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# Comparison of gingival health status in adolescents puberty in rural and urban

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**Abstract. Background:** In growth and development, adolescent often experience health problem, one of them is dental and oral hygiene and gingival health. Gingivitis can occur at any age, but most often occurs at the age of puberty. Hormonal factors that become secondary factors or predisposition gingivitis one of them is a hormonal imbalance that is the increase in endocrine hormone at the age of puberty. Lack of awareness of the importance of oral and gingival health can lead to gingivitis or periodontitis. Objective: The purpose of this study was to determine the differences in gingival health status in adolescents aged puberty in rural and urban. Methods: This research is a descriptive observational research with cross sectional study design. The number of samples were 60 teenagers, each - 30 teenagers in Senior High School 4 Sidrap and Senior High School 10 Makassar. The data were collected by clinical examination using gingival index according to Loe and Sillness and data were analyzed by chi-square test. Result: The results obtained p value = 0.024 which indicates that there is a significant difference between adolescents aged puberty in rural and urban based on gingivitis criteria experienced. Conclusion: There is a difference in gingival health status in adolescents of puberty age in rural and urban areas based on gingivitis criteria experienced
Keywords: Gingivitis, Adolescent, Puberty, Rural, Urban

## 1. Introduction

Adolescence is a transitional period from children to adulthood. In this period various changes occur both hormonal, physical, psychological and social changes. This change happens very quickly and unknowingly [1].

In growth and development, adolescents often experience health problems, one of which is dental and oral hygiene.[2] The World Health Organization (WHO) recommends that school students be the right group to do health promotion efforts in maintaining the health of the oral cavity and surrounding tissues. In puberty a teenager will experience a variety of critical things in growing up to maturity so that requires mental adjustment and the formation of attitudes, values, and interests [3].

*World Health Organization* (WHO) recommended to undertake epidemiological studies of dental and oral hygiene in the 15-year-old age group which is the critical age for measuring indicators of adolescent periodontal disease as age for examination, since the fixed teeth that are the research indices have been fully grown. Poor oral hygiene can lead to gingival inflammation [3].

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In adolescents young adults are prone to periodontal diseases such as gingivitis and periodontitis. This can be seen from the WHO data in 2010 that the age of 15 years 48.7% experienced gingivitis due to calculus. At this age is vulnerable to calculus because there are still many teenagers who have bad habits that affect the status of oral and dental health in terms of periodontal status [4].

The gingiva is the mucosal part of the oral cavity that surrounds the tooth and covers the alveolar (ridge). It is part of the dental support apparatus, periodontium, and by forming a connection with the tooth, the gingiva serves to protect the tissue under the attachment of the tooth to the influence of the oral environment [5].

Gingivitis is an inflammation or inflammation that affects the soft tissues around the tooth of the gingival tissue. Clinical features of gingivitis are redness that appears on the gingival margin, enlargement of blood vessels in subepithelial connective tissue, loss of keratinization from the gingival surface and bleeding on probing [5].

Gingivitis can occur at any age, but most often occurs at the age of puberty. Hormonal factors that become secondary factors or predisposisi gingivitis is one of them is hormonal imbalances that increase endocrine hormone at age of puberty [6].

Periodontal tissue conditions, especially gingiva can also affect a person's diet associated with the place where he did socialization and interaction. Lack of awareness of the importance of oral and gingival health can lead to gingivitis or periodontitis.

From the report of National Basic Health Research (RIKESDAS) 2007, South Sulawesi Province. By type of area, the prevalence of dental and mouth problems is slightly higher in rural areas than in urban areas, whereas receiving dental treatment in rural areas is lower than in urban areas [7].

Based on RIKESDAS 2007, prevalence of dental and oral problem population according to regency/municipality in South Sulawesi Province, in Sidenreng Rappang District with dental and mouth health problems 27% and receiving dental treatment as much as 27.3%. Whereas in Makassar City experiencing dental and mouth health problems as much as 15.2% and who received treatment from dental medical personnel as much as 55.1% [7].

Based on these statements researchers are interested to conduct research on the comparison of gingival health status in adolescents aged puberty in rural and urban areas. For rural areas, researchers take samples in senior high school 4 Sidrap located in Rappang, District Panca Rijang, Sidenreng Rappang District. As for urban areas, researchers took samples in senior high school 10 Makassar, Makassar City. The results of this study are expected to provide useful information for the community about the comparison of gingival health status in adolescents in rural and urban areas.

## 2. Materials and methods

This research is a descriptive observational research with cross sectional study design. The number of samples are 60 teenagers, each - 30 teenagers in senior high school 4 Sidrap and senior high school 10 Makassar.

