ORIGINAL ARTICLE

COMMON CAUSES OF LIMITED MOUTH OPENING AND ITS MANAGEMENT APPROACH AMONG DENTISTS IN KARACHI

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ABSTRACT

Limited mouth opening, which is also known as trismus or lockjaw, has a number of abeyant issues and its treatment depends on the major cause. The objective of this study is to figure out the common causes of limited mouth opening in Karachi and to ascertain the management approach for a patient with trismus. The level of awareness and skill amongst clinicians with reference to the management of patients with trismus has also been evaluated. About 300 dental clinicians were asked a group of questions by the help of a questionnaire. The survey was conducted amongst the public and private dental OPDs in Karachi. The questions have been asked to evaluate the level of awareness, diagnostic approach, and quality of management and care offered to the patients having trismus. The three most common causes of trismus according to the present study came out to be oral submucosal fibrosis (26.7%), infections (24.0%), and trauma (15.0%), respectively. The dentists have chosen different management approaches according to their field of specialization and case dependence such as physiological mouth opening exercises (50.7%), prescribing medications specially muscle relaxants (24.3%), incision on contracted oral mucosa (12.7%), correction of temporomandibular joint (TMJ) or bone deformity (7.7%), and intralesional corticosteroid therapy (4.7%). The study concluded that trismus can turn into a potentially life-threatening situation if misdiagnosed and managed improperly; therefore, special attention should be given to patients coming with any of the above-mentioned symptoms.

Keywords: Life-threatening, limited mouth opening (trismus), management, treatment.

1. INTRODUCTION

Trismus or lockjaw may be defined as a limitation to open the mouth completely, due to reduced mandible mobility[1]. Trismus is a condition and is not a disease itself. It has a number of pertinent causes, which ranges from simple and non-progressive to those that are potentially life-threatening. It is usual to see a considerable number of patients each month with a secondary or at times primary issue of trismus in dental clinics. This condition may impair eating, impede oral hygiene, restrict access for important dental procedures and adversely affect speech and facial appearance[2]. In healthy individuals, mouth opening is around 30–50 mm but when the mouth opening is limited to a maximum of 20 mm, the individual is said to have a reduced mouth opening or trismus[3]. The width of the index finger at the nail bed is between 17 to 19 mm. Therefore, two fingers' breadth (40 mm) and up to three fingers' breadth (54–57 mm) is the usual mouth opening. Generally, males display a greater width of mouth opening than females[4].

Various conditions may cause or serve as a predisposition for the development of trismus[2]. The common causes of limited mouth opening include congenital disorders, infections, trauma, iatrogenic, neoplasia, chemotherapy and radiotherapy, temporomandibular joint disorders, drugs, psychogenic, oral submucosal fibrosis, and several other causes[5-15]. Although the cases of trismus seem to be difficult initially but by proper diagnosis and management appropriate treatment can be provided to the patients with good prognosis. Therefore, it is

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important for the clinicians to be aware of this significant condition, its primary causes, and its management. By pursuing this study, it is intended to evaluate the most common causes of limited mouth opening in dental settings within Karachi. The aim is also to observe its management approach in this region and analyze the need to create awareness amongst practicing clinicians, so that the patients having trismus may be managed through a standard systematic approach, enhancing the efficacy of treatment and improving patient's lifestyle.

2. METHODS

A total of 300 dental clinicians were asked a group of closed ended questions with the help of a questionnaire, to conduct a survey. Of the 300 clinicians that were asked to participate in the survey, the vast majority consisted of General Dental Practitioners (91%), whereas the remainder included Oral Medicine Specialists (3.3%), Oral Pathologists (2.7%), Oral Maxillofacial Surgeons (2.3%), and Periodontists (0.7%) (Fig. 1). About 8 dental hospitals of Karachi were surveyed, requesting 30 dentists from each dental hospital to answer the questionnaire. Similarly, 30 private dental clinics throughout Karachi were also visited, with each having a minimum of 2 dental clinicians available on an average at different timings, who participated in the survey. The questions asked from the clinicians were so designed to evaluate the level of awareness, diagnostic approach, quality of management, and care offered to the patients having trismus.

