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Awareness Level of Post Extraction Malocclusion Among Patients Attending University of Rwanda Dental Teaching Clinic

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Abstract

Background

Malocclusion, a common oral condition, can result from genetic or environmental factors, with hereditary influences being the most prevalent. Tooth extraction, a frequently performed dental procedure, can disrupt dental harmony, leading to malocclusion. This condition has broad implications, including physical discomfort, social difficulties, and psychological distress, such as pain, reduced social interaction, academic challenges, bullying, and feelings of inferiority. Understanding and addressing the awareness levels regarding post-extraction malocclusion is crucial to minimizing its negative effects on oral health and overall well-being.

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Objective of The Study

The study aimed to evaluate the awareness of post-extraction malocclusion among patients at the University of Rwanda Dental Teaching Clinic.

Methodology

A cross-sectional approach was used, involving 384 patients with a history of tooth extraction. These patients, surveyed over two months, provided insights into their understanding of the potential consequences of extractions on dental alignment. The assessment focused on how education and socioeconomic status influenced awareness levels.

Results

The results revealed a significant lack of awareness among patients, with 66.9% unaware that tooth extraction could cause malocclusion. The survey showed that education and socioeconomic status were critical factors in awareness levels. Patients with higher education and socioeconomic status demonstrated greater awareness. Despite various reasons for tooth extraction, nearly half of the respondents (45.1%) believed their teeth could not be saved, and a large majority (84.4%) did not engage in regular dental checkups. Notably, there was no significant difference in awareness between male and female patients.

Conclusion

The study concludes that most patients at the University of Rwanda's dental clinic are unaware of the risk of post-extraction malocclusion. The findings underscore the importance of enhancing education and awareness, particularly among individuals from lower socioeconomic backgrounds and those with less formal education. Improving awareness could lead to better oral health outcomes and overall well-being by encouraging preventive measures and regular dental checkups.

Keywords

Awareness level; Malocclusion; Tooth extraction.

Introduction

Malocclusion

Can be defined as an appreciable deviation from the normal occlusion that may be considered aesthetically or functionally unsatisfactory [1]. The normal occlusion as postulated by Angle is that the upper first molars were the key to occlusion and that the upper and lower molars should be related so that the upper molar's mesiobuccal cusp occludes the lower molar's buccal groove. If the teeth were positioned on a gently curved occlusion line and this molar relationship existed, then normal occlusion would result.

Angle then described three classes of malocclusion, depending on the first molars' occlusal arrangements:

- **Class I:** The molars are in their normal position, but the line of occlusion is incorrect because of malposed teeth, rotations, or other causes.
- **Class II:** Lower molar distally positioned relative to upper molar line of occlusion not specified.
- **Class III:** Lower molar mesially positioned relative to upper molar, line of occlusion not specified

[2].

This dental misalignment is a prevalent condition that affects a significant portion of the global population and manifests as crowded teeth, overbite, underbite, cross bite, or other irregularities.

Tooth extraction

This is the painless removal of the whole tooth or tooth root with minimal trauma to investing tissue so that the wound heals uneventfully [3]. One common cause of malocclusion is tooth extraction without undergoing prosthetic rehabilitation, a procedure frequently performed to alleviate dental issues such as overcrowding, decay, or periodontal disease.

The level of awareness

Refers to an individual's knowledge and understanding of a particular topic or condition. In the context of malocclusion following tooth extraction, the level of awareness pertains to how well individuals understand the potential consequences and preventive measures associated with this condition. Awareness plays a crucial role in addressing oral health issues effectively and seeking appropriate treatment. However, the awareness of individuals regarding the potential occurrence of malocclusion after tooth extraction remains a critical aspect that demands attention. In the context of this research, data collection will be conducted at University of Rwanda Dental Teaching Clinic, which is located in Kigali City. Kigali City, the capital and largest city of Rwanda, is a vibrant urban center with a growing population. The city has experienced significant development in various sectors, including healthcare.

However, there is limited research available specifically focusing on malocclusion awareness following tooth extraction among individuals in Kigali City. This research focuses on assessing the level of awareness on malocclusion that occurs after tooth extraction in patients attending University of Rwanda Dental Teaching Clinic. By examining the knowledge and understanding of individuals regarding this potential post-extraction consequence, this study aims to shed light on the need for education and intervention in promoting oral health awareness within the population.

Aim and Objectives

The aim of the study is to assess the level of awareness on post extraction malocclusion among patients attending University of Rwanda Dental Teaching Clinic.

Research methodology

This research was done at the University of Rwanda Dental Teaching Clinic. It is located in Kigali city, Gasabo District, Kimironko Sector in University of Rwanda Remera Campus. It is a teaching clinic for dental surgery students and dental therapy students who are in the clinical placement. It receives patients from all Provinces of the country, but most patients are from Kigali city. This is a cross-sectional study, Involving data collection from a sample of the population at a single point in time. There was a selection of the most accessible patients from the population of interest attending the University of Rwanda Dental Teaching Clinic.

