Socio-Economic Factors associated with Tooth Extraction in Can Tho

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Abstract

Tooth loss can lead to occlusal disorders and temporomandibular joint issues, resulting in pain and deteriorating chewing ability. Oral health problems affect health-related quality of life, especially anxiety, distress, and shame. However, the number of studies describing these effects in Vietnam is still limited.

To describe clinical, subclinical characteristics and some related factors in patients with tooth extraction.

A descriptive cross-sectional study was conducted on 200 patients aged 18 years and older with tooth extraction at Can Tho University of Medicine and Pharmacy Hospital. The information about age, sex, education, place of residence, the reasons for tooth extraction, clinical and subclinical characteristics, and the number of extracted teeth was recorded. Data were analyzed using SPSS 20's Frequency test, Chi-Square test, and Fisher's Exact test.

Out of 256 teeth extracted, in which the main reason was misaligned teeth (38.28%), followed by decayed teeth (25.39%) and retained roots (12.89%). Tooth extraction was more common in women (63.32%) than men (36.68%). People who brushed their teeth less than twice a day, and did not have dental visits in the past 12 months accounted for the highest proportion (92.5%, 58.5%). There was also a statistically significant difference between urban (71.43%) and rural (28.57%) patients. Low education level was the reason for the prevalence of oral diseases, while higher education level played a preventive role ($p=0.046<0.05$). In the elderly group, the proportion of patients with tooth extraction due to oral disease increased ($p=0.002<0.05$).

On average, a patient had less than two teeth extracted. Tooth decay and misaligned teeth were the most common causes of extraction. It was reported that some socio-economic factors are associated with tooth extraction.

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Introduction

In recent decades, the treatment tends to be "maximum restorative, minimally invasive" and tooth extraction is considered a last resort or the only option in some cases[1]. Extraction is a common treatment for oral diseases, mainly caries, and periodontal diseases with complex etiology and biological, social, and behavioral risk factors. Each tooth has a specific role in the sets of teeth and is an indispensable part of the chewing system[2]. Therefore, loss of teeth causes occlusal disorders, and changes in the temporomandibular joints, thereby leading to pain, and dysfunctional chewing[3]. Oral health problems have a negative impact on the quality of life such as anxiety, stress, shame, daily activities, and social relationships[4, 5]. The correct diagnosis of the dental condition and appropriate treatment will help patients avoid complications, a waste of time and money. It is the evaluation of clinical features, subclinical images, and cause of tooth extraction that greatly contributes to the process of diagnosis and treatment. However, in Vietnam, few studies have been done to assess the impact of factors associated with causes of tooth extraction in public health facilities, especially at the Can Tho University of Medicine and Pharmacy Hospital. Therefore, this study was conducted with the goal of analyzing the

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relationship between oral health status, socio-economic factors of patients, and tooth extraction at Can Tho University of Medicine and Pharmacy Hospital.

Materials and methods

The descriptive cross-sectional study was done in patients aged 18 years and older with tooth extraction at Can Tho University of Medicine and Pharmacy Hospital from September 2020 to June 2021. In this study, all patients are willing to participate and those patients with acute pathology (acute stroke, myocardial infarction, acute renal failure, severe pneumonia), severe fluid and electrolyte disturbances, impaired consciousness, mental problems, pregnancy, concomitant systemic diseases (coronary artery disease, autoimmune disease, malignancy receiving immunosuppressive drugs or chemotherapy) are excluded. Convenience sampling was used, and the sample size was calculated with the following formula: (patients)

$$n = Z^2_{1-\frac{\alpha}{2}} \times \frac{p \times (1-p)}{d^2} = 1.96^2 \times \frac{0.843 \times (1-0.843)}{0.05^2} = 200$$

Where n is the number of samples; Z (standard value) = 1.96 for α = 0.05; d (precision for prevalence) = 0.05; p (expected prevalence) = 0.843 according to Saliva et al. (2017)[6] .

The information about general characteristics (age, gender, place of residence), causes of tooth extraction, and socio-economic factors (education level, habits of dental care) were collected with medical record information and patient interviews (Table 1, 2, 3, 4).

Data were entered in Microsoft Excel 2019 and analyzed using SPSS 20's Frequency test, Chi-Square test, and Fisher's Exact test, where p was considered as less than 0.05.

