

## A Study on Seasonal Variation of Bell's Palsy in a District Area of Bangladesh

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### Abstract:

**Introduction:** Bell's palsy is a common cranial neuropathy causing acute onset of unilateral lower motor neuron type of seventh cranial nerve palsy that result in ipsilateral facial muscle weakness. The aim of this study was to determine the possible correlation of Bell's palsy and seasonal influence in a district area of Bangladesh. **Materials & Methods:** This is an observational study in which we collect, compiled and analyzed the patients information who attended in outpatient department of neuromedicine unit at Cumilla medical college hospital Cumilla from January 2018 to December 2019. **Results:** In our study, out of 214 patients male were 117(54.7%) and female were 97(45.3%). Age range from 4 to 90 yrs, median age was 40.0±17.6 Number of patients with Bell's palsy presented in various seasons include 44% during winter, 35% during summer, 9% during fall monsoon and 12% during autumn period. We analyzed the data by using Mean±SD and chi-square test. A significant association was evident in winter and summer season (P=0.04 and P=0.045) respectively. **Conclusion:** In our present study we found significant relation between seasonal variation and occurrence of Bell's palsy.

**Key words:** Bell's palsy, facial paralysis, seasonal variation.

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### Introduction:

Bell's palsy, which was first described by Sir Charleo Bell, is partial or full peripheral nerve paralysis which has an acute onset, is idiopathic and generally involves only one side of the face<sup>1</sup>. The annual incidence 11.5-40.2/100,000 in the general population<sup>2</sup>. Bilateral involvement is seen in 0.3% of Bell's palsy patient<sup>3</sup>. Though it is seen at all age, but most frequent in the 15-40 years of age group<sup>4</sup>. While the cause of Bell's palsy remains unknown, a reactivation of

latent herpes viruses (HSV-10) in the geniculate ganglia of facial nerve may play an important role in its pathogenesis<sup>5</sup>. In a study of Murakami et al.<sup>6</sup> DNA of herpes simplex was found on the facial nerve endoneurium of patient diagnosed with Bell's palsy. Bell's palsy is seen more frequently in Germany in winter season, this fact support this hypothesis. It is assumed that with vasomotor changes in a facial region exposed to cold leads to partial ischemia in facial nerve and initiate inflammation around the nerve. Cold air again more easily reactivates the latent remaining viral infection<sup>7,8</sup>. Bell's palsy is a clinical diagnosis and its features reaches peak by 72h<sup>9</sup>. It's differential diagnosis are broad and the rate of misdiagnosis by initial consulting physician is 10.8%<sup>10,11</sup>. Associated symptoms of neck, mastoid or ear pain are usually support the diagnosis<sup>12</sup>. PCR have failed to demonstrate any consistent correlation between viral load and clinical features<sup>13,14</sup>. Though MRI has limited value as diagnostic tool but NCS can predict degree of recovery<sup>15</sup>. The aim of the study was to evaluate the relationship of seasonal variation of Bell's palsy in a district area like Cumilla of Bangladesh.

### Materials and Methods:

This retrospective observational study was made of 214 patients who were presented with facial paralysis at the neurology outpatient department of Cumilla medical college hospital from the period of January 2018 to December 2019. In this study Bell's palsy was defined as the acute disorder of the facial nerve which may begin with symptom of pain or discomfort in the ear and the mastoid region, by hypersensitivity to noise, decreased tear production, reduced taste in the affected side of the tongue and full or partial paralysis of one side of the face<sup>16</sup>. The condition is diagnosed after other possible cause of facial weakness has been ruled out. Patient were excluded if they had chronic otitis media, facial palsy developed after trauma, mass in the parotid region, surgery in this area, such as acoustic neuroma involve the

facial nerve. The age and gender of the patient were evaluated separately according to the month and season in which facial paralysis are seen. Seasons were classified as winter (December to February), summer (March to May), fall (June to August) and autumn (September to November) according weather bureau of Bangladesh. All data are calculated by percentage, mean± S.D and chi-square test and statistical analysis were done by SPSS version 22.

**Results:**

Table I show, out of 214 cases with Bell's palsy comprised 117(54.7%) male and 97(45.3%) female with a mean age was 40.0±17.6 and male female ratio was 1.5:1. Most of the person affected at the age of 21 to 30 years and mean percentage was 24.30%. In our study showed number of cases increases from December to March and peak was in January. Bell's palsy presented 44% in winter, 35% in summer, 12% in autumn and 9% in fall. Cases are increases in winter and summer seasons which were statistically significant (P=0.04 and P=0.045) respectively.

