

Oral Health-related Quality of Life (OHRQoL) Following Surgical Extraction of Impacted Mandibular Third Molars: Preliminary Observations in a Saudi Arabian Subpopulation

Abstract

Introduction: OHQoL is crucial for the best preoperative assessment and development of suitable indications for mandibular third molar surgical extraction. The current study hopes to report QoL after surgical extraction of impacted mandibular third molars. **Materials and Methods:** This was a prospective study conducted in the Department of Oral and Maxillofacial Surgery, between January 2020 and April 2020. After consenting to partake in the study, patients' baseline demographics, indication for seeking third molar removal and laterality of impaction were recorded. All the surgical extractions were performed by the same surgeon. Pain was assessed pre and postoperatively with the numerical pain rating scale while QoL was assessed pre and postoperatively using the validated Arabic version of the 16 item United Kingdom Oral Health Related Quality of Life measure (UK-OHQoL). **Results:** A total of 92 patients were recruited. There are 41 (44.6%) males and 51 (55.4%) females with M:F of 1:1.2. Age range was between 18 and 48 years with a mean of (31.2±6.6) years. Age group 20–29 years constitutes the highest number of patients. Subscales: eating, appearance, sleep, mood and work revealed more percentage complaints (42.9%, 23.4%, 24.7%, 28.6%, and 16.9%, respectively).

Regarding mean domain and overall QoL scores, it was observed that there was gradual improvement in mean scores from the Pre-op values and the review periods with best mean QoL reported at POD 14. **Conclusion:** Improvement in overall mean QoL scores during the review periods as compared with the preoperative score was observed. Eating, appearance, sleep, mood and work subscales revealed more percentage complaints.

Keywords: Impaction, mandibular third molar, pain, quality of life, surgical extraction, swelling

Introduction

The psychological and social impact of oral diseases and procedures on the Quality of Life (QoL) is obvious especially following surgical removal of impacted mandibular third molars.^[1,2] The physiological sequelae and post extraction wound healing complications of third molar removal can drastically affect patients' QoL.^[3-5] As third molar removal is one of the most common oral procedures done,^[1] patients are usually informed about the benefits and risks of the surgical procedure. However, most of the information available to both surgeon's and patients', centers on clinical outcomes.

Recently, there have been calls for better patient assessment and patient outcomes following surgical extraction of impacted mandibular third molars as very few of such studies exist.^[1,6] Such studies will help surgeons to

monitor general well-being of patients and to enable patient-reported outcomes in order to assess the severity of symptoms and the effectiveness of interventions.^[7]

Several validated questionnaires have been developed to assess Oral health related quality of life (OHQoL). These include Dental impacts on daily living (DIDL), 16-item United Kingdom Oral health-related quality of life (OHQoLUK-16), Oral index disease profile (OIDP), Oral health impact profile (OHIP), and Geriatric oral health assessment index (GOHAI).^[8] The UK oral health-related quality of life (OHQoLUK-16) is based on the more recently revised WHO model of health: 'structure-function-activity-participation', focusing on both disease and health states (negative and positive).^[9] This new model of health reflects social understanding that health (and oral health) affects people in both positive and negative ways and thus both enhance and

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reduce QoL. Furthermore, this instrument has been validated in 3 Arabic speaking countries (Syria, Egypt and Saudi Arabia) and thus suitable across cultural use with good psychometric properties.^[10]

To the best of our knowledge, no study has reported OHQoL following surgical extraction of the impacted mandibular third molars in Saudi Arabian population applying the UK-OHQoL-16 instrument, hence the justification for this study.

Materials and Methods

This was a prospective study conducted in the Department of Oral and Maxillofacial Surgery, Specialty Regional Dental Center between January 2020 and April 2020. Approval for the study was obtained from the Research and Ethics committee of the General Directorate of Health Affairs in Najran with protocol number KACST, KSA:H-11-N-081, IRB 2021'58.

