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Etiology and Prevalence of Permanent Tooth Extraction Among Group of Yemeni Population

Baleegh A Alkadasi*[1], Nasser M Al-Ahmari[2], Mokhtar A AL-Dumaini[3], Nashwan A Noman[4], Adel A Aladimi[5] and Mohammed M Al-Moaleem[6]

[1]*Department of Periodontics, Faculty of Dentistry, IBB University, IBB, Yemen*
[2]*Prosthodontic Department, College of Dentistry, King Khalid University, Abha, Saudi Arabia*
[3]*Prosthodontic Department, Faculty of Dentistry, IBB University, IBB, Yemen*
[4]*Department of Dentistry, Faculty of Medicine, Taiz University, Taiz, Yemen*
[5]*Department of conservative Dentistry, Faculty of Dentistry, IBB University, IBB, Yemen*
[6]*Prosthetic Dental Science Department, College of Dentistry, Jazan University, Jazan, Saudi Arabia*

ABSTRACT

The objective of the present study was to investigate the reasons of the permanent tooth extraction and its relationship with age and gender, for which 662 participants, divided into five age groups 14–23, 24–33, 34–43, 44–53, and ≤54-years-old were studied. Oral and radiographic examinations were done for each participant. Causes of tooth loss, age group, gender, Khat chewing, Shammah use, smoking, teeth brushing and Miswak using were recorded. The data were statically analyzed with SPSS program using Chi-square tests. The p value ≤ 0.050 were considered statistically significant. From the total number of the participants 335(50.6%) were males. The highest age group was in the 14–23 age-group (43.1%). Dental caries was represented by (49.53), while the periodontal disease was (23.3%). The failure of root canal treatment, orthodontic and other causes were (3.6%, 11.3%, 11.3%), respectively. There were significant differences between genders and different age groups in relation to causes of tooth extraction.

KEY WORDS: EXTRACTIONS, PERMANENT TEETH, DENTAL CARIES, PERIODONTAL DISEASE, TOOTH LOSS.

INTRODUCTION

Many surveys on the causes of tooth loss in different countries have been conducted and have concluded several controversies regarding whether periodontal and /or dental caries diseases are the main reasons for tooth loss. In-addition, failure of previous endodontic treatments, orthodontic causes and other reasons such as trauma, iatrogenic or preapical pathosis and combinations of these, have been cited as some of the common reasons for extraction of teeth in the available literatures (Richards et al. 2005, Reich and Hiller 1993).

Khat-chewing habit in Taiz, Republic of Yemen is widely spread and practiced by most of the population (Al-Sharabi 2011). Khat is fresh leaves of the shrub Catha edulis, which are chewed like tobacco in the lower

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buccal pouch unilaterally (left or right) in a bolus form for several hours per day (Hattab and Al-Abdulla 2011, Imran and Murad 2009). Due to continuous khat contact with mucosa and gingiva by daily khat chewing, there is an increase in periodontal problems with membrane attachment loss, being the the most common causes of khat chewing, (Hassan etal. 2007, Al Moaleem 2017, Ali et al., 2018, Noman et al. 2019 Salman et al., 2019).

Table 1. Summary of some studies in different countries regarding the causes of tooth extractions