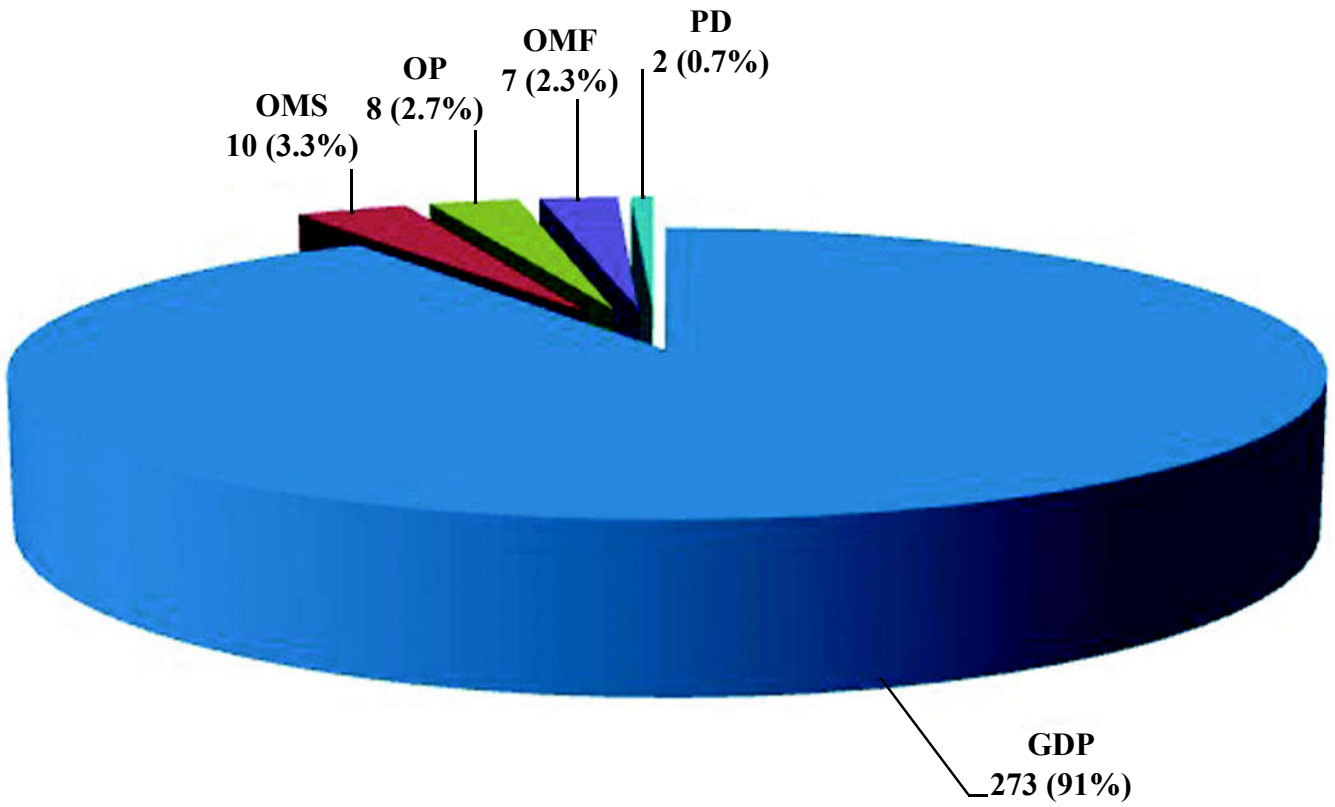

Fig. 1. The number of dental clinicians of various specialties.
GDP = General Dental Practitioners, OMS = Oral Maxillofacial Surgeons,
OP = Oral Pathologists, OMF = Oral Maxillofacial Surgeons, PD = Periodontists.

