

Original Research

Prevalence of Trigeminal Neuralgia in adults: A population-based study

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ABSTRACT:

Background: Trigeminal Neuralgia is a type of orofacial pain disorder that is restricted to one or higher numbers of branches of the trigeminal nerve. This disorder dramatically causes a reduction in the quality of life of the afflicted patients which may be attributed not only to painful episodes but also, to various other disease-associated comorbidities like- anxiety as well as depression. **Aim:** This study aimed to estimate the prevalence of trigeminal neuralgia in the studied adult population. **Materials and methods:** Total sample of 300 subjects was selected of which 100 were found to be afflicted. Relevant clinical and medical information was accessed through medical records. Data were analyzed using one-way analysis of variance, Chi-square test, and student t-test wherever applicable. **Results:** In our study, female predilection was noted and more involvement of the right side of the face was seen. Also, subjects with rural backgrounds were observed to be more afflicted than those with an urban background. **Conclusion:** Trigeminal neuralgia is a rare disorder and medical management is still controversial.

Keywords: Trigeminal neuralgia, prevalence, adult, population.

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INTRODUCTION

Trigeminal neuralgia is a neurological disorder that is characterized by the frequent occurrence of unilaterally occurring, with sudden onset and paroxysmal type of pain which is characterized by episodes or attacks in the oro-facial region. It has frequently been described as "the worst type of pain existing in this world" by afflicted subjects [1]. Trigeminal Neuralgia has been found to affect one or a greater number of branches of the trigeminal nerve and most often affects the second or third branches [2]. The triggering factors for Trigeminal Neuralgia attacks are- washing of the face, shaving, smoking while speaking, during brushing of teeth, or exposure to intense cold [3]. The pain initiated by these frequent attacks usually terminates usually within few

seconds, however, in few cases, it has been reported to last up to two minutes [4].

The etiology underlying Trigeminal Neuralgia may be idiopathic or may be symptomatic. Symptomatic cases of Trigeminal Neuralgia have been thought to be secondary due to underlying diseases, for example, tumors, cardio-vascular infarction, and multiple sclerosis. However, the causes or reasons underlying the idiopathic type of Trigeminal Neuralgia have not been fully understood. Hence, it has been postulated that the process of demyelination along the trigeminal nerve is the reason behind the associated pain. It has been presumed to be occurring due to neuro-vascular interactions occurring between the trigeminal nerve and abnormal venous and/or arterial vascular structures [5].

Trigeminal Neuralgia has routinely been treated by various specialties which include- oral and maxillofacial surgeons. Though there is no common consensus existing over the modality of treatment for this disease. Often the treatment is delayed due to frequent misdiagnosis. Additionally, the relative complexity of required treatment protocols for this condition complicates the management. Following diagnosis, in the initial stage of medical management, drugs such as carbamazepine, gabapentin, phenytoin, clonazepam, valproic acid, and/or topiramate are administered. This may be subsequently followed by performing procedures like- rhizotomy, microvascular decompression, or by using Gamma-Knife [6-8].

Trigeminal Neuralgia is a rare condition. Hence, it is difficult to assimilate a high amount of any epidemiological information or data [9]. This disease can be found to be occurring in any age group. Greater than 90% of diagnosed cases have been reported in subjects over 40 years of age. It has been observed with greater frequency in females when compared to men [4, 10]. Also, it has been seen that it may be seen to occur in combination with other diseases, for example, patients with diseases such as multiple sclerosis and vascular hypertension exhibit a greater risk of developing Trigeminal Neuralgia [11]. Although there appears to be no existing consensus over the overall prevalence as well as the incidence of Trigeminal Neuralgia in existing scientific literature. Several investigators have reported Trigeminal Neuralgia from various areas around the globe [2, 3, 12-15]. In most of the established scientific evidence, the prevalence of Trigeminal Neuralgia in the sampled population has been reported to be ranging between 0.7-27 per 100,000 individuals. After analyzing the literature evidence, the aim of the current study was determined as to “Retrospectively study the prevalence of Trigeminal Neuralgia among adult subjects”.

RESULTS

Table 1: Diagnostic and classification criteria for trigeminal neuralgia as per the 3rd edition of International Classification of Headache disorders (ICHD-3)

- A. Recurrent paroxysms of unilaterally occurring facial pain along with the distribution of one or more divisions of the trigeminal nerve, with no radiating pain and fulfillment of criteria B and C.
- B. Pain sensation has the following characteristic features:
 1. Lasting from a fraction of one second to two minutes
 2. Of severe intensity
 3. Resembling Electrical shock- and is of shooting, stabbing or sharp nature or quality
- C. Precipitated by various innocuous stimuli within an affected distribution of trigeminal nerve supply
- D. if the clinical symptom cannot be accounted for better than by another diagnosis as per ICHD-3.