**Table-I: Distribution of the study patients by age (n=214).**

| Age (years) | Number of patients | Percentage |
|-------------|--------------------|------------|
| ≤10         | 3                  | 1.4        |
| 11-20       | 30                 | 14.0       |
| 21-30       | 52                 | 24.3       |
| 31-40       | 43                 | 20.1       |
| 41-50       | 32                 | 15.0       |
| 51-60       | 27                 | 12.6       |
| 61-70       | 16                 | 7.5        |
| 71-80       | 8                  | 3.7        |
| >80         | 3                  | 1.4        |

Mean±SD =40±17.6  
 Range = 4.0-90.0  
 (min-max)

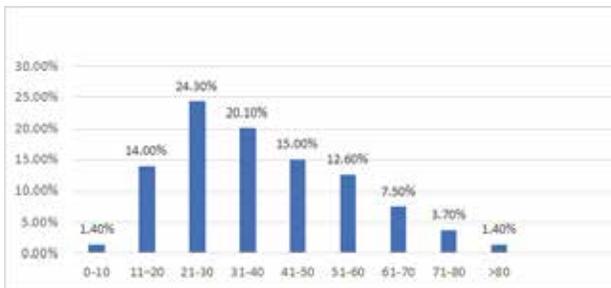


Figure-1: Distribution of age (n=214). n=number of patient

**Table-II: Distribution of the study patient by sex.**

| Sex    | Number of patients | Percentage |
|--------|--------------------|------------|
| Male   | 117                | 54.7       |
| Female | 97                 | 45.3       |

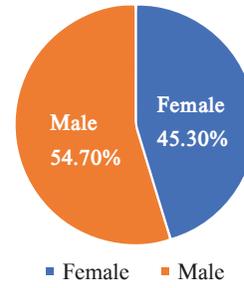


Figure-2: Distribution of the study patients by sex.

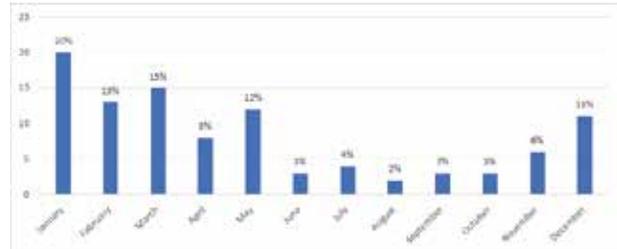


Figure-3: Number of cases of Bell's palsy according to month.

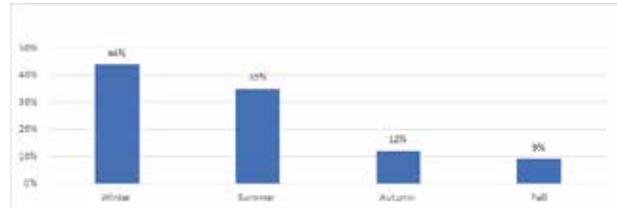


Figure-4: Number of cases of Bell's palsy according to season.

**Discussion:**

The most common type of Idiopathic facial paralysis or Bell's palsy is peripheral facial palsy which is typically self-limiting, has an acute onset and affects all the muscle groups of only one side of the face<sup>17</sup>. The study showed that out of 214 cases mean age distribution was 40±17.6 and peak incidence was 3rd to 5th decade. Sex distribution showed male 117(54.7%) and female 97(45.3%) and male female ratio was 1.5:1 Heburn Erdur et al & Ru-Lan Hsieh et al. assure that mean age of patient was (49.2±18) and (43.1±16) respectively and incidence of Bell's palsy rises among male and younger patient which is similar to our study. The presentation of Bell's palsy differed according to months with highest likelihood in December to March and the lowest in June to October. On average 44% presented in Winter (Dec. to Feb.), 35% in Summer (March to May), 9% in Fall (June to August) and 12% in Autumn (Sept. to Nov.) respectively. There was statistically significant in Winter and Summer season (P=0.04 and P=0.045). Karen E. Campbell and Brundage<sup>18</sup> showed that the incidence of Bell's palsy was higher in cold and dry environment than in wetter or warm environment. Leibowitz<sup>19</sup> showed that high incidence of Bell's palsy occurred more frequently in younger patients during the cold seasons and older patients during the warm seasons. Spengos et al.<sup>20</sup> showed that Bell's palsy incidence was lower in the Summer and higher

in the Autumn and Winter seasons and the month with the highest incidence was January. In a study Hsieh et al, which was conducted in the sub tropical climate of Taiwan, no statistically significant difference was determined between the seasons but when age sub groups were examined there was statistically significant in the incidence of Bell's palsy in cold season in those aged less than 50 years. In the current study the highest incidence of Bell's palsy was determined in the Winter seasons especially in the month of December to February. This environmental factor causes acute respiratory tract infections possibly by reactivating latent virus infections. However the findings of other studies investigating seasonal variation of Bell's palsy are heterogeneous and discrepancies may be due to the geographic and climate area where the study was conducted. Limitations of our study include the hospital based and low number of cases per season which precluded a statistical analysis of variation of seasonal incidence across the study period.

#### Conclusion:

We assessed the association of seasonal variation of Bell's palsy among a district area of Bangladesh. Our study showed that during the winter season the incidence of Bell's palsy increased among men and younger population in Bangladesh. Prospective study with a large sample size is to be required for more confirmation of our findings.

**Conflict of Interest:** None.

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