Inclusion criteria

People who underwent tooth extraction and accepting to participate in the research.

Exclusion criteria

- People who haven't undergone tooth extraction
- People who will not be willing to participate in the study
- People with mental disorders.
- People who are in a dilemma if they have or haven't undergone tooth extraction.

Data analysis methods

Data were systematically collected using questionnaires. Once responses were received, data were entered into SPSS for analysis. Errors checked for missing values, and inconsistencies in the data set and ensure all responses are properly coded. Descriptive statistics were done to summarize the data. The results are presented in the form of tables. Statistical analysis is presented in Percentages and Frequencies. Bivariate analysis using Chi square was done to assess associations between categorical variables. Confidence level was set at 95% at p-value of 0.05. SPSS version 25 released in 2017 aided in quantitative analysis of the collected data with p-value set at 0.05.

Ethical considerations

Ethical approval was obtained from UR CMHS research board before data collection begins. Informed consent was obtained from all participants before participating in the research. Patients under the age of 18, had their consents signed by their parents or guardians. Confidentiality and anonymity of participants were guaranteed.

Data presentation

Variable	Frequency
(n=384)	
	Percent (%)
Sex	
	Female
Male	257
	127
	66.9
	33.1
Age group	
	0-14
15-64	
65-100	
	1
	367
	16

	0.26
9.4	
4.17	
Educational level	
	None
Primary	
Secondary	
University	49
130	
137	
68	12.8
33.8	
35.7	
17.7	
Socio-economic status	
	Division 1
Division 2	
Division 3	
Division 4	
	24
179	
178	
3	
	13.8
5.8	
23.9	
20.3	

Table 1: Sociodemographic characteristics of study participants.

Demographics

The majority of respondents were female (66.9%) compared to males (33.1%). The distribution shows that a significant proportion have secondary education (35.7%) followed by primary education (33.9%), while fewer have university education (17.7%), and a small portion have no education (12.8%). Most respondents fall under Division 2 (46.6%) and Division 3 (46.4%), indicating a predominantly middle-income bracket. Only a small percentage belong to Division 1 (6.3%), which likely represents lower-income individuals, while very few are in Division 4 (0.8%), indicating higher-income individuals (Table 1).

Variable	Frequency
(n=138)	
	Percent
(%)	
Awareness on malocclusion	Yes
No	
	176
	208
	45.8
	54.2
Awareness on how extraction can lead to malocclusion	Yes
No	
	127
	257
	33.1
	66.9
Confidence in recognizing the signs of malocclusion	1not confident all
2 less confident	
3 fairly confident	
4 good confident	
5very confident	
	146
	93
	63
	51
	31
	38.8
	24.2
	16.4
	13.3
	8.1
Experience on malocclusion symptoms after tooth extraction	Yes
No	
	92
	213
	24
	55.4

Number of teeth extracted	
Last time of tooth extraction	1 tooth
2 teeth	
3 teeth	
Above 3 teeth	
Fixed partial denture(crown and bridge)	
Less than 6 months	
6-12 months	
12-18 months	
Above 18 months	
	93
	128
	79
	84
	7
	293
	102
	60
	81
	141
	24.2
	33.3
	20.6
	21.9
	1.8
	76.3
	26.6
	15.6

	21.1	
	36.7	

Table 2: Knowledge about Malocclusion.

Knowledge about Malocclusion

About half of the respondents (45.8%) know what malocclusion refers to, but a significant portion (54.2%) do not. Most respondents (57.3%) have not been informed about malocclusion by any source. Despite this, only a minority (33.1%) believe that tooth extraction can lead to malocclusion. A smaller proportion (24%) reported experiencing malocclusion symptoms after extraction. Among those who have had extractions, the distribution of the number of teeth extracted is relatively even, with a notable portion having two teeth extracted (33.3%). A significant portion (36.7%) had their last tooth extracted more than 18 months ago (Table 2).

Variable		Accessibility	
	NO		
	YES		P-value
	Frequency		
	Frequency		
Educational level	Primary		
	Secondary		
	University		
	None		
		30	
	47		
	43		
	7		
		100	
	90		
	25		
	42		
		<.001	
Socio-economic level	Division 1		
	Division 2		
	Division 3		
	Division 4		

		2	
50			
72			
3			
		22	
129			
106			
0			<.001
Gender	Male		
Female			
		43	
84			
		84	
173			
			<.001
Dental Check ups	Every 6 months		
Yearly			
Once in 2 years			
None		22	
21			
7			
77			
		4	
3			
2			
248			
			0.818

Table 3 : Association between education level and awareness on post extraction malocclusion.

