RESEARCH ARTICLE

Reasons for refusing orthognathic surgery by orthodontic patients: A cross-sectional survey

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Abstract

Objectives: To find out the most common reasons for refusing orthognathic surgery and to compare the responses along gender lines and in terms of open-ended and closed-ended approaches.

Method: The cross-sectional retrospective study was conducted from August to December 2020 at the Orthodontics Department of Bahria University Medical and Dental College, Karachi, Pakistan, and comprised of patients who were planned for but refused orthognathic surgical treatment between January 2018 and July 2020. Data was collected through telephone-based interviews to record reasons of avoiding orthognathic surgery. The data-collection tool had both open-ended and closed-ended questions. Data was analysed using SPSS 23.

Results: Of the 60 patients, 42(70%) were females and 18(30%) were males with a mean age range of 23.25±2.19years. Overall, 19(31.7%) patients avoided surgery due to additional expense, while post-operative pain was cited as a reason by 35(58.3%) patients. Males were 9 times more concerned about their dental alignment compared to females (p=0.005). Fear of tooth injury (p<0.0001) and intra-operation and post-operation bleeding (p<0.0001) were found twice in males than females.

Conclusion: The most common reasons for refusal to have orthognathic surgery were increased cost and post-operative pain. Males were more concerned about dental alignment and had higher fear of post-surgical tooth injury and intra- and post-operative bleeding compared to the females.

Keywords: Orthognathic surgery, Maxillo-mandibular surgery, Jaw abnormalities, Intraoperative complications, Post-operative complications, Post-surgical pain, Haemorrhage. (JPMA 72: 1954; 2022)

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Introduction

Orthognathic surgery is an effective treatment modality in plastic and maxillofacial surgeries for improving function and aesthetics.[1] Functional constraint and aesthetics are determined to be the most primary motivators for patients with dentofacial deformities to seek treatment.[2] The increased reliability of surgical intervention has aided in the widespread adoption of these procedures, making them appear almost risk-free in many instances.[3]

Aside from the numerous benefits of orthognathic surgery, such as stable outcomes in severe jaw disorders, enhanced facial aesthetics, and masticatory performance,[4] there have been a number of complications mentioned in earlier studies.[5] These complications include nerve damage, severe intra-operative bleeding, temporomandibular joint problems, post-operative infections, bone necrosis, neuropathic pain, thromboembolism, periodontal problems, auditory and ophthalmic changes, post-surgical depression and psychological problems due to increased treatment duration.[6-15] Earlier studies have also shown several potentially fatal consequences.[16]

Patients who are planned for surgical orthodontics to correct malocclusion must be adequately informed about the entire operational procedure as well as the potential consequences.[17] Brons et al.[17] reported a 40% occurrence of post-surgical complications following corrective jaw surgery. Among 143 (33.8%) of the 423 treated patients, Friscia et al.[18] documented 185 complications. Another retrospective investigation revealed the prevalence of fatal vascular, ocular, cranial, and bone consequences, such as a tear in the dura mater.[19] Hence, it is necessary to provide a detailed explanation and to educate the patients regarding post-surgical complications and pain that they may endure afterwards before they decide to undergo treatment. This can help the surgeons in reducing patients' apprehension and distress about surgery and improve individual patient contentment with the outcomes of surgery.[20] However, it is often noticed that patients refuse surgical treatment modality either due to insufficient knowledge and uncertainty regarding the surgical procedure or due to the several post-operative complications discussed in the literature.[6-16] Very few studies have been conducted to explore the decision-

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making process, thoughts and anxieties when patients are presented with high-stake problems, like undergoing a major surgery to improve their aesthetics or occlusion.[21] An effort to understand the reasons behind their decisions can result in alleviation of certain concerns, increasing the acceptance of the treatment modality. In the field of research, questionnaire-based studies are common. Due to the on-going pandemic of coronavirus disease-2019 (COVID-19), certain standard operating procedures (SOPs) have to be followed while conducting research surveys, including the avoidance of unnecessary physical contact and crowding of out-patient departments (OPDs). The surveys, as such, are mostly conducted over the telephone.[22]

It was supposed to be interesting to see if and how the responses differ when patients are asked open-ended (OE) and closed-ended (CE) questions. No such study was found to have been conducted in Pakistani population. The current study was planned to fill the gap by finding out the most common reasons for refusing orthognathic surgery and comparing the responses along gender lines and in terms of OE and CE approaches.

