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Differences in Caries Severity Based on Sociodemographic Factors in Pediatric Patients at Universitas Brawijaya Hospital

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ABSTRACT

Early childhood caries (ECC) is influenced by age and gender, with the severity of primary dental cavities being measured using dmf-t index. Therefore, this research aimed to identify differences in caries severity based on age and gender among pediatric patients at Universitas Brawijaya Hospital. The identification process was conducted through an analytical observational method using secondary data, comprising 71 medical records of pediatric patients receiving treatment in the hospital from April 2021 to November 2022. Medical records were observed by examining the number of teeth with decay, missing, and filling, as well as age and gender. According to the chi-square test results, there were no significant differences in caries severity based on age or gender ($p > 0.05$). In conclusion**,** this research showed no differences in caries severity based on sociodemographic factors in pediatric patients.

Keywords: Early Childhood Caries, Sociodemographic, Pediatric Patients

ABSTRAK

Early childhood caries (ECC) dapat dipengaruhi oleh usia dan jenis kelamin. Tingkat keparahan karies pada gigi sulung diukur menggunakan indeks dmf-t. Penelitian ini bertujuan untuk mengetahui perbedaan tingkat keparahan karies berdasarkan sosiodemografi pada pasien anak di Rumah Sakit Universitas Brawijaya. Penelitian ini merupakan penelitian observasional analitik dengan menggunakan data sekunder yaitu tujuh puluh satu rekam medis pasien anak yang berkunjung dan menerima perawatan di Rumah Sakit Universitas Brawijaya pada bulan April 2021 sampai November 2022. Rekam medis diobservasi dengan melihat jumlah gigi yang karies, hilang, direstorasi, serta usia dan jenis kelamin. Berdasarkan hasil uji chi-square tidak terdapat perbedaaan tingkat keparahan karies yang signifikan pada pasien anak baik berdasarkan umur maupun jenis kelamin ($p>0.05$). Kesimpulan dari penelitian ini adalah tidak terdapat perbedaan tingkat keparahan karies berdasarkan sosiodemografi pada pasien anak di Rumah Sakit Universitas Brawijaya.

Kata Kunci: Early Childhood Caries, Sosiodemografis, Pasien Anak

1. Introduction

Teeth decay, also known as caries, is a persistent condition affecting the structure of teeth. and can develop slowly to cause discomfort. Furthermore, it is often caused by several factors, including the host, microorganisms, substrate, and time [1]. In children under 71 months of age, the occurrence of caries is called Early Childhood Caries (ECC), while those below 3-year-old are referred to as Severe Early Childhood Caries (S-ECC) [2].

ECC is the presence of one or more decayed (noncavitated or cavitated lesions), missing, and filled teeth surfaces among primary teeth in children under 6 years old. Meanwhile, S-ECC is characterized by smooth-surface-caries in children under 3-year-old, which manifests as the presence of cavitated lesions, missing, or filled smooth surfaces in primary maxillary anterior teeth. The severity of S-ECC is generally shown by a decayed, missing, or filled score of ≥ 4, ≥ 5, and ≥ 6 for children under age 3, 4, and 5, respectively [3].

The causes of ECC can be attributed to several factors, categorized into primary and secondary risks. Specifically, primary risk factors include dietary patterns such as bottle-feeding practices, oral hygiene habits, and fluoride exposure. Meanwhile, secondary risk factors include stress, which is associated with the receptiveness of children to dental care [4]. ECC can also be influenced by age, gender, parental education, and roles [5]. In Indonesia, teeth decay is a significant issue, ranking among the most prevalent oral health problems in the country. According to the 2018 Basic Health Research (Riskesdas), 45.3% of the population had experienced teeth decay, reaching 81.5% among 3 to 4-year-old and 90.2% in 5-year-old children [6].

The dmf-t index is often used to measure the severity of caries in primary teeth, representing the cumulative number of teeth affected by caries [7]. In Indonesia, dmf-t index for children falls into the 'very high' category for 5-year-old and the 'high' category for 3 to 4-year-old [6]. Among various hospitals in the country, Universitas Brawijaya Hospital is recognized as a referral center for addressing dental and oral concerns, serving as the primary hub for pediatric dental care. Therefore, this research was carried out to explore differences in caries severity based on sociodemographics in pediatric patients at Universitas Brawijaya Hospital.

