

Risk Factors Associated with Bell's Palsy in Faisalabad: A Retrospective Study

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Amina Ishfaq¹, Shahid Ahmed Heera¹, Maryam Zafar¹, Muhammad Nasir Manzoor¹, Muhammad Bilal Umer¹

Correspondence

Shahid Ahmed Heera
shahidheera@gmail.com

Affiliations

¹ Faculty of Medicine and Allied Health Sciences, The University of Faisalabad, Faisalabad, Pakistan

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Disclaimers

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ABSTRACT

Background: Bell's palsy is a common neurological disorder characterized by sudden facial paralysis, leading to significant distress and reduced quality of life. Despite extensive research, the exact etiology remains unclear, with various factors such as age, gender, and comorbid conditions like hypertension and diabetes implicated.

Objective: This study aimed to identify the risk factors associated with Bell's palsy in a specific population, focusing on demographic and clinical variables.

Methods: A retrospective study was conducted on 98 patients diagnosed with Bell's palsy in Faisalabad, Pakistan. Data were collected from multiple healthcare settings, including government and private hospitals, polyclinics, and independent medical practitioners. Variables such as age, gender, BMI, comorbidities, and history of exposure to cold were analyzed. Statistical analysis was performed using SPSS version 25.

Results: Of the 98 patients, 56.12% were female, and 43.88% were male. The right side of the face was affected in 67.3% of patients, while 32.7% had left-side involvement. Significant associations were found between Bell's palsy and hypertension ($p < 0.05$), diabetes mellitus ($p < 0.05$), and exposure to cold ($p < 0.05$).

Conclusion: Bell's palsy was more prevalent in females and younger individuals. Hypertension, diabetes, and cold exposure were identified as significant risk factors. These findings contribute to understanding the potential causes and risk factors for Bell's palsy, informing clinical management and prevention strategies.

INTRODUCTION

Bell's palsy is a sudden, temporary weakness or paralysis of the muscles on one side of the face, caused by inflammation or compression of the facial nerve, also known as the seventh cranial nerve. The condition is characterized by the rapid onset of partial or complete paralysis that typically resolves within weeks to months, though some individuals may experience longer-lasting effects. The etiology of Bell's palsy remains unclear, but it is generally thought to result from viral infections, including herpes simplex virus, which leads to nerve inflammation and subsequent facial muscle paralysis (1). The disease's sudden and often alarming presentation, along with its significant impact on facial appearance and function, has led to considerable research interest in understanding its causes, risk factors, and optimal management strategies (2).

Several studies have explored the association between Bell's palsy and various demographic, environmental, and health-related factors. For instance, there is evidence suggesting that certain conditions, such as diabetes and hypertension, may predispose individuals to a higher risk of developing Bell's palsy (3). Additionally, environmental factors like cold exposure have been implicated in the onset of the condition, particularly in colder climates where incidences of Bell's palsy appear to be more frequent (4).

The relationship between Bell's palsy and psychological stress has also been a subject of investigation, with some studies indicating that stress may exacerbate the severity of the condition, possibly through mechanisms involving the psycho-neuro-immune axis (5).

Clinically, Bell's palsy presents with a range of symptoms, from mild facial weakness to complete paralysis, often accompanied by other sensory disturbances such as altered taste and increased sensitivity to sound on the affected side. The degree of nerve dysfunction is commonly assessed using the House-Brackmann grading system, which provides a standardized method for evaluating the severity of facial nerve impairment (6). Despite the availability of this grading system, the prognosis of Bell's palsy can be variable, with most patients recovering fully, while a minority may experience persistent weakness or synkinesis, where involuntary muscle movements occur during facial expressions (7).

The current study aims to investigate the potential risk factors associated with Bell's palsy, focusing on a patient population from Faisalabad, Pakistan. Given the region's unique climatic conditions and demographic characteristics, this study provides an opportunity to explore the influence of local factors on the incidence and severity of Bell's palsy. Previous research has highlighted the importance of identifying patient-specific risk factors, which can help clinicians predict outcomes more accurately and

tailor treatment approaches accordingly (8). This study seeks to contribute to the existing body of knowledge by analyzing demographic data, comorbid conditions, and environmental exposures in patients diagnosed with Bell's palsy, thereby enhancing our understanding of the condition's etiology and progression.

In conclusion, while Bell's palsy is generally considered a benign and self-limiting condition, its sudden onset and potential for lasting facial disfigurement make it a significant concern for affected individuals. By examining the relationship between various risk factors and the development of Bell's palsy, this study aims to provide insights that may improve early diagnosis, management, and patient outcomes in this population (9).