Researcher Names/ Year of the Study	Country	Sample Size	Causes and Percentages	Gender / Significant	Highest % in age group / Significant
CURRENT STUDY	Taiz, Republic of Yemen	662	Caries (49.53), P A (23.3%), Orthodontic (11.3%),	Failure RCT (3.6%), Others (11.3%) Male (49.4%)/ Female (50.6%) Significant	14-23 Dental caries was the most common cause in (14-23 and 24-33). PD↑ gradually from (34-43) to ≥ 54-year-olds.
Salman et al.2019	Pakistan	520	Caries (50.53), P A	Female (53%)	45-54
			(38.4%), Orthodontic (0.0%), Failure RCT (0.3%), Others (10.8%)	Male (47%)/ Significant	Most lost their teeth due to caries, followed PD
Shah et al. 2019	Gujarat,	869	Caries (77.3), P A	Female	44-45 & 55-64
	India		(16.6%), Orthodontic (0.5%), Failure RCT (5.0%), Others (0.6%)	(50.4%) Male (49.6%)/ Non-significant	Caries (53.7%), in patients (15-44 years group). P D 81.4% of (45-84 years group). Young patient
Ali et al.2018	Aden,	450	P D (51.1%),	Male (72.2%)	
	Yemen		Caries (33.1%), Other & Orthodontic (15.8%)	Female (27.8%)	caries P D ↑with age
Al Ameer &	Al- Madinah,	1589	Caries (63.4%),	Females	Over 40 (40.8%)
Awad. 2017	KSA		P D (14.6%) Failed root canal (2.7%), Orthodontic (1.3%), Trauma (0.2%)	(57.6%), Male (42.3%) /Significant	Female all age groups
Al Moaleem et al.	Jazan,	579	P D (37.1%),		Over 40 (50-59)
2016	KSA		Caries (30.1%) Trauma (12.1%)		caries P D ↑50 (70%)
Kaira et al.	India	1506	Caries (43.95%),	Females (55.9%),	(51-70), then
2016			P D (31.34%), Orthodontic (10.4%), Failure RCT (0.45%), Trauma (0.29%)	Male (44%)	(11-20)
Sahibzada et al.	Turkey	8355	Caries (85.3%),	Females (59.1%)	Over 50 years
2016			P D (7.6%) Orthodontic (2%), Failure RCT (1%), Trauma (1%)	Male (40.9%)/ Significant	
Al-Shammari et	Kuwait	2783	Caries (43.7%)	Female (50.2%)	31 - 40 (29.9%)
al. 2015			P D (37.4%) Orthodontics (4.3%).	Male (49.8%)/ Significant	Caries ↓in young patients (60.7%; 20-29)

Continue Table 1

			Failed RCT (2.7%)		P D (63%; 30-50)
Chrysanthakopulos 2015	Greek	1231	P D (34.4%) Caries (32.2%) Others (33.4%)		P D ↑with age
Gossadi et al. 2015	Jazan, KSA	691	Caries (33.3%), P D (31%) Orthodontic (17.1%)	Female (28.5%) Male (25.9%) / Non-significant	Young (20-29) caries P D ↑ 40 years
Lee et al 2015	Taiwan	4811	Caries (55.3%); all age group P D ↑ 35 years	Female	Over 60 years
Kashif et al. 2014	Pakistan	6251	Caries (51.8%), P D (19.2%), Orthodontics (2.9%), Failed RCT (2.8%)	Female (56.7%), Male (43.3)	Age 50 years
Alesia & Khalil 2013	Riyadh, KSA	1554	Caries (50.2%) Orthodontics (18.2%) P D (8.2%)	Female (55.5%) Male (44.5%)	10-30
Jafarian & Etebarian. 2013	Iran	1,382	Caries (51%), P D (14.4%), Orthodontic (7.2%)	Female (51.3%) Male (47.8%) / Significant	(41-60) Caries ↑20, P D ↑40 years. Male (55.3%), Female (43.9%)/ Significant
Anyanechi & Chukwuneke 2012	Eastern Nigeria	3998	Caries (55.2%)	Females (62.3%) Males (37.7%)	(11- 30) Both males & females
Haseeb et al. 2012	Pakistan	1178	Caries (63.1%), P D (26.2%), Failure RCT (4.6%), Trauma (3.2%)	Male (59.6%), Females (40.4%)	Over 51-80 years
Montandon et al. 2012	Brazil	437	Caries 45 years P D ↑ with 45-82		35-65 years
Yousaf et al. 2012	Pakistan	1500	Caries (41.2%), P D (34.8%), Orthodontic (4.3%), Others (3.2%)	Male (70%) Female (30%)	Over 40 years
Nasreen & Haq 2011	Bangladesh	110	Caries (68.2%), P D (12.7%), Orthodontic (4.5%)	Female (53.6%) Male (46.4%)	(20-39)
Preethanath, 2010	Al Baha, KSA	820	Caries P D	Female (19.71%) Male (12.57%)/ Non-significant	Young (20-29) caries P D ↑ with age
Anand & Kuriakose 2009	India	1791	Caries (39.5%), P D (28.4%), Orthodontic (19.4%), Others (2.5%)	Males (53%) Females (47%)/ Significant	(55-64), (15-24)
Baqain et al. 2007	Jordan	2435	Caries (63.8%), P D (22.9%), Orthodontics (2.4%), Trauma (2.4%)	Male/ Significant	21 - 30 years/ Significant P D ↑40 Orthodontic/ Significant
Sayegh et al. 2004	Jordan	2200	Caries (46.9%), P D (18%) Orthodontics (4%), Trauma (0.7%)		≤ 40 years of age (Caries), ↑40-year-old group (P D)
Aderinokun & Dousmu 1997	Nigeria	1301	P D (61.9%) Caries (34.1%) Trauma (4.0%)	Females (51.5%) Male (49.5)/ Non-Significant	(21-31) caries P D ↑45 years

