mother’s education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school or not going</td>
<td>66 (13.7)</td>
<td>16 (2–28)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Junior High school</td>
<td>99 (20.6)</td>
<td>16 (2–28)</td>
<td></td>
</tr>
<tr>
<td>Senior High school</td>
<td>225 (46.8)</td>
<td>14 (0–28)</td>
<td></td>
</tr>
<tr>
<td>Undergraduate or more</td>
<td>91 (18.9)</td>
<td>11 (0–28)</td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.05
Discussion

Gingivitis and dental calculus are prevalent among children in this study. This may be due to economic barriers, leading to inequity in dental care. Health insurance expansion could potentially reduce economic barriers to dental care. This study was conducted after implementation of the Indonesian Universal Health Care Scheme, which may significantly reduce economic barriers to accessing dental care and may improve dental health in Indonesia. Indonesian people who live in remote areas do not have sufficient dental care access. However, the study sample includes children who live in the capital city of Indonesia with access to health care. Despite this fact, the oral health of these children remains poor. Thus, improving oral health of Indonesian citizens is challenging.

It is crucial to identify oral health problems in children to ensure effective planning and delivery of interventions. This epidemiological survey in Jakarta revealed that the oral health of 12-year-old schoolchildren was unsatisfactory and most had gingivitis. However, most of the children claimed to brush their teeth at least once a day. This inconsistency between reported dental hygiene practice and actual oral health could be due to children over-reporting their tooth brushing habits or improper brushing techniques. Gingival health can be restored through adequate oral hygiene practice. Motivation and regular reinforcement to maintain good oral health are essential in promoting children’s oral health. Proper school-based oral health programmes, which are feasible and effective in promoting gingival health in Indonesia, should be implemented.

Conclusions

Gingivitis and dental calculus were prevalent among 12-year-old Indonesian schoolchildren who live in Jakarta, the capital city. These oral health conditions were left untreated. Nearly all of the 12-year-old schoolchildren in this study had poor periodontal condition, indicated by calculus and gingival bleeding. Therefore, strategies to promote oral health and prevent periodontal disease are urgently required.

Acknowledgement

This study was supported by the Universitas Indonesia.

Conflict of Interest Statement

Authors declare no conflicts of interest in this research.

References