Clinical examination was performed by using periodontal probe and glass of mouth to obtain gingival index (gingival index) and then analyzed data using chi-square test to obtain comparison in rural and urban area. The score of examination result for gingival index is 0 = healthy gingiva; 0.1 - 1.0 = mild gingivitis; 1,1 - 2.0 = moderate gingivitis; 2,1 - 3,0 = severe gingivitis.

Prior to the clinical examination, adolescents in senior high school 4 Sidrap and senior high school 10 Makassar will fill out informed consent sheets in advance as a sign of approval that she is willing to be a research subject.

## 3. Result

**Table 1.** Distribution of samples based on age in the countryside.

| Age (year) | Quantity | Percentage (%) |
|---|---|---|
| 15 | 13 | 43,3 |
| 16 | 15 | 50 |
| 17 | 2 | 6,7 |
| Amount | 30 | 100 |

In the table above shows that the distribution of sample by age in senior high school Negeri 4 Sidrap the most at the age of 16 years as many as 15 people (50%), followed by the age of 15 years as many as 13 people (43.3%) while the fewest at the age of 17 year ie only 2 people (6.7%).

**Table 2.** Distribution of samples by sex in rural areas.

| **Gender** | **Age (Year)** | | | **Quantity** | **(%)** |
|---|---|---|---|---|---|
| | **15** | **16** | **17** | | |
| Man | 1 | 8 | 2 | 11 | 36,7 |
| Women | 12 | 7 | 0 | 19 | 63,3 |
| Amount | 13 | 15 | 2 | 30 | 100 |

In the table above shows the distribution of the sample by sex in senior high school Negeri 4 Sidrap the most widely in women ie 19 people (63.3%). Whereas in men only 11 people (36.7%). In the female sex of the most at the age of 15 years ie 12 people. In the male sex of the most at the age of 16 years ie 8 people and at least at the age of 17 years ie 2 people.

**Table 3.** Distribution of samples by age in urban areas.

| Age (year) | Quantity | Percentage (%) |
|---|---|---|
| 15 | 20 | 66,7 |
| 16 | 8 | 26,6 |
| 17 | 2 | 6,7 |
| Amount | 30 | 100 |

In the table above shows that the distribution of sample by age in senior high school 10 Makassar is the most at the age of 15 years as many as 20 people (66.7%), followed by the age of 15 years as many as 8 people (26.6%) while the least on age 17 years i.e. only 2 people (6.7%).

**Table 4.** Distribution of samples by gender in urban areas.

| Gender | Age (year) | | | Quantity | Percentage (%) |
|---|---|---|---|---|---|
| | 15 | 16 | 17 | | |
| Man | 4 | 3 | 0 | 7 | 23,3 |
| Women | 16 | 5 | 2 | 23 | 76,7 |
| **Amount** | 20 | 8 | 2 | 30 | 100 |

In the table above shows the distribution of the sample by sex in senior high school 10 Makassar, the most common in women is 23 people (76.7%) while in men only 7 people (23.3%). In the female gender of the most at the age of 15 years are 16 people and at least at the age of 17 years are 2 people. In the male gender of the most at the age of 15 years are 4 people.

**Table 5.** Comparison based on gingivitis severity.

| Group | Gingivitis Criteria | | | | | | | | Value p |
|---|---|---|---|---|---|---|---|---|---|
| | Health | | Easy | | Medium | | Weight | | |
| | n | % | n | % | n | % | N | % | |
| Rural | 1 | 3.3 | 5 | 16.7 | 16 | 53.3 | 8 | 26.7 | 0.024* |
| Urban | 2 | 6.7 | 13 | 43.3 | 14 | 46.7 | 1 | 3.3 | |

In the table above shows the comparison of adolescents aged puberty in rural and urban areas based on gingivitis criteria and obtained p value of 0.024 which means that there is a significant or significant comparison between adolescents aged puberty in rural with adolescents in urban.

**Table 6.** Comparison based on time of visit to dentist.

| Make a visit to the dentist | Group | Gingivitis Criteria | | | | | | | | Value p |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Health | | Easy | | Medium | | Weight | | |
| | | n | % | n | % | n | % | n | % | |
| When toothache | Rural | 1 | 5.3 | 1 | 5.3 | 13 | 68.4 | 4 | 21.1 | 0.018* |
| | Urban | 2 | 9.1 | 10 | 45.5 | 9 | 40.9 | 1 | 4.5 | |
| Never | Rural | 0 | 0 | 4 | 36.4 | 3 | 27.3 | 4 | 36.4 | 0.118 |
| | Urban | 0 | 0 | 3 | 37.5 | 5 | 62.5 | 0 | 0 | |

In the table above shows the comparison of adolescent age of puberty based on visits to dentists, groups, and gingivitis criteria. In the category of visits when dental pain obtained p value of 0.018 which means there is a significant (significant) difference between gingivitis criteria experienced by adolescents in rural and urban areas. While in the category of never visit to dentist obtained p value of

0.118 which means there is no significant difference between gingivitis criteria experienced by adolescents in rural and in urban.