Of the overall study population examined (n = 300), 100 subjects were found to be diagnosed with Trigeminal Neuralgia. Out of which, subjects belonging to the female gender constituted 46.6 % with a mean age of 63.5 ± 11.1 (median age = 62.7 and inter-quartile range from 58.5 to 69.7. While remaining, 53.4 % was constituted by

MATERIALS AND METHODS

This was a retrospective cross-sectional analysis comprising of diagnosed Trigeminal Neuralgia patients who reported to the Out-Patient Department of the hospital in a period ranging between 2019 to 2020. A complete review of the subject's medical history and treatment records were done to collect data.

Inclusion criteria for subject selection were a) Adult Trigeminal Neuralgic patients aged above 18 years and b) Subjects whose diagnosis of Trigeminal Neuralgia was as per the diagnostic criteria described by ICHD-3 (Table 1). Any patient with a final alternative diagnosis regardless of Trigeminal Neuralgia was excluded from the study.

Patients were recruited through their clinical records and diagnosis. All collected clinical data was thoroughly reviewed by present investigators.

Assuming a level of confidence at 95% and a precision of 10% and an estimated prevalence of trigeminal Neuralgia as 20%, the exact sample size required to estimate the prevalence of Trigeminal Neuralgia was 300.

Basic demographic-related information, any available information on various characteristics of the disease, and the overall prevalence of classical triggering factors were also collected.

STATISTICAL ANALYSIS

All available data were collected and entered in Microsoft Excel Worksheet for descriptive analysis. After this, collected data was analyzed by using the Statistical Package for Social Sciences (SPSS) version 23.0 for Windows (IBM Co., Armonk, NY).

Exploratory univariate data analysis was performed using the Chi-square statistical test and student's t-test for identification of disease prevalence in the studied population.

male subjects with a mean age of 65.4 ± 10.2 (median age = 63.2 and inter-quartile range ranging between 59.2 to 70.1).

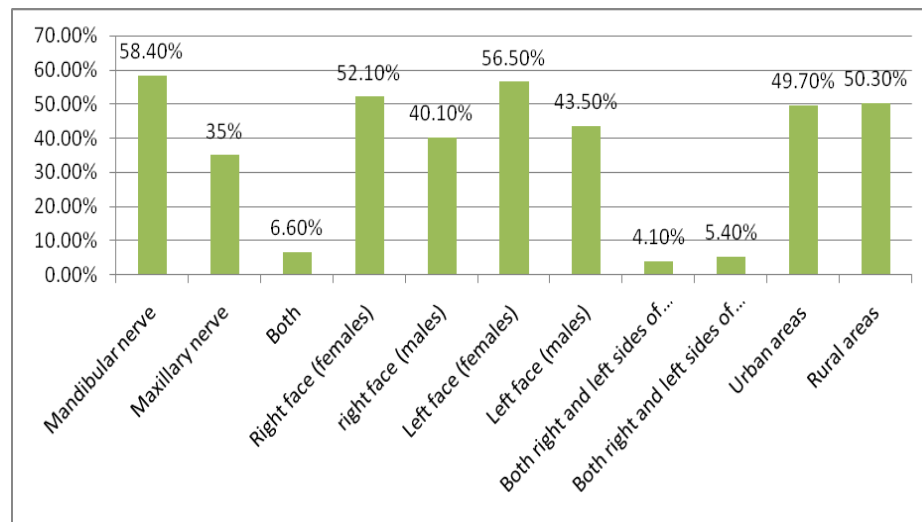
The average duration of the history of the disease at the time of first clinical consultation was found to be 4.6 ± 6.3 years. 57 % of the selected patients were diagnosed with the classical type of Trigeminal Neuralgia whereas, 15 % had secondary Trigeminal Neuralgia and 35 % had an idiopathic variety of Trigeminal Neuralgia.

Table 2: Table demonstrating findings of trigeminal neuralgia in the current study

| Nerve involved | Frequency |
|--|----------------------------------|
| Mandibular nerve | 58.4 % |
| Maxillary nerve | 35 % |
| Both | 6.6 % |
| Side of the face involved | Frequency |
| Right side | 52.1 % (females); 40.1 % (males) |
| Left side | 56.5 % (females); 43.5 % (males) |
| Both right and left sides | 4.1 % (females); 5.4 % (males) |
| Prevalence in urban/rural areas | Frequency |
| Urban | 49.7 % |
| Rural | 50.3 % |

The mandibular division of the trigeminal nerve was found to be involved in most of the diagnosed cases (58.4 %) which was followed by involvement of the maxillary nerve (35 %). Both the maxillary and mandibular nerves were found to be involved in the remaining i.e., 6.6 %. The right half of the face was found to be more involved than the left side of the face (i.e., 52.1 % and 47.9 %). On the other hand, 6.5 % of Trigeminal Neuralgia cases were found to have involvement of both the right and left halves of the face.