All healthy patients that were referred to the department for surgical extraction of impacted mandibular third molar under local anaesthesia and consented to participate in the study were included. Patients with history suggestive of the following conditions were excluded: Diabetes mellitus, congestive cardiac failures, chronic nephritis, chronic liver disease, systemic malignancy, sickle cell disease, presence of acute pericoronar infection, immune-compromised, subjects that require antibiotic prophylaxis for endocarditis, subjects with history of allergy to penicillin, subjects with dyspeptic symptoms or who are being treated for peptic or duodenal ulcer disease, pregnant patients and breastfeeding mothers.

After consenting to enrol in the study and before the surgical extraction of the third molars, patients baseline (demographics) comprising of age and gender, indication for seeking third molar removal and laterality of impaction were obtained. Third molar impaction was classified based on Winter's and Pell and Gregory Classifications.

A pilot study of 20 patients was carried out over a period of 1 month to assist in calibrating both the researcher and assistant for appropriate data collection and Google Form sending to patients. The experience gained during the pilot study enabled both the researcher and assistant to develop adequate logistics that ensured subjects adherence to the research protocol.

Sample size

Sample size was determined by using the prevalence rate of 5.2% from a similar comparative study on QoL following mandibular third molar surgery using UKOHQoL in Africans^[4] and a formula for a prevalence study:

$$N = (Z_{crit})^2 P (100-P)/d^2$$

where N is the total sample size, Z_{crit} is the standard normal deviate corresponding to selected significance criteria of 0.05 or confidence interval of 95%, it is a constant factor and equals 1.960, P is the assumed prevalence rate (5.2) adopted from a similar study,^[4] d is the minimum expected difference (5 mm).

Based on the above formula, we have

$N = (1.96)^2 5.2 (100-5.2)/5^2$ and $n = 75.7$ which was approximated to give a minimum sample size of 76 patients. With 20% attrition rate, sample size was increased to $(76+15.2) = 91.2$ which was approximated to 92 patients.

Surgical protocol

All the surgical extractions were performed by the same surgeon (Senior Registrar, Oral and Maxillofacial Surgeon) utilizing the standardized procedure under local anaesthesia (2% lignocaine with 1:100,000 adrenaline). Tooth sectioning was carried out appropriately when required. After surgery, the patients were given tabs Augmentin 625 mg 8 hourly for 7 days, tabs Ibuprofen 400 mg tid for 3 days and chlorhexidine mouth wash 6 hourly for 1 week as take home medications. Follow-up appointments to monitor wound healing were given to all the participants. Patients were instructed not to take any other medication except the ones provided.

Pain assessment

Pain was assessed using the numerical pain rating scale (0 = least pain while 10 = worst pain). The numeric pain scale was developed into Google Form and patients were asked to complete the form in the clinic as preoperative pain value. Thereafter, the Google Form was sent to each patients' WhatsApp number on Post-operative day (POD) 1, 3, 5, 7 and 14 to pick values for the numeric pain scale. Numeric pain scale was graded as follows: no pain = score 0, mild pain = score 1-3, moderate pain = score 4-6 and severe pain = score 7-10.

Quality of life

QoL was assessed pre and postoperatively using the validated Arabic version of the 16 item United Kingdom Oral Health Related Quality of Life measure (UK-OHQoL).^[10]

The UK-OHQoL questionnaire was developed into Google Form and patients were asked to complete the form in the clinic as Pre-Op QoL. Subsequently, the Google Form was sent to each patients' WhatsApp number on POD 1, 3, 5, 7 and 14 to complete the QoL questionnaire. For UK-OHQoL-16, there are four domains: (1) symptom level; (2) body function level; (3) at person level; (4) at social level. The domains have several symptoms that were assessed as shown in [Table 1]. Each item was scored: very bad effect (score 1); bad effect (score 2); no effect (score 3); good effect (score 4); very good effect (score 5).