Subjects and Methods

The cross-sectional retrospective study was conducted from August to December 2020 at the Orthodontics Department of Bahria University Medical and Dental College, Karachi, Pakistan and comprised patients who were planned for but refused orthognathic surgical treatment between January 2018 and July 2020.

After approval from the institutional ethics review committee, the sample size was calculated in the light of an earlier study[23] using the equation n=[DEFF*Np(1-p)]/ [(d2/Z21-α/2*(N-1)+p*(1-p)] with 95% confidence level, 5% confidence limit and a design error of 1. The overall mean age of the sample was 23.25±2.19 years. The sample was calculated using convenience sampling technique from among patients with severe jaw discrepancies for whom orthognathic surgery was planned but they refused it as a treatment option.

Patients with no significant past medical history and no previous history of removable or fixed orthodontic treatment were included, while patients with history of trauma, maxillofacial or plastic surgery, psychiatric patients or those having severe craniofacial deformities or syndromes and those who did not respond to phone calls or did not understand either Urdu or English were excluded.

After taking informed consent from the subjects (Annexure I and II), data was collected using a

ANNEXURE I

BAHRIA UNIVERSITY MEDICAL AND DENTAL COLLEGE (BUMDC)

DEPARTMENT OF ORTHODONTICS

CONSENT FORM

OPD Reg No. _____ Ortho Record No. _____ Date _____

Patient Name _____ Age _____

Address _____

Contact No _____ Office _____

I understand that Dr. _____ will use his/her best knowledge, skill and training expertise in my treatment.

I have been fully explained, regarding:

- The nature of the problems of my teeth.
- The treatment plan, its different phases/requirements, potential risks and relapse.
- Cooperation of patient is necessary regarding oral hygiene maintenance, use and care of braces throughout the treatment otherwise caries or discoloration of tooth surface may result
- The data obtained from the patients can be used for research purposes and for university examinations.
- Patient's pre-treatment, mid-treatment and post-treatment records (including diagnostic casts, radiographs and pictures) will be used for survey and research purposes.
- Regular visit is very important for completion of the treatment; in case of missing appointments and non-compliance may result in discontinuation of treatment.
- Treatment charges include the down payment and monthly installments

Note: In case patient cannot understand English, the concerned doctor should explain each instruction in Urdu

I have read and understood the above instructions and I will follow it.

Patient's / Guardian's Signature: **Doctor's Name and Signature:**

_____ _____

ANNEXURE II

BAHRIA UNIVERSITY MEDICAL AND DENTAL COLLEGE (BUMDC)
DEPARTMENT OF ORTHODONTICS
CONSENT FORM

OPD Reg No.: _____ Ortho Record No.: _____ Date: _____

Patient Name: _____ Age: _____

Address: _____

Contact No: _____ Office: _____

I understand that Dr. will use his/her best knowledge, skill, and training expertise in my treatment.

I have been fully explained, regarding:

- The nature of the problems of my teeth.
- The treatment plan, its different phases/requirements, potential risks, and relapse.
- **In case of Orthognathic surgical treatment plan, patient will be provided with all the necessary information concerning a proposed surgery/special procedure including details about nature of the surgery, procedure of the anesthesia, the expected benefits, and effects as well as the possible risks or complications that might occur during or after the surgery.**
- Cooperation of patient is necessary regarding oral hygiene maintenance, use and care of braces throughout the treatment otherwise caries or discoloration of tooth surface may result.
- The data obtained from the patients can be used for research purposes and for university examinations.
- Patient's pre-treatment, mid-treatment, and post-treatment records (including diagnostic casts, radiographs and pictures) will be used for survey and research purposes.
- Regular visit is very important for completion of the treatment; in case of missing appointments and non-compliance may result in discontinuation of treatment.
- Treatment charges include the down payment and monthly installments

Note: In case patient cannot understand English, the concerned doctor should explain each instruction in Urdu.
I have read and understood the above instructions and I will follow it.

Patient's / Guardian's Signature: _____ **Doctor's Name and Signature:** _____

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predesigned questionnaire that was filled up during a structured telephonic interview by a single calibrated clinician to avoid intra-operator bias.

The schedule of the interview with date and time was communicated to the participants through their cell phones. The patients were assigned serial numbers to ensure confidentiality. Each interview was scheduled at a time that was convenient to both the researcher and the participant. If the patient was not the main decision maker in the treatment plan, the interview was conducted with the member of the family who was available.[24] The total call duration for each interview was 20-30 minutes,[25] and it was ensured that, wherever possible, the participants were in a quiet place for the duration of the call. The questionnaire (Annexure III) was prepared in both English and Urdu, and it was ensured that the participants understood the question properly before responding.