Factors Influencing Awareness About Malocclusion

Awareness on post extraction malocclusion was found to influence socioeconomic status, where respondents in division 4 were all aware, and only a small percentage of people (8.33%) in division 1 were aware. P value is <0.001 implying significance. Educational level of respondents is also found to be a factor influencing awareness about malocclusion where a large number people who have completed University have a big ration (1.72) of these who are aware to those who are not aware about malocclusion after

extraction, compared to the one of these who have not studied any level of education (0.16). The p value of this association is <0.001 which is significant. Gender of respondents is not found to be a factor influencing awareness about malocclusion after tooth extraction. The p value of this association is 0.818 which is not significant since it is > 0.05.

Awareness and regular dental Check-Ups

The majority (84.4%) do not visit the dentist regularly for check-ups. The respondents who are aware were found to have a high frequency of regular dental check-ups (every six months and every year). The respondents who are not aware were found that they do not do any dental check-up.

Variable	Frequency	
(n=138)		
	Percent	
(%)		
Information on other treatment modalities	Yes	
No		
		209
	175	48.6
	51.4	
Treatments recommended	Root canal treatment	
Restoration of the tooth		
Orthodontic treatment		
No treatment was told to me		
		100
	84	
	25	
	175	39.8
	21.9	
	6.5	
	45.6	
Information on Preventive measures	Yes	
No		
		153
	231	
		26.8
	60.2	
Preventive measures recommended	Removable partial denture	
Implant		
Fixed partial denture (crown and bridge)		
Orthodontic appliance		
None		

	115	
6		
19		
13		
293		
1.6		
4.9		
3.4		
60.2		

Table 4: Knowledge on other treatment modalities other than tooth extraction and preventive measures.

Knowledge on treatment modalities

A slight majority (54.4%) were informed about alternative treatment modalities before extraction. Among those informed, RCT (26%) and restoration of the tooth (21.9%) were the most common alternatives mentioned. Reasons for choosing extraction varied, with the most common being the belief that the tooth was hopeless 45.1% (Table 4).

Preventive Measures and Awareness

A significant portion (39.8%) were informed about potential preventive measures or treatments for malocclusion after extraction. Among those informed, the most recommended preventive measure was removable partial denture (29.9%), making it to be the most used preventive measure at a percentage of 15.9%. However, a large majority (60.2%) reported not receiving any recommendations for preventive measures. Consequently, the utilization of preventive measures was low, with the majority (76.3%) not using any of the recommended options (Table 4).

Discussion

In this cross-sectional study aimed to assess the awareness level of post-extraction malocclusion among patients attending the University of Rwanda Dental Teaching Clinic was conducted in patients who had their teeth extracted. Malocclusion is a common concern after tooth extraction. Despite its significance, awareness regarding post-extraction malocclusion and its consequences may vary among patients. Understanding the knowledge gaps and factors influencing awareness is crucial for improving patient education and promoting optimal oral health outcomes.

The demographic study showed that 66.9% of respondents were female, indicating possible gender disparities in the ways that people seek healthcare. Furthermore, a significant percentage of participants had finished their secondary school (35.7%), which was followed by their primary education (33.9%). Conversely, a smaller number (17.7%) had completed their university education, and 12.8% had no education at all. This suggests that the studied population has a comparatively high degree of educational attainment. Fewer respondents were in lower or higher income categories, with the majority of respondents having a middle-class socioeconomic background. Divisions 2 (46.6%) and 3 (46.4%) comprise

the majority of responders, suggesting a primarily middle-class demographic. Very few people (0.8%) are in Division 4 (Higher income group), which indicates higher-income people, and just a small fraction (6.3%) are in Division 1 (Lower income group), which probably represents people with lower incomes. These demographic details shed light on the research population's socio-cultural background and may influence healthcare access and utilization.

The study highlighted a significant lack of awareness among patients regarding post-extraction malocclusion. Despite undergoing tooth extraction, a considerable proportion of respondents were unaware of malocclusion and its potential consequences. Moreover, only a minority of respondents believed that tooth extraction could lead to malocclusion, indicating misconceptions or lack of awareness regarding post-extraction complications. Dental practitioners play a crucial role in educating patients about potential risks associated with tooth extraction and the importance of post-extraction follow-up care.

About half of the respondents (45.8%) know what malocclusion refers to, but a significant portion (54.2%) do not. Most respondents (57.3%) have not been informed about malocclusion by any source. Despite this, only a minority (33.1%) believe that tooth extraction can lead to malocclusion. A smaller proportion (24%) reported experiencing malocclusion symptoms after extraction. This underscores the importance of patient education and informed decision-making regarding dental treatments. Furthermore, factors such as access to information and communication strategies employed by dental professionals may influence patients' awareness levels and treatment choices.