2. Methods and Materials

This research was carried out using an analytical observational design where a total sampling method was applied to obtain medical records of pediatric patients receiving treatment in Pediatric Dentistry Department of Universitas Brawijaya Hospital. These records are stored in a room that can only be accessed by hospital administration officers, with proper monitoring of accessibility. The data obtained for analysis include dmf-t, age, and gender of patients. This research has passed through ethical review and received approval from the Ethics Committee for Health Research at the Health Polytechnic of the Ministry of Health in Malang (Number: 708/KEPK-POLKESMA/2022).

The inclusion criteria were 82 medical records of pediatric patients aged less than 71 months, diagnosed with ECC between April 2021 and November 2022, as well as documented comprehensively in Pediatric Dentistry Department of Universitas Brawijaya Hospital. Meanwhile, the exclusion criteria included incomplete medical records and the absence of panoramic radiographs. This led to the exclusion of 11 medical records, thereby only 71 were used for further analysis.

Medical records meeting the specified criteria were observed to identify teeth affected by caries, missing, and restored, as well as to record age and gender of patients. Subsequently, the data were processed and analyzed to determine dmf-t index as well as differences based on age and gender among pediatric patients using the Statistical Analysis for Social Sciences (SPSS) Statistics Version 26.

3. Results

A total of 71 patients receiving treatment between April 2021 and November 2022 met the inclusion and exclusion criteria. Based on the medical records, data distribution was analyzed in terms of age and gender. The results showed that the majority of pediatric patients registered were male (52.1%), where 84.5% were 5-year-old, as presented in Table 1.

Table 1**.** Characteristics of respondent demographic.

Characteristics	n (%)
Age	
3 years old	4 (5.6%)
4 years old	7 (9.9%)
5 years old	60 (84.5%)
Gender	
Males	37 (52.1%)
Females	34 (47.9%)

dmf-t index for pediatric patients at Pediatric Dentistry Department of Universitas Brawijaya Hospital was found to be 10.8. Based on Table 2, the average dmf-t index was lowest at 6.3 for patients aged 3 years and highest at 11.1 for 5-year-old. The results of Kruskall-Wallis test based on age showed that dmf-t index variable did not show a significant difference among the three age categories, with p-value of 0.218 (p >0.05). This showed that there were no significant differences in dmf-t among the three age categories.

Table 2. dmf-t index in patients by age

Category	Total (n=71)	3 years old (n=4)	4 years old (n=7)	5 years old (n=60)	p (0.05)
Decay	702	26	71	605	
Missing	63	0	4	59	0,218
Filling	2	0	0	2	
Total	767	26	75	666	
dmf-t index	10.8	6.5	10.7	11.1	

Based on Table 3, the average dmf-t index was higher for female patients (11.3) compared to males (10.2). Kruskall-Wallis test conducted based on gender showed that dmf-t index variable did not have a significant difference, with p-value of 0.355 (p >0.05). This suggested that there was no significant difference in dmf-t scores between males and females.

Table 3. dmf-t index in patients by gender

Category	Female (n=34)	Male (n=37)	p (0.05)
Decay	343	359	
Missing	43	20	0,355
Filling	1	1	
Total	387	380	
dmf-t Index	11.3	10.2	

4. Discussion

The severity of a disease, ranging from mild to severe, can be measured using an index. Regarding dental health, caries index is used to obtain data for assessing the status of an individual, specifically dmf-t index, representing decayed, missing, filled teeth [8]. In this research, the analysis conducted based on age showed significant results, where 3-year-old children had dmf-t index of 6.5, categorized as high (4.5-6.5). Meanwhile, dmf-t index values for age of 4 and 5 years were calculated to be 10.7 and 11.1, respectively, categorized as very high (>6.5). This information showed caries severity among pediatric patients, with higher dmf-t index values suggesting a greater level of dental caries [9]. The results showed that older age corresponded to higher dmf-t index value, suggesting a more severe condition [7,8].