Other than demographic details, the questionnaire explored the reason due to which the participant had not opted for orthognathic surgery. The OE question was asked first, followed by the CE question in which multiple reasons were listed according to published literature[6-16] and the options that best described the reason had to be selected by the subject.

Data was analysed using SPSS 23. Descriptive analysis was performed to find out the most common reasons of refusing orthognathic surgery by patients, and to compare the responses in OE and CE approaches. Comparison between males and females and inter-group comparison of OE and CE approaches was done using logistic regression analysis. $P<0.05$ was taken as significant.

ANNEXURE III

REASONS FOR REFUSING ORTHOGNATHIC SURGERY BY ORTHODONTIC PATIENTS (A Cross-sectional Survey)

RESEARCH FORM

Name: **Age:** **OPD #:** **Date:**
Type of surgery planned:

Questionnaire

Q1. What is the reason for refusing orthognathic surgery as your treatment option? (Open ended question)

1.
2.
3.
4.
5.

Q2. Among the following which reasons would you select for refusing surgery as your treatment option? (Close ended question)

1. Uncertainty about the procedure. ☐
2. Anaesthetic complications. ☐
3. Fear of incision/cut or problems in the procedure. ☐
4. Intra operative or post-operative bleeding. ☐
5. Post-operative infection. ☐
6. Post-operative pain. ☐
7. Increased duration of orthodontic and surgical treatment. ☐
8. Increased cost of surgery. ☐
9. Post-surgical Temporomandibular joint problems. ☐
10. Nerve damage. ☐
11. Vision or hearing loss. ☐
12. Tooth injury. ☐

Results

Of the 60 patients, 42(70%) were females and 18(30%) were males. Overall, 19(31.7%) patients cited expense to be incurred during the surgical treatment as the most common reason in OE approach. The second most common reason 17(28.3%) was fear of incision and cut. Post-operative pain was stated by 15(25%) patients (Figure-1).

In CE approach, the most common reason of refusal was post-operative pain 35(58.3%), followed by duration, cost and post-operative infection 22(36.7%) each, and fear of incision and cut 21(35%) (Figure-2).

Comparison of OE and CE responses showed that increased cost and fear of incision were almost comparable, while variations were noted in other responses (Figure-3).

Gender was compared with OE responses (Table-1) as well as with CE responses (Table-2).

Table-1: Logistic regression analysis between gender and reasons for refusal of surgery (open-ended questions).

Reasons	Gender	Odds ratio (95% Confidence Interval)	p-value
Uncertainty of Procedure	Male	0.385 (0.043--3.467)	0.395
	Female	1	
Increased duration	Male	2.386 (0.679 -- 8.368)	0.175
	Female	1	
Increased cost	Male	0.574 (0.159--2.074)	0.574
	Female	1	
Post-operative Pain	Male	0.308 (0.061--1.543)	0.152
	Female	1	
Fear of Incision and cut	Male	1.076 (0.312--3.712)	0.907
	Female	1	
Intra and post-operative bleeding	Male	1.990 (1.489 -- 5.202)	<0.001
	Female	1	
Post-operative infection	Male	0.822 (0.149--4.542)	0.822
	Female	1	
Uncertainty of appearance	Male	1.778 (0.270--11.709)	0.55
	Female	1	
Concerned about Dental Alignment Only	Male	9.00 (0.865--93.675)	0.005
	Female	1	
Tooth injury	Male	2.102 (0.360--2.256)	<0.001
	Female	1	

Table-2: Logistic regression analysis between gender and reasons for refusal to surgery (closed-ended questions).

Reasons	Gender	Odds ratio (95% Confidence Interval)	p-value
Uncertainty of Procedure	Male	1.162 (0.304--4.439)	0.826
	Female	1	
Increased duration	Male	0.920 (0.285--2.969)	0.89
	Female	1	
Increased cost	Male	0.637 (0.190--2.135)	0.637
	Female	1	
Post-operative Pain	Male	0.527 (0.169--1.640)	0.269
	Female	1	
Fear of Incision and cut	Male	1.018 (0.314 -- 3.300)	0.976
	Female	1	
Intra and post-operative bleeding	Male	2.315 (0.126--5.321)	<0.001
	Female	1	
Post-operative infection	Male	0.427 (0.120--1.528)	0.191
	Female	1	