MATERIAL AND METHODS

This retrospective study was conducted to investigate the potential risk factors associated with Bell's palsy in a patient population from Faisalabad, Pakistan. The study population comprised patients diagnosed with Bell's palsy who received treatment at various healthcare facilities, including government and private hospitals, polyclinics, and independent medical practices across Faisalabad. The study design was carefully chosen to review patient records retrospectively, allowing for the analysis of data from a large number of patients over a specific period.

The study included a total sample size of 98 patients, which was determined using the Raosoft sample size calculator to ensure statistical validity. Data collection involved accessing patient records from the physical therapy outpatient departments (OPDs) of all participating healthcare facilities. Inclusion criteria for the study were: patients of any age or gender with a diagnosis of Bell's palsy, unilateral facial paresis, acute facial paresis, idiopathic facial paresis, and peripheral facial paresis. Exclusion criteria included patients with traumatic, inflammatory, or neoplastic pathologies of the facial nerve, paralysis affecting both sides of the face, concurrent diseases of the peripheral or central nervous system, and incomplete clinical investigations.

The data collection process involved recording demographic information, clinical symptoms, and associated risk factors from the medical records of patients diagnosed with Bell's palsy. The data collection was carried out systematically to ensure the completeness and accuracy of the records. Variables such as age, gender, body mass index (BMI), affected side of the face, history of exposure to cold, history of head injury, presence of comorbid conditions like diabetes and hypertension, and history of any previous surgeries were recorded for each patient. The severity of facial paralysis was assessed using the House-Brackmann grading system, which is widely accepted for evaluating the degree of facial nerve dysfunction (1).

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Ethical approval for the study was obtained from the Ethical Committee of The University of Faisalabad, and permission letters were secured from the participating healthcare facilities. Informed consent was obtained from all participants or their legal guardians before data collection. The study adhered to the ethical standards outlined in the Declaration of Helsinki, ensuring that all procedures were conducted with respect to patient confidentiality and the principles of medical ethics. The identity of the patients was protected by coding the data, and no personal identifiers were used in the analysis or reporting of the results. The study was designed to be physically and emotionally harmless to the participants, with no interference in their usual care plans.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics were used to summarize the demographic data, clinical characteristics, and risk factors associated with Bell's palsy. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as means and standard deviations. Cross-tabulations and Chi-square tests were employed to assess associations between categorical variables, and Pearson's correlation was used to evaluate the relationship between continuous variables and the severity of Bell's palsy. Statistical significance was set at a p-value of less than 0.05, indicating that any associations observed were unlikely to be due to chance (2).

The analysis aimed to identify key risk factors and their potential impact on the development and progression of Bell's palsy, contributing to a better understanding of the condition and informing clinical practices. The rigorous methodological approach ensured that the findings were robust, reliable, and applicable to the broader patient population.

RESULTS

between age and BMI, indicating that younger patients (< 50 years) were more likely to have a normal or overweight BMI, while older patients (≥ 50 years) showed a slightly higher prevalence of underweight and obese BMI categories ($\chi^2 = 14.631, p = 0.002$).

Table 1: Demographic Characteristics of Bell's Palsy Patients (N = 98)

Characteristic	Category	N (%)
Age	< 50 years	84 (85.7)
	≥ 50 years	14 (14.3)
Gender	Male	43 (43.9)
	Female	55 (56.1)

Characteristic	Category	N (%)
BMI	Underweight	11 (11.2)
	Normal	44 (44.9)
	Overweight	41 (41.8)
	Obese	2 (2.0)
Affected Side	Left	32 (32.7)
	Right	66 (67.3)

Note: The mean age of patients was 26.6 ± 4.13 years.

A highly significant association was found between head injuries and the likelihood of undergoing related surgical procedures, highlighting that patients with head injuries were more likely to have had operations on the head, neck,

or face ($\chi^2 = 32.755$, $p = 0.000$). The analysis showed a strong association between heart disease and hypertension, with patients suffering from heart disease being

Table 2: Risk Factors Associated with Bell's Palsy (N = 98)

Risk Factor	Affected (N)	Not Affected (N)	Total (N)	Percentage Affected (%)
Exposure to cold air	33	65	98	33.7
Head injury	16	82	98	16.3
Respiratory disease	12	86	98	12.2
Heart disease	16	82	98	16.3
Neurological disease	5	93	98	5.1
Diabetes mellitus	21	77	98	21.4
Hypertension	22	76	98	22.4
Family history	28	70	98	28.6
Ear infection	33	65	98	33.7
Smoking	20	78	98	20.4
Viral infection	21	77	98	21.4
Consanguineous parents	37	61	98	37.8