Educational level of respondents is found to be a factor influencing awareness about malocclusion where a large number of people who have completed University have a big ratio (1.72) of who are aware to those who are not aware about malocclusion after extraction, compared to the one of these who have not studied any level of education (0.16). The p value of this association is < 0.001 which is significant.

A study done in Abha, Kingdom of Saudi Arabia at King Khalid University, emphasized on how educational level influenced the awareness of dental malocclusion. The incidence of malocclusion was lowest at 76.6% for children of parents with a postdoctoral degree. Parents with bachelor's degree (at 48%) and with secondary level education at 25%. Parents with a primary education degree show a higher prevalence of malocclusion among their children at 8%. Hence, this study shows that occlusion of children with parents who have higher levels of education are protected due to better access to resources and higher level of motivation to interrupt habits which affect the child's oral health [26].

Awareness on post extraction malocclusion also influences socioeconomic status, whereby respondents in division 4 were all aware, and only a small percentage of people (8.33%) in division 1 were aware. P value is < 0.001 implying significance since. In Shiraz, Islamic Republic of Iran, a study was done on the assessment of parental awareness about malocclusion, and a random sample of 1000 7–9-years old school children was given a questionnaire to fill in, at home. 795 parents have completed the questionnaire. There was a significant increase in the knowledge of malocclusion. In families with a higher level of education and income [26].

Gender of respondents is not found to be a factor influencing awareness about malocclusion after tooth extraction. The p value of this association is 0.818 which is not significant since it is >0.05 . This goes the same way with the study conducted in India on the Factors influencing the perceived orthodontic treatment need and its relationship with awareness of malocclusion among college adolescents where A total of 448 teenagers, ages 17 to 19, were chosen at random from the colleges. A standardized and pretested questionnaire was used to gather data. Participants were questioned to gauge their perception of the necessity for orthodontic treatment. This study has revealed that it is impossible to explain the awareness of malocclusion by gender [27].

An essential aspect of patient education is providing information about alternative treatment modalities before tooth extraction. However, the study revealed that a substantial number of patients were not informed about alternative options, such as root canal treatment or restoration of the tooth. A slight majority (54.4%) were informed about alternative treatment modalities before extraction. Among those informed, root canal treatment (26%) and restoration of the tooth (21.9%) were the most common alternatives mentioned. Reasons for choosing extraction varied, with the most common being the belief that the tooth was hopeless (45.1%). This lack of information may have contributed to patients' decisions to choose extraction over other treatment modalities. Enhancing patient awareness of available treatment options is critical for promoting informed decision-making and minimizing unnecessary extractions.

The study revealed low utilization of preventive measures for malocclusion after tooth extraction, with the majority of respondents not receiving recommendations or utilizing preventive options. A significant portion (39.8%) were informed about potential preventive measures or treatments for malocclusion after extraction.

Among those informed, the most recommended preventive measure was removable partial denture (29.9%), making it to be the most used preventive measure at a percentage of 15.9%. However, a large majority (60.2%) reported not receiving any recommendations for preventive measures.

Consequently, the utilization of preventive measures was low, with the majority (76.3%) not using any of the recommended options. This highlights the need for improved patient education and awareness regarding preventive measures, such as removable partial dentures or orthodontics.

The majority (84.4%) do not visit the dentist regularly for check-ups. The respondents who are aware were found to have a high frequency of regular checkups (every six months and every year). The respondents who are not aware were found that they do not do any checkup. In Shiraz, Islamic Republic of Iran, a study was done on the assessment of parental awareness about malocclusion, and a random sample of 1000 7–9-years old school children was given a questionnaire to fill in, at home. 795 parents have completed the questionnaire. It has revealed that less than one-third of parents brought their kids to the dentist for regular, yearly examinations. When children receive dental care in a system where dentists and orthodontists collaborate, parents' knowledge of orthodontic issues generally corresponds with the orthodontist's evaluation of the need for treatment [26].

Conclusion and Recommendations

Approximately half of the respondents are aware of malocclusion, but many remain uninformed, particularly about its link to tooth extraction. Socioeconomic status and education significantly impact awareness, with those in higher divisions and with more education being more knowledgeable. While some respondents were informed about alternative treatments, extraction was still commonly chosen due to the belief that the tooth was hopeless. Preventive measures are underutilized, and regular dental check-ups are infrequent, especially among those unaware of malocclusion.

Educational programs should be introduced to raise awareness about post-extraction malocclusion, utilizing various channels like posters and informational sessions. Campaigns should be tailored to the socioeconomic status of patients, with extra efforts to reach those in lower divisions. Improved communication between dental practitioners and patients about alternative treatments and potential extraction consequences is crucial. Emphasizing preventive measures during consultations and encouraging their use is important. Strategies to promote regular dental check-ups, regardless of awareness levels, should be developed. Implementing these recommendations can enhance awareness, prevention, and overall dental health outcomes.

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