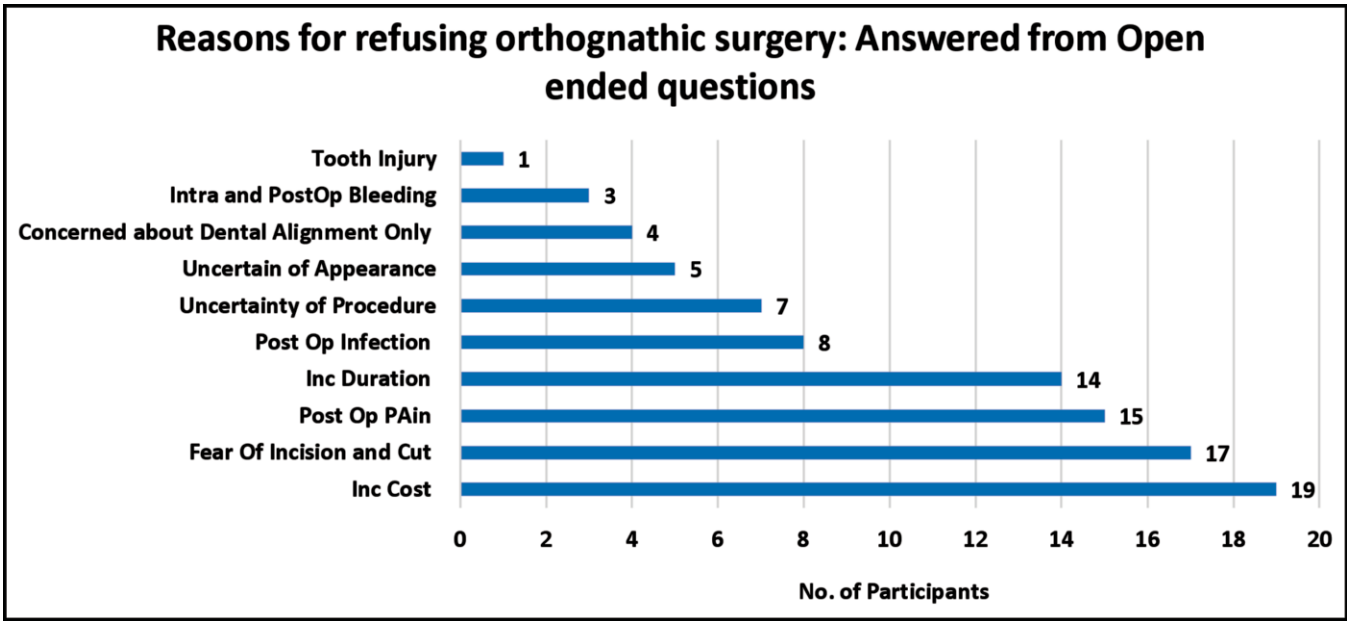

Figure-1: The most common reasons for refusing orthognathic surgery (open-ended questions).