Table 3: Cross-Tabulations and Statistical Analysis (N = 98)

Cross-Tabulation	Chi-Square (χ^2)	p-Value	Association
Age vs. BMI	14.631	0.002	Significant
Head Injury vs. Operation on Head, Neck, or Face	32.755	0.000	Highly Significant
Heart Disease vs. Hypertension	55.839	0.000	Highly Significant
Smoking vs. Respiratory Disease	3.805	0.051	Not Significant
Cold Exposure vs. Flu Before Bell's Palsy	33.922	0.000	Highly Significant

significantly more likely to have hypertension ($\chi^2 = 55.839$, $p = 0.000$). No significant association was observed between smoking and the presence of respiratory diseases among the patients studied ($\chi^2 = 3.805$, $p = 0.051$). A significant association was identified between exposure to cold air and the subsequent development of flu, indicating that these factors may contribute to the onset of Bell's palsy ($\chi^2 = 33.922$, $p = 0.000$).

DISCUSSION

The present study provided a comprehensive analysis of the demographic characteristics, risk factors, and outcomes associated with Bell's palsy among a cohort of 98 patients. The findings are significant in advancing the understanding of this condition, particularly in a regional context where such data may be limited. In the context of existing literature, this study corroborates several established associations while also presenting unique insights that contribute to the broader understanding of Bell's palsy.

The demographic data revealed a higher prevalence of Bell's palsy among females compared to males, which aligns with some previous studies that suggest a slight female

predominance in this condition (6). The mean age of patients was relatively young, with a significant majority under the age of 50, which is consistent with findings from studies that have reported a peak incidence in younger adults (16). The predominance of right-sided facial involvement, as observed in this study, is an interesting finding that warrants further investigation, as it has been inconsistently reported in the literature (9).

The analysis of risk factors highlighted the significant role of cold exposure, flu, and BMI in the development of Bell's palsy. Exposure to cold air was a prevalent factor among the patients, with a strong statistical association observed between cold exposure and the onset of flu prior to the development of facial paralysis. This finding is supported by

These results provide valuable insights into the demographic and clinical characteristics of patients with Bell's palsy, along with an understanding of the significant risk factors and their interrelationships. The findings suggest that cold exposure, BMI, and flu are significant risk factors associated with Bell's palsy, while other factors such as smoking and respiratory disease did not show significant associations in this study.

previous research indicating that cold exposure and viral infections may trigger inflammatory responses that precipitate facial nerve paralysis (10). The association between higher BMI and the incidence of Bell's palsy also aligns with studies that have linked obesity with increased susceptibility to nerve dysfunction due to the pro-inflammatory state associated with excess body weight (6). However, not all risk factors examined showed significant associations. For instance, smoking and respiratory diseases did not exhibit a strong relationship with Bell's palsy in this cohort, contrary to some reports that have suggested a potential link between smoking and peripheral nerve disorders (11). This discrepancy could be attributed to differences in population characteristics or the relatively small sample size of this study, which may have limited the ability to detect weaker associations.

The study's strengths include its comprehensive data collection from multiple centers, providing a broad perspective on the incidence and characteristics of Bell's palsy in the region. The inclusion of a wide range of potential risk factors allowed for a detailed analysis of their relative importance, contributing valuable information to the existing body of knowledge. Additionally, the use of standardized assessment tools and statistical methods ensured the reliability of the findings.

Nevertheless, the study also had limitations that should be considered when interpreting the results. The relatively small sample size and the regional focus of the study limit the generalizability of the findings to broader populations. Memory bias may have affected the accuracy of patient-reported data on past exposures and medical history. Furthermore, the retrospective design of the study, while useful for identifying associations, does not allow for the establishment of causality. Future research should aim to address these limitations by including larger, more diverse populations and employing prospective study designs.

CONCLUSION

In conclusion, this study highlighted significant associations between certain demographic factors and risk factors such as cold exposure, flu, and BMI with the development of Bell's palsy. These findings underscore the importance of considering environmental and lifestyle factors in the management and prevention of this condition. While the study adds to the understanding of Bell's palsy, further research is needed to explore the mechanisms underlying these associations and to evaluate the potential for targeted interventions to reduce the risk of Bell's palsy in susceptible populations. Recommendations for future studies include the investigation of genetic predispositions, longitudinal monitoring of patients, and the evaluation of preventive strategies in high-risk groups. The findings from this study provide a foundation for such endeavors and contribute to the ongoing effort to improve outcomes for patients with Bell's palsy.

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