## 4. Discussion

Gingivitis is an inflammation or inflammation that affects the soft tissues around the tooth that is gingival tissue.17 Clinical features of gingivitis are redness that appears on the gingival margin, enlargement of blood vessels in sub epithelial connective tissue, loss of keratinization from the gingival surface and bleeding on probing [8].

Hormonal factors that are secondary or predisposing to gingivitis include hormonal imbalances such as elevated endocrine hormones during puberty.9 Increased levels of endocrine hormones during puberty can cause vasodilation resulting in increased blood circulation in gingival tissue and sensitivity to local irritants, such as bacterial plaque biofilm, which results in puberty gingivitis [10].

Based on the results of the study, in rural areas aged 15–17 years old puberty who experienced gingivitis were 29 adolescents (96.7%) and 1 adolescent with healthy gingiva. As for urban areas, of 30 adolescents examined, there were 28 adolescents (93.3%) who had gingivitis and 2 adolescents with healthy gingiva. (table 5) Based on statistical calculations using chi-square test showed a significant difference or comparison between adolescents in rural and urban areas based on gingivitis criteria experienced.

The average gingivitis experienced in adolescents in rural areas was classified into moderate category (16 persons (55.2%), followed by 8 people in weight category (27.6%) and 5 people (17.2%) in light category. While the average gingivitis experienced in adolescents in urban areas are classified into mild to moderate categories are 13 people (46.4%) in the mild category, 14 people (50%) in the moderate category and only 1 person (3.6%) in the weight category (table 5).

This study shows that in adolescents who are in rural areas more experienced gingivitis compared with adolescents who are in urban areas. When seen from the category of gingivitis experienced, in adolescents in rural areas tend to experience gingivitis in the category of moderate to severe, whereas in adolescents in urban areas tend to experience gingivitis in the category of mild to moderate.

The high prevalence of gingivitis in rural areas can be attributed to the limitations of health facilities and medical personnel so that adolescents residing in rural areas find it difficult to obtain maximum health services including dental and oral services. In addition, in rural (rural) societies tend to have low socioeconomic status so as to be more concerned about the basic needs than the health problems themselves including dental and oral health.

When associated with adolescent level awareness of the importance of oral and gingival hygiene, based on results from questioner in adolescents in rural areas, there were 36.7% of adolescents who had never visited dentists and 63.3% of adolescents who visited dentist when toothache. In urban areas, there are 26.7% of urban adolescents who never visit dentists, and 73.3% of adolescents visit dentists when toothache. It also proves that the level of awareness of the importance of oral and gingival health in urban adolescents is slightly higher than in rural adolescents (table 6).

This research is in accordance with the report of National Basic Health Research (RIKESDAS) 2007, South Sulawesi Province. By regional type, the prevalence of dental and mouth problems is slightly higher in rural areas than in urban areas, whereas receiving dental treatment in rural areas is lower than in urban areas.

The results of this study, also in accordance with the study of Asdar and Taufiqurrahman[11] conducted in adolescents in Sinjai District in 2007 that showed that 70.3% of subjects experienced gingival bleeding. The high number of research subjects with gingival bleeding may be associated with poor oral hygiene. The results showed that gingival bleeding was accompanied by calculus according to the theory that periodontal disease occurred due to primary factors of bacterial irritation and secondary factors of local and systemic factors. Local factors may include erroneous restorations, caries cavities, waste piles, poorly designed designs, orthodontic appliances, irregular dental arrangements, mouth-breathing and smoking habits, while systemic factors may include genetic, nutritional, hormonal and hematologic (blood disease) [11].

In this study, as for systemic factors affecting gingival condition of adolescent age of puberty is hormonal factor. Hormonal changes that occur during puberty can cause severe inflammation followed by swelling and gingival bleeding. As for the local factors in the form of the number of calculus on the teeth caused by lack of awareness of the importance of oral health and gingiva.

## 5. Conclusion

There is a difference in gingival health status in adolescents of puberty age in rural and urban areas based on gingivitis criteria experienced. In adolescents in rural areas more experienced gingivitis compared with adolescents who are in urban areas. The high prevalence of gingivitis in adolescents in rural areas is due to a lack of awareness of the importance of oral and gingival health that is characterized by the large amount of calculus on the teeth. Adolescence also occurs hormonal changes that occur during puberty that can cause severe inflammation and followed by swelling and bleeding gingiva.

## 6. Suggestion

1. Further research is needed with a larger sample of research and broader area coverage.
2. It is expected that the attention of local government to overcome the limitations of health facilities and medical personnel so that teenagers, especially those living in rural areas can get the maximum health services including dental and mouth services.
3. Need to do counseling about the importance of maintaining healthy teeth and mouth and gingiva, especially in adolescents aged puberty.

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