The study was approved by the Ethics Committee of Can Tho University of Medicine and Pharmacy. Patients were given a clear explanation of the study and had the right of participating and withdrawing from a study at any time. The data obtained in this study are kept strictly confidential and will be used only for research purposes.

Results

In the study of 200 patients, in terms of demographic characteristics, 74 patients were male (37%) and 126 patients were female (63%). Patients over the age of 60 accounted for the highest proportion (36.5%), followed by the 18-24-year-old group (21%), followed by the 45-59-year-old group (17%). The proportions of 25-34 years old (15.5%) and 35-44 years old (10%) were lower respectively. In terms of socio-economic characteristics, the proportion of patients with a university or higher was the highest (41.73%), followed by those with middle, and high school education (33.86%), followed by a primary school, and illiterate were 14.17%, and 9.45%, respectively, with a minimum illiteracy rate of 0.79%.

		n	%	p
Demographic variables	Sex (n=200)			
	Male	74	37	0.782*
	Female	126	63	
	Age group (n=200)			
	18-24	42	21	
	25-34	31	15.5	
	35-44	20	10	0.002**
	45-59	34	17	
	60+	73	36.5	
Indicators of socioeconomic status	Education (n=127)			
	Illiterate	1	0.79	
	Primary school	12	9.45	
	Middle and High School	43	33.86	0.734**
	College	18	14.17	
	University or higher	53	41.73	
	Place of residence (n=197)			
	Urban	140	71.07	0.014*
	Rural	57	29.03	
Dental care behaviors	Brushing (n=200)			
	Twice a day	185	92.5	0.965*
	Less than twice a day	15	7.5	
	Flossing (n=200)			
	Once a day or more	98	49	<0.001*
	Less than once a day	102	51	
	Dental visits in the past 12 months (n=200)			
	No	117	58.5	0.932*
	Yes	83	41.5	

Table 1. Sample distribution based on socio-demographic variables and oral health behaviors.

Also in the socioeconomic characteristics group, the proportion of patients living in urban areas was 71.07%, and the proportion of patients living in rural areas was 29.03%. In the oral care habits group, 92.5% brushed their teeth twice a day, and 7.5% brushed their teeth less than twice a day. For the flossing habit, the ratio of 1 or more daily to less than 1 or no daily use was approximately 49/51. In the follow-up rate of the past 12 months, most patients answered "no" (58.5%), and the rest answered, "yes" (41.5%).The most common cause of tooth extraction was misaligned teeth 38.28% (98

patients), followed by caries 25.39% (65 patients) and retained roots 12.89% (33 patients). Tooth extraction for orthodontic reasons and periodontal diseases were at a low rate of 6.64% and 7.03%, respectively.

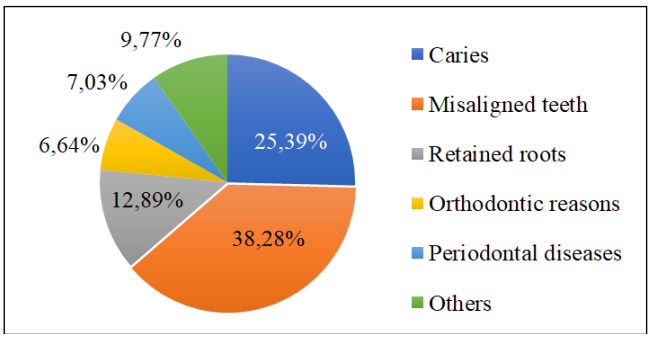

Figure 1. Causes of tooth extraction.

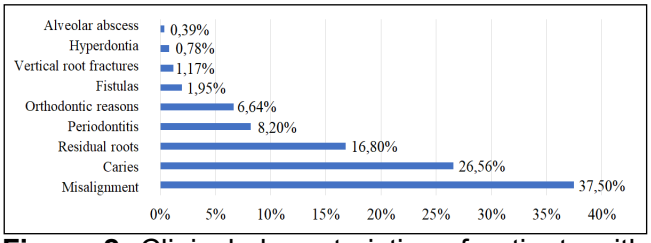

Figure 2. Clinical characteristics of patients with tooth extraction.