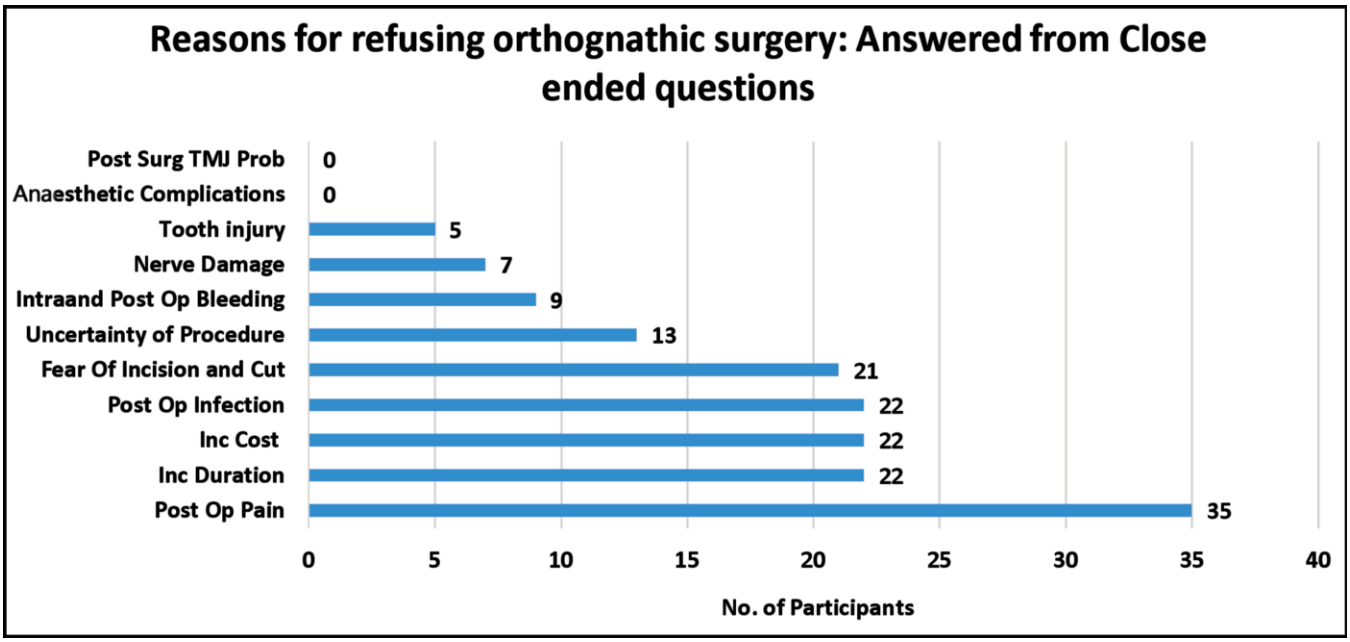

Figure-2: The most common reasons for refusing orthognathic surgery (closed-ended questions).

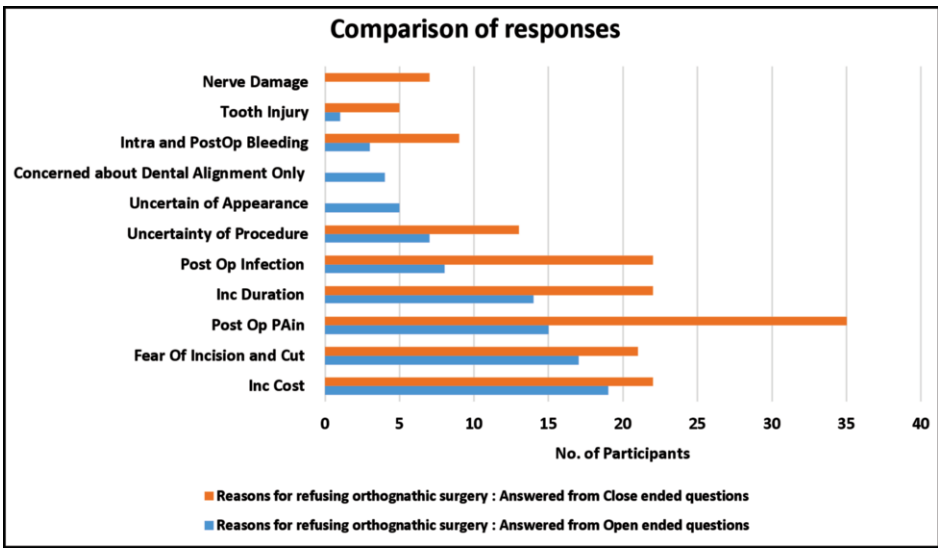

Figure-3: Comparison of open-ended and closed-ended responses.

Discussions

Orthognathic surgery is a popular technique for treating major dentofacial abnormalities that are not amenable to surgical or orthodontic camouflage.[26] However, in certain places/centres, patients are hesitant in considering it as an option owing to preconceived notions, misconceptions and actual adverse effects as well as cost concerns. According to the study findings, the two most prevalent causes for treatment rejection were soaring costs and pain.

In the current study, an OE and CE approach was employed to determine the most prevalent causes for orthognathic surgery denial. CE questions limit people's responses to the possibilities provided, whereas OE questions allow individuals to react with their own thoughts without being influenced by the researcher. As a result, OE questions serve an important role in reducing researcher bias, but they have their own set of issues, such as the requirement for significant coding and result compilation, which causes the researchers to resort to CE questions.[27] Using an OE approach, the findings revealed that the most often mentioned reason was significantly larger expense. The noteworthy element was that the bias in the CE replies was towards the pain and discomfort that the surgical procedure would induce. These results are consistent with another recent study on Pakistani population.[28] With Pakistan being a third-world country and the study site catering mostly to patients from low socioeconomic status, financial constraint was an understandable reason for refusal. However, the shift of this concern to pain that the surgery might induce was an interesting twist that sheds light on the fact that CE questions can have a remarkable response bias when used as a study tool.