Statistical analysis

Data was stored and analyzed using IBM SPSS software version 25 for IOS (Armonk, NY: IBM Corp). Descriptive statistics was generated as part of the data analysis. Pearson chi-square was used to compare the relationship among the different variables (gender, age group, indications for extraction, tooth angulation and laterality of the impaction). The psychometric properties of the UK-OHQoL instrument were evaluated by means of Cronbach α . The comparison of summative scores

Table 1: Distribution of patients' characteristics according to gender

	Gender		Total (%)	Statistics
	Male (%)	Female (%)		
Age-group				$\chi^2 = 1.167, df = 5, P = 0.948$
20–24	9 (9.8)	9 (9.8)	18 (19.6)	
25–29	7 (7.6)	10 (10.9)	17 (18.5)	
30–34	13 (14.1)	16 (17.4)	29 (31.5)	
35–39	7 (7.6)	8 (8.7)	15 (16.3)	
40–44	5 (5.4)	7 (7.6)	12 (13.0)	
45–49	0 (0.0)	1 (1.1)	1 (1.1)	
Total	41 (44.5)	51 (55.5)	92 (100.0)	
Tooth				$\chi^2 = 3.745, df = 1, P = 0.042^*$
48	26 (28.2)	22 (24.0)	48 (52.2)	
38	15 (16.3)	29 (31.5)	44 (47.8)	
Total	41 (44.5)	51 (55.5)	92 (100.0)	
Angulation				$\chi^2 = 1.866, df = 3, P = 0.601$
Mesioangular	23 (25.0)	26 (28.3)	49 (53.3)	
Horizontal	5 (5.4)	6 (6.5)	11 (11.9)	
Vertical	7 (7.6)	6 (6.5)	13 (14.1)	
Distoangular	6 (6.5)	13 (14.1)	19 (20.7)	
Total	41 (44.5)	51 (55.5)	92 (100.0)	
Indication for extraction				$\chi^2 = 9.749, df = 5, P = 0.083$
Sub-acute pericoronitis	18 (19.6)	23 (25.0)	41 (44.6)	
Caries and its sequelae	16 (17.4)	20 (21.7)	36 (39.1)	
Failed restoration	0 (0.0)	6 (6.5)	6 (6.5)	
Failed RCT	1 (1.1)	0 (0.0)	1 (1.1)	
Pressure	4 (4.3)	2 (2.2)	6 (6.5)	
Orthodontic	2 (2.2)	0 (0.0)	2 (2.2)	
Total	41 (44.5)	51 (55.5)	92 (100.0)	

RCT = root canal therapy

*Statistically significant

Table 2: Pain distribution in patients on preop and postop review periods

	Review periods					
	PRE-OP	POD 1	POD 3	POD 5	POD 7	POD 14
No pain	19 (20.6)	14 (18.2)	13 (17.1)	23 (32.4)	38 (51.4)	41 (70.1)
Mild pain	8 (8.7)	17 (22.1)	25 (32.9)	20 (28.2)	18 (24.3)	7 (12.1)
Moderate pain	19 (20.6)	25 (32.5)	17 (22.4)	17 (23.9)	9 (12.2)	5 (8.6)
Severe pain	46 (50.0)	21 (27.3)	21 (27.6)	11 (15.5)	9 (12.2)	5 (8.6)
Total	92 (100.0)	77 (100.0)	76 (100.0)	71 (100.0)	74 (100.0)	58 (100.0)

of the UK-OHQoL-16 questionnaire pre- and postoperatively was completed using one way Analysis of variance (ANOVA) for repeated measures. The level of statistical significance was set at ($P < 0.05$).

Results

A total of 92 patients were recruited into this study. There were 41(44.6%) males and 51 (55.4%) females with M:F of 1:1.2. Age range was from 18 to 48 years with mean of 31.2 ± 6.6 years. Age group between 20–29 years constituted the highest number of patients [Table 1]. Tooth number 48 was the most common tooth that was extracted and mesioangular impaction was the commonest angular relationship (49 (53.3%)). Sub-acute pericoronitis (41 (44.6%)) was the main reason for seeking mandibular third molar removal which was

closely followed by caries and its sequelae (36 (39.1%)). Other characteristics were as shown in [Table 1].