Continue Table 1

Murray et al. 1996	Canada	6143	Caries Orthodontic in chilled hood	All age P D ↑40 years

PD; periodontal diseases RCT; root canal treatments Increase; ↑ Decrease; ↓
Significant; * Non-Significant #

It is clear from a number of earlier studies that dental caries is a main cause of tooth loss among young age and in both gender as well as elder groups) Kashif et al.2014, Montandon et al.2012 (Anyanechi and Chukwuneke 2012 Noman et al. 2019, but other cross-sectional studies have concluded that both periodontal diseases and caries are the main reasons of permeant teeth extractions in males and females (Gossadi et al. 2015, Murray et al.1996, Aderinokun and Dosumu 1997), even though a quite number of studies mentioned that teeth loss were totally related to periodontitis (Ali et al. 2018, Murray et al.1996). Studies pointed to some reasons such as orthodontic causes (Noman et al. 2019, Nasreen and Haq 2011, Chukwuneke 2012, Yousaf et al. 2012, Al-Shammari et al. 2006, Baqain et al., 2007), while others said it is related to root canal failures (Al Ameer and Awad 2017, Chukwuneke 2012, Kashif et al.2014 , Al-Shammari et al. 2006), or other causes were observed to be the causes of tooth loss (Al Ameer and Awad 2017, Nasreen and Haq 2011, Chukwuneke 2012, Kashif et al.2014 , Al-Shammari et al. 2006, Baqain et al., 2007, Aderinokun and Dosumu 1997). Table 1; shows summary of some studies in different countries regarding the causes of tooth loss.

Tooth loss may affect communication, as well as produces some masticatory difficulties and could end in poor facial aesthetic outcome. In-addition, it is an indicator of the overall general oral health of any population (Brodeur et al.1996, Stratton and Wiebelt 1988). Thus the aim of this study was to investigate the causes of tooth loss and the effect of several social habits that causes tooth loss its relationship with age, and gender.

MATERIAL AND METHODS

Study design: This cross-sectional study was conducted among subjects seeking dental extractions and oral treatments at different clinics in Taiz city, Republic of Yemen. The current study was conducted in full accordance with the World Medical Association Declaration of Helsinki, and after a signed of the ethical approval of the study.