More than half our sample (58%) in the CE response segment cited pain as a major reason for surgery refusal. Luo et al. found that post-surgery 14.3% patients experienced musculoskeletal pain, while 7.1% experienced pain of neuropathic origin.[29] Agbaje et al.[30] concluded that 80% of patients with orofacial pain and temporomandibular joint (TMJ) pain before orthognathic surgery were pain-free one year after the surgery. While 12.2% of patients with no preoperative orofacial pain and 9.3% without preoperative TMJ pain presented with pain a year after the orthognathic surgery. The majority of the current study's participants avoided surgery owing to their fear of incisions and post-operative infections. Although, according to literature, the prevalence of post-surgical infections is relatively low and is effectively managed with antibiotics.[31-32]

A significant number of subjects said they did not want to have surgery because they believed it would lengthen their treatment duration. Whereas Bowe et al.[33] asserted that the average post-operative stay in hospital following successful orthognathic surgery was 1.2±0.2 days, with age being the key factor influencing the length of post-operative hospitalisation.

Three patients during the OE appraoch and 9 during the CE phase expressed concern about intra-operative and post-operative bleeding during surgery. A recent study found that both the bimaxillary and bilateral sagittal split osteotomy (BSSO) surgical procedures resulted in considerable hidden blood loss.[34] Hoffman and Islam[35] concluded that haemorrhage during orthognathic surgery can occur because of damage to the inferior alveolar or retromandibular artery or vein, maxillary artery and vein, facial artery, pterygoid plexus and palatine artery.

In the current study, several patients declined orthognathic surgery due to a lack of knowledge about the treatment modality. They had come in owing to dental misalignment and were surprised at the thought of having to undergo a major surgery. Socioeconomic status and literacy in general might have had a role in this outcome, and a study to determine the refusal reasons depending on literacy level could provide intriguing results. It is critical to understand the patient's viewpoint to examine their decision to have orthognathic surgery and their understanding of the procedure.[25] If patients do not have in-depth understanding of a major surgical intervention, it is preferable for them to avoid it rather than opt for it. This practice would have a direct impact on the study's findings. Similar results were found in a study which clearly demonstrated that most individuals are less acquainted with orthognathic surgery as a treatment method for correcting dento-facial deformities.[36]

On comparing males and females, the current study discovered that males were more concerned about dental alignment alone and had a greater fear of tooth injury during surgery, whereas females had a higher expectation for treatment results and were more concerned about their overall facial appearance and aesthetic appeal rather than just tooth alignment. Kim and Park reported similar results.[37]

The current study found out that none of the patients reported nerve injury as their reason in OE approach, but 7 patients selected nerve injury as a probable option in the CE phase. Following modified single-stranded oligonucleotides (SSO), da Costa et al.[6] observed that two years after surgery, 16% patients developed altered sensitivity of the chin, lower lip, or even both. One study[38] revealed anterior disc dislocation with and without reduction, post-operative condylar resorption, joint crepitation, discomfort, and limited mouth opening, whereas, in our sample, none of the patients were worried about post-surgical TMJ problems. Similarly, participants in the current study had no fear of intra-operative anaesthetic complications which could be most likely due to the lack of knowledge about anaesthesia and its complications among the laypersons which is not in agreement with other studies that reported complications, such as sectioning of the endotracheal tube[39] and herniation of the airway tube[40] during surgery.

The current study had some limitations. It was a single-centre study in which consent was obtained over the phone rather than a written signed document. No written information describing the study was supplied to the participants, and no feedback was offered to the participants once the questionnaire was completed.

The interaction with the patients was conducted over the phone, and a study[41] has claimed that when interviews or talks are conducted in person, respondents open up and speak more freely. However, the same study has also said that doing the interview over the phone as opposed to in person has the benefit of the individual being less biased based on the appearance and demeanour of the interviewer, which supports the approach of the current study. Although, in times of pandemics, such encounters should be avoided or limited, we did our best to mitigate this shortcoming by allowing ample time for an interview to be conducted.[25]

Conclusion

Increased cost and post-operative pain were the most common reasons for refusal of orthognathic surgery in OE

and CE questions, respectively. In both the approaches, comparable responses were related to increased cost and fear of incision and cuts. Gender comparison showed that males were more concerned about dental alignment and had higher fear of post-surgical tooth injury and intra- and post-operative bleeding compared to the females.

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