Graph 1: Graph demonstrating findings related to trigeminal neuralgia in the present study



While segregating the collected data, based upon the type of demographic location, it was found that Trigeminal Neuralgia was found to more prevalent among rural area population (50.3 %) when compared to urban areas (49.7 %).

Association between the nerve or nerves involved in both male and female study participants was evaluated by using a one-way analysis of variance. It was observed that the mandibular nerve was involved in 66.6 % of males and 33.4 % of female subjects. In contrast, the maxillary nerve was found to be involved in 43.4 % of male subjects and 56.6 % of female study participants. While it was noted that both the maxillary and mandibular divisions of the trigeminal nerve was affected in 3.1 % of males and 1.2 % of females in the study population. However, on statistical analysis, this association was found to exhibit no significance ($P > 0.05$).

It was observed that towards the right facial side, female gender subjects (59.9 %) had a higher prevalence of Trigeminal Neuralgia than male subjects (40.1 %). However, on the left side of the face, male subjects were observed to have a higher prevalence (43.5 %) than female participants (56.5 %). Though, both the right as well

left sides of the face were found to be involved in 5.4% of male patients and 4.1 % of female patients. On statistical analysis, no association was found to be significant ($P > 0.05$).

DISCUSSION

Trigeminal Neuralgia is a very rare and uncommon disorder that presents with brief episodes of sharp and lancinating pain in the oro-facial region in areas that have trigeminal nerve distribution. The disease is synonymously known as "Fothergill's disease" and "tic douloureux." It is categorized based upon etiologies such as a) primary or idiopathic and b) secondary or symptomatic. The approximate peak age of onset of this disease is in the 5th to 8th decades of a person's life.[16, 17, 18] Although the younger aged subjects have also been found to be closely related to the symptomatic type of Trigeminal Neuralgia. Although, a significant overlap in age ranges in patients diagnosed with a classical variety of Trigeminal Neuralgia and symptomatic variety of Trigeminal Neuralgia has also been reported.[19, 20] Similar findings were observed in our study as well. The peak age of disease onset in our study was found in between the 5th and 6th decades of life. Trigeminal Neuralgia demonstrates gender predilection. In published scientific literature, female predominance has been reported in a ratio of 5.9:3.4. [16, 17] In contrast, a male predominance has been reported in India. [17] Similarly, male preponderance was noted in our study as well. In contrast, Zakrzewska in 2002 observed an equal involvement of male-to-female incidences in their studied population [18].

On the evaluation of gender association with nerve involvement, we noted that in a higher percentage of cases, Trigeminal Neuralgia was affected the mandibular branch of this nerve in both male and female genders, although, on statistical analysis, this association was found to have no significance ($P > 0.05$).

On the other hand, while evaluating the association of gender with involvement of a side of the face, it was observed that a higher percentage of involvement was seen in the right side of the face in both male and female patients with trigeminal neuralgia. However, on statistical analysis, this association was found to be non-significant ($P > 0.05$). It was also noted that patients belonging to rural setups were more afflicted by Trigeminal Neuralgia than those who have residential addresses located in urban areas.

The exact etiology affecting the degree of branches of nerve involvement in Trigeminal Neuralgia is still not known [19]. Various studies have demonstrated that the most commonly affected nerve in this disease is the mandibular division (V3) while the ophthalmic division (V1) is the least affected [11, 14, 12, 19]. In contrast, few studies have also suggested that the maxillary division of the trigeminal nerve is the most routinely affected nerve in Trigeminal Neuralgia [2, 6].

On the other hand, Katusic et al (1990) suggested that the maxillary and mandibular branches were equally affected and the ophthalmic branch was least affected compared to other nerve branches [15]. In the present study, the most involved branch was found to be the mandibular nerve branch (V3). This finding is consistent with the findings of previously described studies.

CONCLUSION

Trigeminal neuralgia is a rare neural origin benign disease that may exhibit a massive impact upon an individual's quality of life. Only a few studies have been attempted to estimate the incidence and prevalence of Trigeminal Neuralgia to the present date. Our study is distinct as it has been conducted on a large sample and is also, capable of establishing the prevalence as well as the incidence of Trigeminal Neuralgia. Also, it is more common among female subjects when compared to males, the right side of the face is more involved when compared to the left side and it is more routinely found affecting the rural population when compared to the urban population.

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