Forty-six (50%) patients complained of severe pain during the preop review. Pain severity continued to improve with fewer patients complaining of severe pain during the post op review periods. By POD 14, 41 (70.1%) reported no pain from the extraction socket. Pain distribution throughout the review period is as shown in [Table 2].

Internal reliability (Cronbach α) values at domain levels and overall QoL of the Arabic version of UK-OHQoL-16 instrument are shown in [Table 3]. Pre- and postoperative QoL subscales in all subjects (frequency and percentage of patients reporting with ‘very bad effect’ and ‘bad effect’) is as shown in [Table 4]. During the Pre-op review, majority of the patients

Table 3: Internal reliability (Cronbach α) values at domain levels and overall quality of life of the UK-HQoL-16 instrument

	Review periods					
	PRE-OP	POD 1	POD 3	POD 5	POD 7	POD 14
Domain levels						
Symptom level	0.802	0.935	0.924	0.939	0.952	0.971
Body function level	0.841	0.837	0.904	0.890	0.897	0.910
Person level	0.855	0.866	0.866	0.880	0.891	0.890
Social level	0.857	0.857	0.886	0.924	0.899	0.904
Overall quality of life (QoL)	0.921	0.800	0.786	0.757	0.755	0.786

Table 4: Pre- and postoperative quality of life subscales in all subjects (frequency and percentage of patients reporting with “very bad effect” and “bad effect”)

	Review periods					
	Preop (%) N = 92	POD 1 (%) N = 77	POD 3 (%) N = 76	POD 5 (%) N = 71	POD 7 (%) N = 74	POD 14 (%) N = 58
Comfort	42 (45.7)	19 (24.7)	21 (27.6)	11 (16.9)	7 (9.5)	2 (3.4)
Breath odour	27 (29.3)	16 (20.8)	20 (26.3)	14 (19.7)	10 (13.5)	2 (3.4)
Eating	36 (39.1)	33 (42.9)	21 (27.6)	22 (31.0)	13 (17.6)	3 (5.2)
Appearance	35 (38.0)	18 (23.4)	21 (27.6)	14 (19.7)	5 (6.8)	3 (5.2)
General health	26 (28.3)	13 (16.9)	12 (15.8)	9 (12.7)	7 (9.5)	0 (0.0)
Speech	8 (8.7)	12 (15.6)	11 (14.5)	11 (15.5)	6 (8.1)	1 (1.7)
Smiling/laughing	16 (17.5)	15 (19.5)	20 (26.3)	11 (15.5)	6 (8.1)	2 (3.4)
Sleep/relaxing	39 (42.4)	19 (24.7)	15 (19.7)	12 (16.9)	7 (9.5)	2 (3.4)
Confidence	17 (18.5)	8 (10.4)	6 (7.9)	7 (9.9)	5 (6.8)	1 (1.7)
Mood	44 (47.8)	22 (28.6)	1 (1.3)	15 (21.1)	11 (14.9)	2 (3.4)
Carefree manner	24 (26.1)	6 (7.8)	6 (7.9)	4 (5.6)	4 (5.4)	0 (0.0)
Personality	15 (16.3)	6 (7.8)	8 (10.5)	5 (7.0)	4 (5.4)	2 (0.0)
Social life	20 (21.7)	13 (16.9)	14 (18.4)	8 (11.3)	6 (8.1)	0 (0.0)
Romantic relationship	24 (26.1)	11 (14.3)	13 (17.1)	11 (15.5)	7 (9.5)	3 (5.2)
Work/usual activities	25 (27.2)	13 (16.9)	14 (18.4)	9 (12.7)	5 (6.8)	2 (3.4)
Finance	18 (19.6)	8 (10.4)	10 (13.2)	7 (9.9)	6 (8.1)	1 (1.7)