Out of 256 teeth extracted, teeth were stuck, misaligned, and underground eruptions had the highest rate of 37.50%, followed by caries at 26.56%, and residual roots at 16.8%. Both periodontitis and orthodontic reasons were 6.64% while hyperdontia, fistulas, loose teeth, vertical root fractures, and alveolar abscess had the lowest rate.

Causes	Place of residence (n, %)		χ^2	p*
	Rural	Urban		
Caries	13 (28.26%)	33 (71.74%)		
Misalignment	23 (27.38%)	61 (72.62%)		
Retained roots	7 (33.33%)	14 (66.67%)		
Orthodontic reasons	2 (18.18%)	8 (81.82)	1.537	0.909*
Periodontal diseases	4 (30.77%)	9 (69.23%)		
Others	8 (36.36%)	14 (63.64%)		

Table 2. Causes of tooth extraction in Place of residence *Chi-square test *(χ2)*

In this study, tooth extractions were more common among patients living in urban areas.

In patients whose education was above primary school, the rate of tooth extraction due to caries was 86.16%, due to misalignment was 94.9% and due to residual roots was 93.9%. There was a statistically significant difference among all groups (p<0.05).

Causes	Education level (n, %)					Total (%)	χ^2	p*
	Illiterate	Primary school	Middle and High School	College	University or higher			
Caries	2 (3.08)	7 (10.77)	34 (52.31)	9 (13.85)	13 (20.00)			
Misalignment	-	4 (4.08)	43 (43.88)	14 (14.29)	36 (36.73)			
Retained roots	-	2 (6.06)	20 (60.61)	6 (18.18)	5 (15.15)			
Orthodontic reasons	-	1 (5.88)	11 (64.71)	-	5 (29.41)	100	3.986	0.046
Periodontal diseases	-	3 (16.67)	11 (61.11)	2 (11.11)	2 (11.11)			
Others	-	3 (12)	11 (44)	5 (20)	6 (24)			

Table 3. The relationship between the causes of tooth extraction and education levels.
*Chi-square test *(χ2)*

	Age (n, %)		χ^2	p*
	< 40	≥ 40		
Clinical features				
Caries	17 (34.69%)	32 (65.31%)		
Periodontitis	1 (9.09%)	10 (90.91%)		
Misalignment	59 (69.41%)	26 (30.59%)		
Orthodontic reasons	9 (81.82%)	2 (18.18)		
Residual roots	6 (20.69%)	23 (79.31%)	45.317	0.001*
Hyperdontia	1 (50%)	1 (50%)		
Fistulas	4 (80%)	1 (20%)		
Loose teeth	-	3 (100%)		
Vertical root fractures	2 (66.67%)	1 (33.33%)		
Alveolar abscess	1 (100%)	-		
Causes				
Caries	16 (34.04%)	31 (65.96%)		
Misalignment	60 (69.77%)	26 (30.23%)		
Retained roots	5 (23.81%)	16 (76.19%)		
Orthodontic reasons	9 (81.82%)	2 (18.18)	37.502	0.002*
Periodontal diseases	1 (8.33%)	11 (91.67%)		
Others	9 (40.91%)	13 (59.09%)		

Table 4. The relationship between age groups and clinical features, causes of extracted teeth.
*Chi-square test *(χ2)*

The difference was statistically significant between the age groups and clinical characteristics (p=0.001<0.05). The rate of patients with caries in the group over 39 years (65.31%) was higher than people under 40 years (34.69%). Gingivitis and periodontitis were seen mostly in the group over 39 years (90.91%). However, the majority of people with stuck, misaligned, and hidden teeth were in the group for under 40 years (69.41%). The group over 39 years had more teeth extracted due to residual roots (79.31%). The difference was statistically significant in the age groups and causes of tooth extraction (p=0.002<0.05). In the study, it was found that the cause of tooth decay in the group of patients over 39 years (65.69%) was higher than in the group under 40 years (34.04%). People under 40 years old had more teeth extracted due to misaligned teeth (69.77%) and orthodontic reasons (81.82%). In the group over 39 years, the percentage of residual roots and periodontal diseases were higher at 76.19%, and 91.67%, respectively.