3. RESULTS

According to the present study, the most commonly observed etiology of limited mouth opening by the clinicians was attributed to oral submucosal fibrosis (26.7%). The second most common etiology mentioned by the clinicians appeared to be infections 24% (periapical, mandibular space infections, etc.) leading to trismus. The third most common etiology observed was temporomandibular joint (TMJ) disorders that 15% of clinicians reported encountering in their experience. Other common but less prevalent causes of trismus in the region includes dental treatment related trismus (14%), after trauma (13.3%), trismus due to tumors and oral cysts (3.3%), trismus as an adverse effect of drugs (2.3%), limitation of mouth opening after radiotherapy and chemotherapy (0.7%) and due to congenital defects or hereditary reasons (0.7%) (Fig. 2).

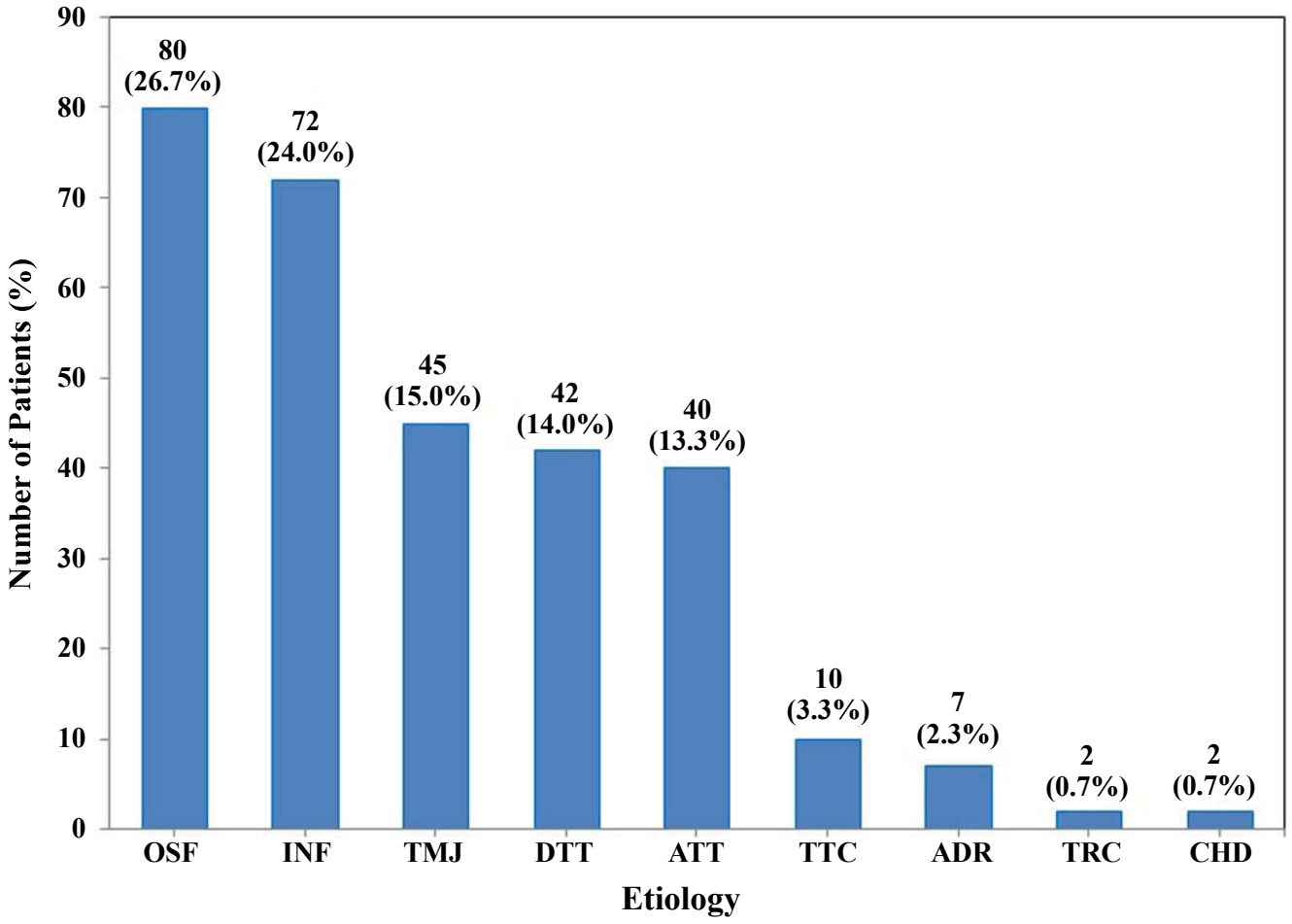

Fig. 2. Etiologies identified for limited mouth opening or trismus.
OSF = Oral Submucosal Fibrosis, INF = Infections, TMJ = Temporomandibular Joint,
DTT = Dental Treatment Related Trismus, ATT = After Trauma Trismus,
TTC = Trismus due to Tumors and Oral Cysts,
ADR = Trismus due to Adverse Drug Reactions,
TRC = Trismus after Radiotherapy and Chemotherapy,
CHD = Trismus due to Congenital or Hereditary Defects.

Clinicians were asked about the management approach for treating the patients of trismus at their settings (Fig. 3). About 24.3% dentists were found to prescribe medications, especially muscle relaxants, as a symptomatic treatment for trismus. On the other hand, 50.7% of oral health professionals advised physiological mouth opening exercises along