Table 5: Mean \pm SD distribution of scores at domains and overall quality of life over review periods

	Review periods					
	Preop	POD 1	POD 3	POD 5	POD 7	POD 14
Domain levels						
Symptom level	5.5 \pm 2.0	6.6 \pm 1.9	6.5 \pm 2.1	6.8 \pm 2.0	7.1 \pm 1.7	7.7 \pm 2.5
Body function level	14.8 \pm 3.7	15.7 \pm 3.9	16.2 \pm 4.1	16.5 \pm 4.3	17.4 \pm 4.0	18.2 \pm 4.4
Person level	14.9 \pm 4.0	16.6 \pm 4.1	16.7 \pm 3.8	17.1 \pm 4.0	17.4 \pm 4.2	18.3 \pm 4.3
Social level	12.1 \pm 3.1	12.9 \pm 3.2	12.9 \pm 3.0	13.1 \pm 3.1	13.7 \pm 3.4	14.4 \pm 3.3
Overall QoL	44.7\pm10.8	52.4\pm12.4	54.8\pm11.2	55.8\pm13.2	57.2\pm12.9	60.1\pm13.6

had comfort (42 (45.7%)) and eating (36 (39.1%)) problems regarding the impacted teeth. Twenty-four (26.1%) patients complained about the impacted teeth affecting their romantic relationship with their spouses. This however improved during the subsequent review periods. At POD 1, 33 (42.9%) of patients had eating problems which was the most complaints of the subscales at POD 1. Other subscale complains at POD 1 was mood (22 (28.6%)), sleeping and relaxing (19 (24.7%)), comfort (19 (24.7%)) and appearance (18 (23.4%)).

Regarding mean domain and overall QoL scores, it was observed that there was gradual improvement in mean scores from the Pre-op values and the review periods with best mean QoL reported at POD 14 [Table 5].

Discussions

OHQoL is essential for an optimum preoperative assessment and development of a suitable indications for surgery, especially mandibular third molar removal.^[11] Additionally, it permits the surgeon to offer the patient realistic expectations of the postoperative recovery period. This invariably, gives rise to a candid informed consent thereby assisting prospective candidates for third molar removal to determine the best period when such procedure should be carried out. This is to minimize as much as possible obstacles to their everyday work and lifestyle.^[11] Increasingly, patients are becoming aware and desire to know how a surgical procedure will affect their overall wellbeing.^[5]

The UK oral health-related quality of life (OHQoLUK-16) is centred on the latest revised WHO model of health: *structure-function-activity-participation*, centring on both disease and health states (negative and positive).^[9] The psychometric properties of this validated instrument in the current study was above 0.7 in all its domains. This shows that the instrument is valid and reliable for use.

Number of patients reporting moderate to severe pain continued to reduce over the review periods. Those reporting severe pain on POD 7 and 14 might be triggered by the anxiety of return to hospital for suture removal.^[12] Unlike previous studies that have reported female gender bias in pain perception after third molar removal,^[13,14] this current study did not find any significant gender difference. Nevertheless, evaluating pain awareness and surgery's impact in patients' QoL is always challenging due to the multifactorial nature of pain process and evaluation.^[11] A major snag in pain evaluation is its subjectivity despite the fact that patient him/herself is the best appraiser of the impact of surgery on his daily life.^[15] Other studies have reported same observation.^[4,5,15]

All the subscales of the QoL instrument at preop review time showed high percentage of patients reporting 'bad effects' and 'very bad effects' as compared with the POD 1 except speech subscale in which only 8 (8.7%) had 'bad effects' and 'very bad effects'. This showed that the patients were symptomatic before the removal of the third molar. Furthermore, the authors opined that reporting 'very bad effects' by the patients will enable the health team to treat them immediately despite presenting at first time. Usually, referred patients were given appointments for third molar surgeries when the condition is sub-acute or chronic. In the current study, the major indications for seeking third molar removal was sub-acute pericoronitis and caries with its sequelae, hence necessitating the preop symptoms.