Study participants, data collections and questioner:The data collections were carried out during the period from February 2018 to March 2019 for participants who were requiring teeth extraction. A total of 662 participants (335; males and 327; females) were involved in the present study. The participants were selected through non-probability convenience sampling. The data were collected by general practitioners dentists after a short period of training using a pre-designed questionnaire. After a written consent had been signed by each participant, the clinical and radiographic examinations of dental arches were performed on a dental chair using the regular examination kit. The questioner form was simple and consisted of a single page. The chartings were done to record the causes of tooth loss in relation to participant's gender and age.

Table 2. Descriptive of participants in relation to gender and social habits

Parameter	Gender		Khat Chewers		Frequency of Khat Chewing			Khat Chewing Side		Teeth Brushing		Miswake Using		Shammah Users		Shammah Using Side		Smoking	
	Male	Female	Yes	No	Daily	Weekly	Monthly	Left	Right	Yes	No	Yes	No	Yes	No	Right	Left	Yes	No
Number	335	327	377	285	287	42	48	260	117	308	354	142	520	71	591	31	40	421	241
Percentage	50.6	49.4	56.9	43.1	43.4	6.3	7.3	39.3	17.7	46.5	53.5	21.5	78.5	10.7	89.3	4.7	6.0	63.6	36.4

Participants grouping and social habits: Khat chewing, Shammah using, Miswake, toothbrushes, and smoking were recorded. The questions of the sides of khat chewing and Shammah use were recorded, also the chewing durations were registered as daily/week/month. Patients of both genders, above the age of 14 years and without any systemic diseases, were involved in the current study. All data related to the causes of teeth loss were recorded and collected in a self-designed preform. According to the age, the selected subjects were divided into five groups, 14–23, 24-33, 34-43, 44-53, and ≥54-years-old, respectively.

Classification of causes and criteria recording: With some modification all the data classifying the causes of missing teeth were recorded using the criteria

mentioned by Mc Caul LK et al. 2001 and Cahen PM et al.1985 . The criteria were: Dental Caries (A tooth was concerned as requiring extraction due to dental caries when caries had destroyed the crown so that it cannot be restored, if there were carious exposure of the pulp or a septic roots. Periodontal Disease (extraction due to periodontal disease if it tended to satisfy the score criteria of Russell's PI index (Russell, 1956), namely the presence of considerable mobility according to the Miller Mobility Index Miller, 1956). Orthodontic Treatment Causes (whenever a tooth is removed under the request from the orthodontist); Other Causes which included trauma (when a non-carious associated trauma to the tooth is the reason for its extraction); or iatrogenic (due to incorrect treatments done in dental clinics).

Statistical analysis: All the data were recorded then summarized as frequencies and percentages, after that analyzed descriptively using Statistical Package for Social Sciences (SPSS) software (version 20.1 SPSS, Chicago, Illinois, USA). An association and comparison with different variables were performed using the Chi-square test. The p-values ≤ 0.05 were considered significant.

RESULTS AND DISCUSSION

From table 2; a 662 participant were included in this study, (335; 50.6% males and 327; 49.4% females). The highest age group was in the 14–23 age group (285; 43.1%), followed by 198 (29.9%) among the 24–33 age group, while the lowest participants were in the age group with ≥ 54 and represented (16, 2.4%). The number and percentage of khat chewer participants were 377 (56.9%), with 287 (43.4%) were daily chewed khat. The participant's number with Shammah user were 71; 10.7% only. But, the highest number and percentage regarding the sides for khat chewing and Shammah using were the left side in both parameters (260 [39.3%] and 31 [4.7%], respectively). Finally the number and percentages of the participants using toothbrush, Miswak and smoking were (308; 46.5%, 142; 21.5%, 421; 63.6%), respectively.