with oral hygiene instructions. Oral surgeons (12.7%) also preferred incising the contracted scar tissue on the oral mucosa. Similarly, 7.7% of the experienced dental surgeons claimed that the correction of TMJ or bone deformity has also helped them in several cases while some clinicians (4.7%) used intralesional corticosteroid injections, as a treatment modality for trismus (Fig. 3). Thus, it has been proved that the management approach and treatment strategy for patients having trismus vary depending on the actual reason of limited mouth opening and that there are various treatment options or a combination of them available to effectively treat trismus.

4. DISCUSSION

Trismus is a multi-causative condition that may include odontogenic infections, trauma, TMJ, head and neck oncology, postoperative complications, etc. However, according to the recent literature, the most common causes are oncology related[10-13,16-20]. About 2% of head and neck cancer patients are presented with trismus due to tumor invasion of the muscles of mastication or due to a reflex spasm of these muscles caused by the tumor[5,6,9,11,16-20]. Trismus can also become a risk if misdiagnosed as a generally limited mouth opening condition without considering the neoplastic disease aspect, either primary or metastatic. Therefore, a thorough clinical and radiological examination is necessary for every trismus patient to rule out neoplastic surmise[11,21-24]. Primary tumors or neoplastic diseases occurring in many parts of the body could metastasize to the epipharyngeal region, parotid gland, jaws or TMJ where the clinical sign may be trismus[10]. Trismus