Despite the overall QoL being gradually improved over the review periods, some subscales revealed more percentage complaints. Notably amongst them were the eating, appearance, sleep, mood and work subscales. Sizable percentage of patients complained of either 'bad effects' and 'very bad effects' about their eating ability on POD's 1 and 3 (42.9% and 27.6% respectively). This improved on subsequent review periods such that only 5.2% complained on POD 14. Similar reports have been published by other studies regarding eating problems following third molar removal.^[1,4,5,11] The inflammatory response of tissues involving the pterygomassetric sling will lead to trismus thus making mouth opening and chewing painful, difficult and stressful.^[14,16,17] Furthermore, dysphagia due to inflammatory response to lingual tissues may alter or lead to change in diet, thus patients should be advised to take soft or liquid diet in the immediate post op period.^[5] Ipsilateral facial swelling as a result of inflammatory response on the buccal tissues may cause change in facial appearance.^[3,5] Sizable percentage (35 (38%)) reported 'bad effects' and 'very bad effects' of their appearance in the current study. This component of the QoL instrument might suggest facial

swelling at the surgical side which is one the sequelae of third molar removal. It has been advised that patients who are public figures or who have public engagements should defer their surgeries because of the possibility of facial swelling post-extraction especially when the indication for surgical extraction is prophylaxis.^[5] Sleep/relaxation and mood subscales also recorded sizeable percentage of patients having 'bad effects' and 'very bad effects'. This subscale complaints' may be due to postop pain or psychological in nature. Adequate analgesic and anti-inflammatory prescription with patients counselling is usually recommended following surgical removal of impacted lower third molar.^[5] Several studies have reported inability to work or perform their usual routing functions following mandibular third molar removal.^[1,14] This was also observed in our study. The economic implication of lost work as a result of mandibular third molar removal has been described to be enormous.^[4] It was detected from the current study that QoL gradually improved from POD 1 till POD 14. Reasons may be that, relief of pre-surgical symptoms might have contributed to the improved QoL over the review periods. This was however, contrary to previous reported observations following mandibular third molar surgical extraction as QoL was reported to be poor especially in the immediate POD 1 to POD 3.^[1,2,4,5,11] In a recent systematic review and meta-analyses on QoL after third molar extraction, heterogeneity has been reported in previous studies especially symptomatology of the third molars at baseline.^[1] They reported that patients who had previous symptoms especially pericoronitis and caries with its sequelae, may modulate their response to the QoL questionnaires differently as compared to patient who had no such symptoms.^[1] From the current study, we observed that patients already reported poor QoL at baseline, therefore the intervention (surgical removal of third molar) may have improved such conditions, thereby improving their overall QoL. Consequently, studies comparing QoL in symptomatic and un-symptomatic third molar impaction at baseline is highly required to validate the result of the present study.

A major limitation of this study is that postoperative sequelae such as trismus, swelling and dysphagia could not be accessed by the dental team due to inability of the majority of the patients to present physically on the review dates because of their far residence. These patients travel far for appointments since our hospital is the only referral centre in our region. Recall visits although scheduled for these patients were never honoured because of the above reasons. Therefore, we relied on subjective data collection based only on patients perceptions. However, telephone calls to these patients was maintained especially on the first to fifth PODs.

Conclusion

The current study showed improvement in overall mean QoL scores during the review periods as compared with the preoperative score. Symptomatic third molar at baseline, may modulate the patients response to the QoL instrument. Despite improvement in the overall QoL, some subscales such as

eating, appearance, sleep, mood and work subscales revealed more percentage complaints at POD 1 and 3. Further studies are required in comparing QoL between symptomatic and asymptomatic mandibular third molar extraction.

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Conflicts of interest

There are no conflicts of interest.

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