Table 4. Frequency and percentages of the study variables in relation to gender

Gender	Male N %	Female N %	Total N %	P value
Khat Chewers				0.000*
Yes N (%)	266 (74.4)	111 (39.9)	377 (56.9)	
No N (%)	69 (20.6)	216 (66.1)	285 (43.1)	
	Frequency of Khat Chewing			0.000*
Daily	199 (59.4)	88 (26.9)	287 (43.3)	
weekly	32 (9.6)	10 (3.1)	42 (6.3)	
Monthly	29 (8.7)	19 (5.8)	48 (7.3)	
No	75 (22.4)	210 (64.2)	285 (43.1)	
		khat Chewing Side		0.000*
Left	206 (61.5)	204 (62.3)	410 (61.9)	
Right	73 (21.8)	44 (13.5)	117 (17.7)	
No	56 (16.7)	79 (24.2)	135 (20.4)	
		Teeth Brushing		0.102
Yes	145 (43.3)	163 (49.8)	308 (46.5)	
No	190 (56.7)	164 (50.2)	354 (53.5)	
		Miswake Using		0.257
Yes	78 (23.3)	64 (19.6)	142 (21.5)	
No	257 (76.7)	263 (80.4)	520 (78.5)	
		Shammah Users		0.000*
Yes	60 (17.9)	11 (3.4)	71 (10.7)	
No	275 (82.1)	316 (96.6)	591 (89.3)	
		Shammah Using Side		0.000*
Left	33 (9.9)	7 (2.1)	40 (6.0)	
Right	27 (8.1)	4 (1.2)	31 (4.7)	
No	275 (82.0)	316 (96.6)	591 (89.3)	
		Smoking		0.053
Yes	201 (60.0)	220 (67.3)	421 (63.6)	
No	134 (40.0)	107 (32.7)	241 (36.4)	

*Statistically significant if p ≤ 0.05 from Chi-Square tests

Table 4. Association between different age groups and cause of tooth loss

Cause/ Age Group	14-23 N %	24-33 N %	34-43 N %	44-53 N %	≥ 54 N %	Total N %	P value
			Dental Caries				0.000*
Yes	150 (52.6)	126 (63.6)	30 (28.3)	16 (28.1)	6 (42.9)	328 (49.5)	
No	135 (47.4)	72 (36.4)	76 (71.7)	41 (71.9)	10 (57.1)	334 (50.5)	
			Periodontal Disease				0.000*
Yes	17 (6.0)	50 (25.3)	48 (45.3)	29 (50.9)	10 (71.4)	154 (23.3)	
No	268 (94.0)	148 (74.7)	58 (54.7)	28 (49.1)	6 (28.6)	508 (76.7)	
			Failure of Root Canal Treatment				0.060
Yes	9 (3.2)	13 (6.6)	0 (0.0)	2 (3.5)	0 (0.0)	24 (3.6)	
No	276 (96.8)	185 (93.4)	106 (100)	55 (96.5)	16 (100)	638 (96.4)	
			Orthodontic Cause				0.000*
Yes	65 (22.8)	9 (4.5)	0 (0.0)	1 (1.8)	0 (0.0)	75 (11.3)	
No	220 (77.2)	189 (95.5)	106 (100)	56 (98.2)	16 (100)	587 (88.7)	
			Other Causes				0.000*
Yes	21 (7.4)	19 (9.6)	19 (17.9)	11 (19.3)	5 (21.4)	75 (11.3)	
No	264 (92.6)	179 (90.4)	87 (82.1)	46 (80.7)	11 (78.6)	587 (88.7)	

*Statistically significant if p ≤ 0.05 from Chi-Square tests

Table 4. Association between different age groups and cause of tooth loss

Gender	Male N %	Female N %	Total N %	P value
		Dental Caries		0.000*
Yes	97 (29.0)	231 (70.6)	328 (49.5)	
No	238 (71.0)	96 (29.4)	334 (50.5)	
		Periodontal Disease		0.001*
Yes	96 (28.7)	58 (17.7)	154 (23.3)	
No	239 (71.3)	269 (82.3)	508 (76.7)	
		Failure Root Canal Treatment		0.681
Yes	11 (3.3)	13 (4.0)	24 (3.6)	
No	324 (96.7)	314 (96.0)	638 (96.4)	
		Orthodontic Cause		0.000*
Yes	19 (5.7)	56 (17.1)	75 (11.3)	
No	316 (94.3)	271 (82.9)	587 (88.7)	
		Other Causes		0.000*
Yes	54 (16.1)	21 (6.4)	75 (11.3)	
No	281 (83.9)	306 (93.6)	587 (587 (88.7)	