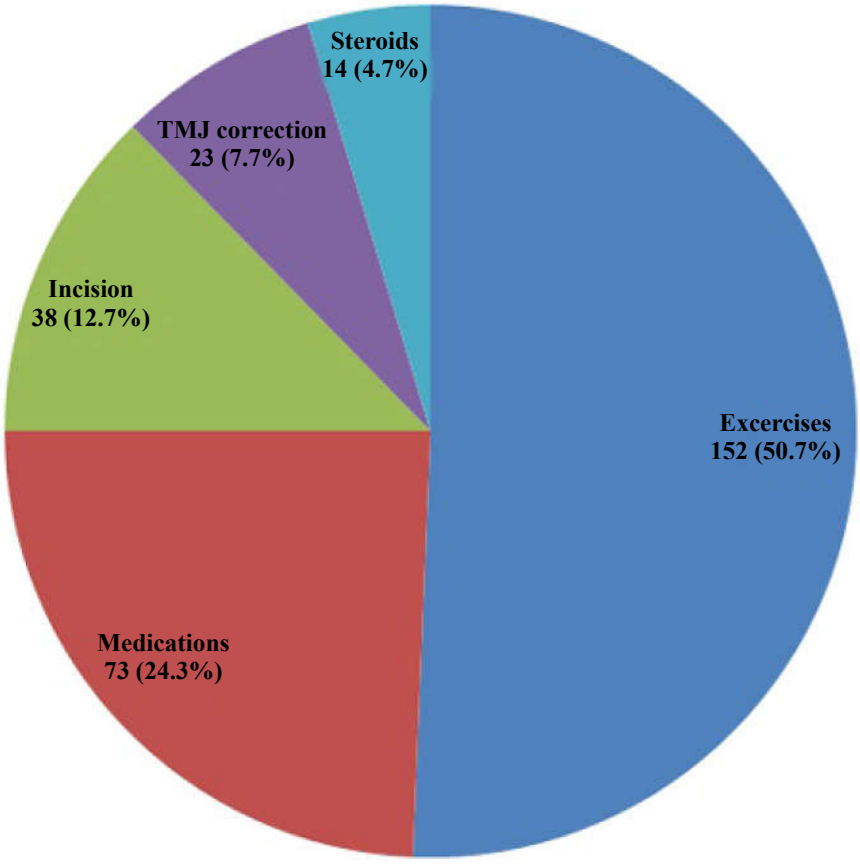

Fig. 3. Management approach for the treatment of trismus among the dental clinicians.

may occur as a significant side effect of radiotherapy especially in combination with muscular tumor invasion and surgery. The most decisive factor for the occurrence of trismus after radiotherapy is probably the inclusion of the medial pterygoid muscle in the treatment portal[11].

A number of dental clinicians have been questioned regarding trismus in this survey (Fig. 1). The results of the present study show that the most common cause of trismus is due to oral submucosal fibrosis (Fig. 2), which is a precancerous condition, most common in people living in the Indian subcontinent. When oral submucosal fibrosis progresses the jaws become rigid due to blanching and fibrosis of oral mucosa, mainly buccal mucosa, to the point that the person is unable to open the mouth[25,26]. The condition is remotely associated with oral cancers and is in connection with areca nut or betel quid chewing.

Infections have also been identified as the second most common reason for the occurrence of trismus in the present study (Fig. 2). Dental and masticator space infections may turn into a potentially life-threatening situation and should be diagnosed as early as possible. Infections involved in causing trismus could be of non-odontogenic or odontogenic origin including pulpal, periodontal, and pericoronal infections[27,28]. Infections that affect the muscles of mastication are more associated with trismus. Any of the aforementioned infections if overlooked or are misdiagnosed may lead to serious complications, such as cervical cellulitis or mediastinitis and sometimes may cause death[7,29]. On the other side, infections of the non-odontogenic origin may also cause trismus; these may include tonsillitis, meningitis, tetanus, brain abscess, parotid abscess, etc.[30].

Dental treatment-related trismus (14%) is also a common but less prevalent cause of limited mouth opening in this region (Fig. 2). The appearance of trismus after injections of a local anesthetic solution is common and is due to inaccurate positioning of the needle when giving block[8]. Occasionally, the medial pterygoid muscle is penetrated or a vessel is punctured followed by hematoma and fibrosis leading to trismus[4,8]. The impact of trismus on a patient can be striking and can affect many areas corresponding to the overall health and lifestyle of the patient including oral hygiene, eating, swallowing, nutrition, speech, etc.[31]. When the dental clinicians included in the present survey were questioned, how they tend to take measures to improve the lifestyle of the patient having trismus? A vast majority of them (40%) responded that they will wait for the restricted mouth opening to get normal and the actual cause to subside and then will focus on improvement of patient's lifestyle and oral hygiene. On the other hand, 60% of the dentists were of the opinion that promoting the use of tooth brushing, prescribing mouthwashes, giving oral health instructions and physiological massages/exercises for the oral mucosa should be carried out to improve the lifestyle and oral hygiene of a trismus patient.