Based on dental care and oral hygiene history recorded in the medical records, the high dmf-t index in 5-year-old patients was due to irregular teeth brushing habits. Some of patients started brushing the teeth at the age of 4 or 5, suggesting the need for early implementation of teeth brushing habits. For 3-year-old children, teeth brushing habits are mostly assisted by parents but not regularly, with inappropriate timing [10].

The increase in caries with age is in line with the etiology theory of caries, requiring a significant amount of time [10]. This is consistent with previous research, where the average dmf-t index increases with age, ranging from 3.5 to 5.5, and 8.14 for 3-year-old, 4-year-old, and 5-year-old [8,11]. Based on the 2018

Riskesdas, the average dmf-t index for 5-year-old children is categorized as "very high", with a score of 8.1 (>6.5). Meanwhile, for 3-4-year-old children, the average dmf-t index is classified into the "high" category at 6.2 (4.5-6.5) [12].

Based on gender, dmf-t index was higher in females (11.3) compared to males (10.2), although statistical analysis did not show a significant difference. The high incidence of caries in females could be attributed to the frequent consumption of cariogenic food [13]. Additionally, the eruption of teeth in females occurs earlier compared to males, which increases susceptibility to caries [14]. In comparison, previous research reported a significantly higher prevalence in females (56.8%) than males (43.2%) [15]. A research conducted in Rohtak, India, also showed a higher prevalence of caries in females (34.3%) compared to males (30.3%) [16].

The results of Kruskal-Wallis analysis showed that there were no differences in dmf-t index based on age or gender. The high incidence of caries was influenced by the habit of maintaining oral health among children [11,13,14]. Based on the examination of medical records, some children were found to have unhealthy habits, such as consuming milk until bedtime, and irregular brushing behavior both in terms of frequency and timing. This is also evident in the 2018 Riskesdas data, showing a lack of knowledge and improper teeth brushing behavior. Based on previous research, only 0.66% of 3 to 4-year-old and 0.56% of 5-year-old children showed proper brushing behavior [6], while 2.31% of Malang population practice adequate dental health [12].

The high dmf-t index is attributed to the prevalent lack of visiting a dentist or receiving dental care due to genetics, environment, behavior, and healthcare services [13]. A significant contributing factor is that the majority of people only visit dentists when their condition has become severe, thereby impacting oral health condition [17]. According to the 2018 Riskesdas, 96.3% of 3-4-year-old and 97% of 5-year-old children have not sought dental care from dentists, with a corresponding 97.22% in Malang City [12].

The increased prevalence of dental caries cases among children aged 3-5 years showed high consumption of sugary foods two or more times daily [18]. The elevated occurrence of ECC in this age group is associated with improper or inadequate feeding practices. For example, the history of bottle-feeding with milk or breastmilk until children fall asleep without drinking water contributes to ECC. The habit of providing liquids containing easily fermentable carbohydrates, such as formula milk, can increase the risk of caries. This is influenced by contact between the sugar in liquids and oral bacteria, particularly Streptococcus mutans, which metabolize the sugar into acid, leading to the demineralization process. Moreover, improper teeth brushing methods can affect oral hygiene and contribute to the occurrence of caries [2,7].

Parental engagement plays a crucial role in maintaining oral health of children, including teaching appropriate brushing methods, reducing the consumption of sugary foods, and increasing knowledge about dental health [19]. The knowledge of parents, particularly mothers, can be influenced by various factors such as level of education, age, social status, experience, environment, and occupation. Therefore, mothers should be aware of the types of healthy foods and beverages, as high consumption of cariogenic foods is associated with greater caries severity [20]. Regular dental check-ups every 6 months are also highly recommended to maintain adequate oral health [21].

5. Conclusions

In conclusion, this research showed no significant differences in dmf-t based on age and gender among pediatric patients receiving treatment at Universitas Brawijaya Hospital. Based on recommendations, future research should extend the scope of investigation to identify the underlying factors contributing to the high caries rate in primary teeth.

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7. Conflicts of Interest

The authors declare no conflicts of interest to disclose concerning this research.

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