*Statistically significant if p ≤ 0.05 from Chi-Square tests

The relation and association between the frequency and percentages among gender in the khat chewing and Shammah using (side or frequency) parameters were significant with p value 0.000. However, we did not detect an association between participants from both gender and teeth brushing, Miswak using and smoking and the results of these parameters were not significant with p values 0.102, 0.257, and 0.053, respectively (Table 3).

Table 4 shows the relation between the different age groups and the resons of tooth loss. Dental caries was the most common cause of teeth loss in the young age groups (14-23 and 24-33 years; 150 [52.6%] and 126 [63.6%] respectively). The rate of periodontal disease increased gradually from the middle age group 34-43 (45.3%), and reached 71% among ≥ 54-year-olds. Among the 14–23-year-olds, all extractions of permanent teeth were for orthodontic causes. The failure of RCT was recorded in the middle and elder age groups. All the previous results

were significant differences with p values < 0.000 except in the cause of failures in root canal treatment which was not significantly difference.

Comparing the causes of tooth loss among gender, among the females participants the number and percentages of tooth loss were more due to dental caries and orthodontic causes (231; 70.6% and 56; 17.1%), while in males it was higher among the periodontal diseases participants (96; 28.7%), and all the parameters were significant differences P < 0.001. The other causes of tooth loss were more among males and recorded 54 (16.1%). All the variables were significantly differences among gender except in the failure of root canal treatment cause (Table 5).

The participants recruited in the current study were carried out at different private clinics in Taiz city. The objectives of this study were to investigate the reasons of the permanent tooth extraction and its relationship with age and gender. World Health Organization (WHO) in its report pointed a good oral health as an indicator of overall good health and recommended many steps in order to improve oral health globally (The World health Report 2002-2003).

It is important to include a good number from both genders in a prevalence study. In the current study the participant's males to females percentages (table 1) were near to each other 50.6% -49.4%, this percentages were close to numbers mentioned by other studies conducted in Yemen (Taiz), India, Iran and Nigeria(Noman et al. 2019, Shah et al.2019, Jafarian and Etebarian 2013, Aderinokun and Dosumu 1997). In other hand this percentage were less than that obtained in other worldwide studies as in Pakistan (Salman et al. 2019, Kashif et al.2014, Yousaf et al. 2012), in Yemen (Aden), in Saudi Arabia cities (Riyadh, Al-Madinah, Jazan), in Bangladesh, in Nigeria, in Turkey, in India (Ali et al. 2018,Al Ameer and Awad 2017, Nasreen and Haq 2011, Chukwuneke 2012, Gossadi et al.2015, Sahibzada et al. 2016, Kaira et al. 2016). These differences may relate to the selected place from where the samples were collected.

From the demographic data of this study, the highest participant numbers were among the 14-23 years-age-group (43.1%), followed by the 24-33 years-age-group (29.9), those age-groups were closed to the same age-groups registered by studies in Asia (Noman et al. 2019, Anyanechi and Chukwuneke 2012, Montandon et al.2012, Gossadi et al.2015, Baqain et al.2007 Aderinokun and Dosumu 1997), but this was in contrast with the results of other international studies (Salman et al. 2019, Shah et al.2019, Nasreen and Haq 2011, Jafarian , Etebarian 2013, Kashif et al.2014, Montandon et al.2012, Kaira et al. 2016 (Salman et al., 2019).