In the present study, 3.3% clinicians observed the cases of trismus due to tumors and oral cysts but about 0.7% of dental surgeons claimed to observe trismus after chemotherapy and radiotherapy (Fig. 2). It has been observed in irradiated patients that trismus occurred from fibrosis and subsequent scar contracture in the muscles of mastication (temporalis, masseter, medial pterygoid and lateral pterygoid)[12]. Patients who have previously been irradiated and who are being treated for a recurrence appear to be at a higher risk of trismus than those who are receiving their first treatment[13,16].

The clinicians included in the present study (Fig. 1) have also been inquired about the preferred approach of offering investigations for a patient having trismus (Table 1). Some dental clinicians (16.7%) stated that they prefer investigations for patients before offering any symptomatic treatment whereas 29.7% of the dentists included in the survey do not prefer any investigation before starting symptomatic treatment in a patient having trismus. However, the majority of the dentists (35.7%) claimed that it depends on the case whether or not investigations shall be performed for patients of trismus before symptomatic treatment (Table 1). Suprisingly, 18% of the dentists have been found to be totally unaware of the

Table 1. Investigation approach of dentists for trismus patients

S. No.	Approach of Dentists	N (%)
1.	Prefer investigation before treatment	50 (16.7)
2.	Do not prefer investigation before treatment	89 (29.7)
3.	Depends on the case of each patient	107 (35.7)
4.	Do not known the investigation	54 (18.0)

investigations (Table 1). The most preferred type of investigations in patients having trismus includes extraoral and intraoral examination, and orthopantomogram (OPG). Apart from these investigations, radiological measures may also be considered to diagnose the actual cause. In some cases, such as fractures involving the mandible usually give rise to trismus because of protection of the injured part but limited mouth opening occurring in case of condylar fracture would require a PA (posterior-anterior) view of the skull to evaluate the damage. Therefore, investigations are indeed an important tool in the management of a trismus patient but their selection depends on the case and condition of the patient[4].

The clinicians have also been asked about their management approach for treating trismus patients in their settings. A vast majority of oral health professionals (~51%) rely on physiological mouth opening exercises along with oral hygiene maintenance and instructions, as a measure of treatment for trismus patients (Fig. 3). Whereas some of them (~24%) prescribe medications (Fig. 3), specifically muscle relaxants, as a symptomatic treatment for trismus, which usually worked for them almost every time. About 13% of the dentists prefer incising the contracted scar tissue (Fig. 3), usually found in oral submucosal fibrosis, on the oral mucosa which has markedly served as a relief for their patients. Similarly, some experienced dental surgeons (~8%) claimed that correction of TMJ or bone deformity also solves the problem of limited mouth opening in most of the cases, depending on the cause. Likewise, use of intralesional corticosteroid injections is also a choice of treatment for some dental clinicians (~5%) as a treatment modality for trismus (Fig. 3). There are various treatment options available for trismus. Thus, it has been observed that the management approach and treatment strategy for patients having trismus varies depending on the actual cause of limited mouth opening. Sometimes, a combination of these options may be employed in order to effectively treat trismus.

Management approach of the dental clinicians for patients having trismus holds great importance and solely depends upon the etiological aspect. Trismus is also partially associated with postoperative pain and is more intense on the first day after surgery with a mean reduction in the oral aperture of about 24%[14,15]. Thus, management can be divided into two main phases, acute and secondary. An acute phase deals with the initial pain that a patient experiences. This involves patient counseling along with some instructions to patients such as to carry out heat therapy, soft diets and use of analgesics or muscle relaxants[21]. For secondary phase, various appliances such as Therabite® or Engstrom jaw mobilizing device, dynamic bite opener, a threaded tapered screw, screw type mouth gag, and tongue blades are used to aid physiological mouth opening[1,17].