Discussion

Patients who participated in this study belonged to the population in Southern Vietnam, which was similar to the study of Nguyen et al[7]. On average, each patient had less than 2 extracted teeth. More women (63%) had teeth extracted than men (37%) and teeth extraction of women in rural areas (29.03%) was less than in urban areas (71.07%). This result was consistent with the study of Humphrey et al, whereas the study of Kida et al revealed that teeth extraction in women was fewer than in men (ratio of 6.6/6,3)[8, 9]. The elderly had more teeth extracted than the young[10]. Out of various causes of tooth extraction, the most common was misaligned teeth (38.28%), caries (25.39%), and residual tooth roots (12.89%), which is similar to the study of Jovino-Silveira et al conducted on 466 tooth extractions with 63.3% due to tooth decay, 13.1% due to periodontal diseases, 12% for orthodontic reasons[11]. Also, Al-Shammari et al carried out with 2,783 extracted teeth of 1,604 patients (1.73 ± 0.07 teeth per patient) and concluded that tooth decay and periodontal diseases were 43.7% and 37.4% of all extractions, respectively[12].

In the oral care habits group, 92.5% brushed their teeth twice a day and 7.5% brushed less than twice a day. For flossing, the ratio of 1 or more to less than 1 or no floss per day was approximately 49/51. For the follow-up rate over the past 12 months, most patients answered "no" (58.5%), and the remaining patients answered, "yes" (41.5%). This study differs from that of Ghorbani et al, according to this study, the ratio of brushing twice a day and less than twice a day was about 1 in 1 (51.4/48.6), while regular flossing, up to less than 1 time a day (62.8%), 53.8% of patients answered yes to dental examinations in the past 12 months[13].

The approach to dental care services varied in different regions and access to dental care in urban areas was easier than in rural areas, thereby the proportion of patients in rural areas (29.03%) was less than in urban areas (71.07%), which was similar to the study of Olivia Jo et al in the UK, and Zhu Jin et al[14, 15]. These studies reported that the distribution of dental examination and treatment facilities was uneven, mostly concentrated in urban areas, and people in rural areas hesitated about routine check-ups and treatment because of time-consuming and long distances, leading to worsening of the health condition.

Females had higher indications of tooth extraction than males. This result is also similar to previous studies on gender distribution in patients with indications for tooth extraction[13]. The authors argued that women were more sensitive to psychological stress and more concerned about oral health status than men. In addition, different stages in a woman's life such as puberty, menstruation, pregnancy, and menopause had different effects on oral health because the lining of the mouth containing estrogen receptors and changes in hormone levels directly affected the oral cavity[16].

In this study, tooth extraction in people with low education levels was due to dental diseases, while in those who were in higher education was due to prevention purposes ($p=0.046<0.05$). Low education was believed to be a risk factor for poor oral health knowledge and poor oral hygiene habits, which led to the increase in missing teeth[17]. In the older age group, the proportion of patients with tooth extraction due to oral diseases increased ($p=0.002<0.05$) including caries (65.96%), residual roots (76.19%), and periodontal diseases (91.67%), whereas in the younger age group, tooth extraction was to prevent oral diseases consisting of stuck and misaligned teeth (69.77%), and orthodontic treatment (81.82%). In the previous study, the rate of tooth loss was high in all ages, and molars were mostly affected according to the study by Qian Zhang[18]. Tooth decay was the main reason for tooth extraction in people under 40 years old, while people over 39 years old were mainly periodontal diseases. Also, patients with low education had their teeth extracted because of caries and residual roots, while patients with higher education had misaligned and stuck teeth ($p=0.046<0.05$). These results were similar to the previous studies in Brazil and Tanzania that people with socioeconomic status were found to be at high risk of tooth loss[8, 11].

Conclusions

According to the findings of this study, on average, less than two teeth were taken per patient; dental decay and misaligned teeth are the most common reasons for tooth extraction. Women had better oral health knowledge than males. Access to dental treatment varies by

patient location (rural vs. urban), place of residence, and educational level. The proportion of patients who had tooth extractions due to oral illness grows with age, whereas the younger age group (< 40 years) had tooth extractions to prevent dental disease.

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Declaration of Interest

The authors report no conflict of interest.

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