The major cause of tooth extraction among participants from Taiz city, Republic of Yemen was dental caries in the younger age group 14–23 and 24–33 and it is significantly differences. In-addition the periodontal disease was gradually increased from the middle to elder age groups 34 – over 54. These results coincided with results found in Yemen (Noman et al. 2019, Ali et al. 2018), in Saudi Arabia (Alesia and Khalil 2013, Gossadi et al.2015, Preethanath2010), in Iran (Jafarian and Etebarian 2013), in Jordon (Baqain et al.2007). Other results concluded that periodontal diseases are the common cause of tooth loss as obtained by (Ali et al. 2018) in India, (Al Moaleem et al. 2016)in Saudi Arabia, (Chrysanthakopoulos 2011) in Greek and in Nigeria (Aderinokun and Dosumu 1997).

Dental caries is the most oral diseases leads to extraction of the permanent teeth. From this prospective study, we found that nearly half of the teeth in the all age-groups (49.5%) were extracted due to dental caries and its sequelae (table-4). This is in parallel with the finding of other research in different countries (Noman et al. 2019, Salman et al. 2019, Alesia and Khalil 2013, Jafarian and Etebarian 2013, Kashif et al.2014, Sayegh et al. 2004). In-addition extraction of teeth due to dental caries diseases were more than 50% in the researchers conducted in other countries(Shah et al.2019, Al Ameer and Awad 2017, Nasreen and Haq 2011, Chukwuneke 2012, Haseeb et al. 2012, Lee et al.2015, Baqain et al.2007, Sahibzada et al. 2016), but it does not reach 40% in a other group of studies (Ali et al. 2018, Anand and Kuriakose 2009, Yousaf et al. 2012, Gossadi et al.2015, Al Moaleem et al. 2016, Al-Shammari et al.2006, Chrysanthakopoulos 2011, Kaira et al.2016, Aderinokun and Dosumu 1997) as showed in table 1. This can be explained by the type of social habits regarding type of foods.

From table 4 and 5 in the present study, the results the cause of tooth loss ''failures of root canal treatments'' were not significantly differences among the different age groups or gender. This is in association with previous results mentioned by(Noman et al. 2019, Salman et al. 2019, Al Ameer and Awad 2017, Kashif et al.2014, Al-Shammari et al. 2006, Sahibzada et al. 2016, Kaira et al.2016). The frequency of the same factor registered near to or more than 5% in other research(Ali et al. 2018, Haseeb et al.2012, Yousaf et al. 2012). Among the orthodontic cause of tooth extraction our results were agreed with that mentioned those types of extraction were totally related to the younger age groups (Noman et al. 2019, Salman et al. 2019, Nasreen and Haq 2011, Jafarian and Etebarian 2013, Kashif et al.2014, Yousaf et al.2012, Al-Shammari et al.2006, Baqain et al.2007, Sahibzada et al.2016, Murray et al.1996), but it was less 2% in (Salman et al. 2019, Al Ameer and Awad 2017) , and reach near to 20% in a studies (Salman et al. 2019, Ali et al. 2018, Alesia and Khalil 2013, Anand and Kuriakose 2009, Haseeb et al. 2012). This wide range of differences can be related to many factors such as the socioeconomic status of the patient, governmental services of such type of treatments and the education level of their parents as well as educational level.

One of the limitation of this study is its designed by researchers but, the data were collected by many general dental practitioners after a demonstration for

participant examination and recording the clinical and radiographically findings on the examination sheet. On the other hand the strength of this study is its participants selections were collected from different areas of Taiz city, Republic of Yemen.

CONCLUSION

Within the limitation of this cross-sectional study the following conclusions can be drawn: The major reason of tooth loss among participants from Taiz city, Republic of Yemen was dental caries and in the younger age group 14–23 and 24–33. Periodontal disease was gradually increased from the middle to elder age groups 34 – over 54. There were significant differences between genders and different age groups in relation to causes of tooth extractions.

Conflict of interest: None

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