It is very important that dentists must be familiar with the differential diagnosis of limited jaw opening[2,19] as some of the conditions attributed to it can be life-threatening[27]. Therefore, good awareness of its causes can help the dentists to refer the patients early for specialist care[2]. In order to check the effectiveness and reliability of the treatment offered to trismus patients, clinicians were asked, if they refer the patients of trismus to a specialist. A total

Table 2. The dental clinicians approach for referring trismus patients to specialists

S. No.	Approach of Dentists	N (%)
1.	Refer to specialists	79 (26.3)
2.	Do not refer to specialists	194 (64.7)
3.	Prefer investigation before treatment	27 (9.0)

of ~26% claimed (Table 2) to refer the patients having limited mouth opening to specialists including oral maxillofacial surgeons, oral pathologists, and specialists in the field of oral medicine. However, around 65% dentists affirmed that they are able to successfully treat trismus, as a general dentist, and that they do not find the need to refer the case of trismus (unless complicated) to any specialist (Table 2). It is, therefore, suggested that either general dentists should be efficiently trained to diagnose the condition accurately and exercise an appropriate management approach or all general dental practitioners should be encouraged to refer the patients of trismus to the respective specialized field so that there is no compromise on the quality of treatment offered to the patients. While the remaining 9% prefer investigation to be done before treatment.

An attempt has been made to study that some drugs are also capable of causing trismus as a secondary effect, such as succinylcholine, phenothiazines, and tricyclic antidepressants are the most common in the list[2,32]. In order to evaluate the awareness regarding restricted-mouth opening, the dentists included in the survey were asked if trismus could occur as an adverse effect to any drug therapy. Among 300 clinicians included in the survey, only 39 (13%) confirmed that trismus could occur due to an adverse effect to a drug therapy while the remaining 261 (87%) of the clinicians are found to be totally unaware of the fact that trismus could also occur as a secondary adverse effect to some drugs. Interestingly, among those 39 (13%), only 15 (5%) of the dentists are actually aware of the definite drugs involved while the remaining 24 (8%) failed to specify any drug involved but are in support of the statement. Therefore, it is suggested that some measures should be taken for awareness and education of trismus amongst clinicians.

The patients on the other side should also be educated to make them well aware of the fact that having limited mouth opening is not normal at all and requires the immediate attention of an oral specialist to check the condition thoroughly. Only, 59 (19.7%) of the clinicians surveyed are found to be associated with providing awareness to masses and are working for mass education, prevention of preventable causes such as areca and betel nut chewing, chewable tobacco intake, and promotion of proper management of trismus. Regrettably, 241 (80.3%) out of the 300 dentists surveyed are not involved in any of such activities but are in support of such awareness and preventive measures. Thus, measures for awareness and education should also be taken for masses from a patient's perspective on a larger scale.

5. CONCLUSION

The present study has been performed to bridge the gaps in accordance with the diagnosis and knowledge of the etiology of trismus, which would ensure the provision of more optimized care for the patients. It is also to be noted that trismus is a condition and is not a disease itself; therefore, it may occur as a sign/symptom of various diseases. Hence, the actual cause of trismus needs to be diagnosed and the cause/disease should be removed or treated, which would be an essential part of the management approach of a trismus patient. Trismus or limited mouth opening is a common condition that dentists usually come across, but due to the lack of proper criteria for diagnosis and management, patients having trismus go through several trials and if the actual disease is not diagnosed, serious complications could occur. Thus, a stipulated and organized process is more likely to yield an accurate diagnosis and it is extremely

essential for a clinician to obtain adequate information of the patient through a complete history and clinical examination. Since trismus is mostly considered innocuous in usual practice without considering the fact that it could give rise to many complications for the patient, along with social insecurity and psychological impact. Therefore, it is suggested that clinicians must be aware of this significant condition, its primary causes, management approach, and treatment strategies.

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CONFLICT OF INTEREST
The authors declare no conflict of interest.

ETHICAL APPROVAL
The study was approved by the Ethics Committee of the Baqai Medical University, Karachi, Pakistan.

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