

PREVALENCE, MANAGEMENT, AND OUTCOME OF BELLS PALSY: A COMPREHENSIVE SYSTEMATIC REVIEW

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ABSTRACT

Background: Bell's palsy, also called idiopathic facial paralysis, is defined as an acute-onset, isolated, unilateral, lower motor neurone facial weakness. The reported annual incidence varies in different parts of the world with estimates varying between 11 and 40 per 100 000 people.

The aim: The aim of this study to show about prevalence, management, and outcome of bell's palsy.

Methods: By the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, this study was able to show that it met all of the requirements. This search approach, publications that came out between 2014 and 2024 were taken into account. Several different online reference sources, like Pubmed, SagePub, and Sciencedirect were used to do this. It was decided not to take into account review pieces, works that had already been published, or works that were only half done.

Result: Eight publications were found to be directly related to our ongoing systematic examination after a rigorous three-level screening approach. Subsequently, a comprehensive analysis of the complete text was conducted, and additional scrutiny was given to these articles.

Conclusion: Bell's palsy is a common but still controversial disease, with unknown etiology until now. Modern literature showed that up to 80 percent of the patients will recover without treatment.

Keyword: Bell's palsy, facial nerve, paralysis, management.

INTRODUCTION

Bell's palsy (BP), named after the Scottish anatomist Sir Charles Bell, is the most frequent diagnosis linked to facial nerve palsy/paralysis as well as the most frequent acute mono-neuropathy. It affects individuals across multiple ages and both sexes, with an annual incidence ranging from 11.5 to 53.3 per 100,000 persons across multiple populations. Typically, BP results in partial or complete inability to automatically move the affected side of the facial muscles. Although it usually resolves within weeks or months, BP facial paresis/paralysis may lead to severe temporary oral insufficiency and an incapability to close the eyelids in some cases, resulting in potentially permanent eye injury. In approximately 25% of patients with BP, moderate-to-severe facial asymmetry may persist, frequently impairing patients' quality of life.^{1,2}

Lifestyle factors including body mass index (BMI), alcohol consumption, and smoking status can influence the risk of chronic disorders such as hypertension and diabetes. For instance, BMI is predictive for the risk of hypertension after adjusting for other variables such as age, ethnicity, marital status, education level, smoking status, alcohol consumption, physical activity, and diabetes. Therefore, these other lifestyle factors could influence the risk of Bell's palsy via increased cardiovascular and metabolic comorbidities.^{3,4}

The underlying pathophysiology observed in post-mortem cases of Bell's palsy is vascular distension, inflammation and oedema with ischaemia of the facial nerve. The aetiology remains unclear. Various causes have been proposed including viral, inflammatory, autoimmune and vascular. However, reactivation of herpes simplex virus or herpes zoster virus from the geniculate ganglion is suspected to be the most likely cause. Despite advances in neuroimaging, the diagnosis of Bell's palsy is mainly clinical.^{5,6}

The course of the facial nerve can be divided into six segments. The first segment is the intracranial segment which comprises of facial nerve's motor nucleus located in the pons from where the motor fibers originate, hook around the abducens nerve nucleus, and are joined by the intermediate nerve which carries sensory and parasympathetic components. Further, this mixed nerve passes through the posterior cranial fossa and enters the bony facial canal (fallopian canal) through the anterior superior quadrant of the internal acoustic meatus. This is known as the meatal or canalicular segment. Inside the inner ear, the facial nerve passes in the fallopian canal in between the cochlea and vestibule and then bends posteriorly at the geniculate ganglion (first genu). This segment is the shortest and narrowest and is most prone to inflammation and ischemia. It is known as the labyrinthine segment. The labyrinthine segment extends and forms the tympanic segment in the middle ear, takes another turn just distal to the pyramidal eminence (second genu), and passes vertically downwards as the mastoid segment. The bony fallopian canal in many cases can be dehiscent in some areas and thus more susceptible to damage. The mastoid segment starts from the second genu, gives off its branches, and ends at the stylomastoid foramen forming the extratemporal segment.^{7,8}

The treatment of Bell's palsy aims to speed recovery and reduce long-term complications. An inability to close the eye on the affected side increases the risk of corneal complications. Eye protection is crucial so an eye patch and lubricants are used to prevent drying of the cornea. Eye drops, such as hypromellose drops, should be applied for lubrication during the day and ointment at night. In severe cases, the eye may have to be taped or partially sutured shut.^{5,9}

METHODS

Protocol

By following the rules provided by Preferred Reporting Items for Systematic Review and Meta-Analysis (PRIMA) 2020, the author of this study made certain that it was up to par with the requirements. This is done to ensure that the conclusions drawn from the inquiry are accurate.

CRITERIA FOR ELIGIBILITY

For the purpose of this literature review, we compare and contrast prevalence, management, and outcome of bell's palsy. It is possible to accomplish this by researching of prevalence, management, and outcome of bell's palsy. As the primary purpose of this piece of writing, demonstrating the relevance of the difficulties that have been identified will take place throughout its entirety.

In order for researchers to take part in the study, it was necessary for them to fulfil the following requirements: 1) The paper needs to be written in English, and it needs to determine about prevalence, management, and outcome of bell's palsy. In order for the manuscript to be considered for publication, it needs to meet both of these requirements. 2) The studied papers include several that were published after 2014, but before the time period that this systematic review deems to be relevant. Examples of studies that are not permitted include editorials, submissions that do not have a DOI, review articles that have already been published, and entries that are essentially identical to journal papers that have already been published.

SEARCH STRATEGY

We used "prevalence, management, and outcome of bell’s palsy." as keywords. The search for studies to be included in the systematic review was carried out using the PubMed, SagePub, and Sciencedirect databases by inputting the words: ("Bell’s palsy"[MeSH Subheading] OR "Prevalence"[All Fields] OR "Epidemiology" [All Fields]) AND ("Management"[All Fields] OR "Risk factor"[All Fields]) AND ("Prognosis"[All Fields] OR "Outcome" [All Fields]) used in searching the literature.

DATA RETRIEVAL

After reading the abstract and the title of each study, the writers performed an examination to determine whether or not the study satisfied the inclusion criteria. The writers then decided which previous research they wanted to utilise as sources for their article and selected those studies. After looking at a number of different research, which all seemed to point to the same trend, this conclusion was drawn. All submissions need to be written in English and cannot have been seen anywhere else.

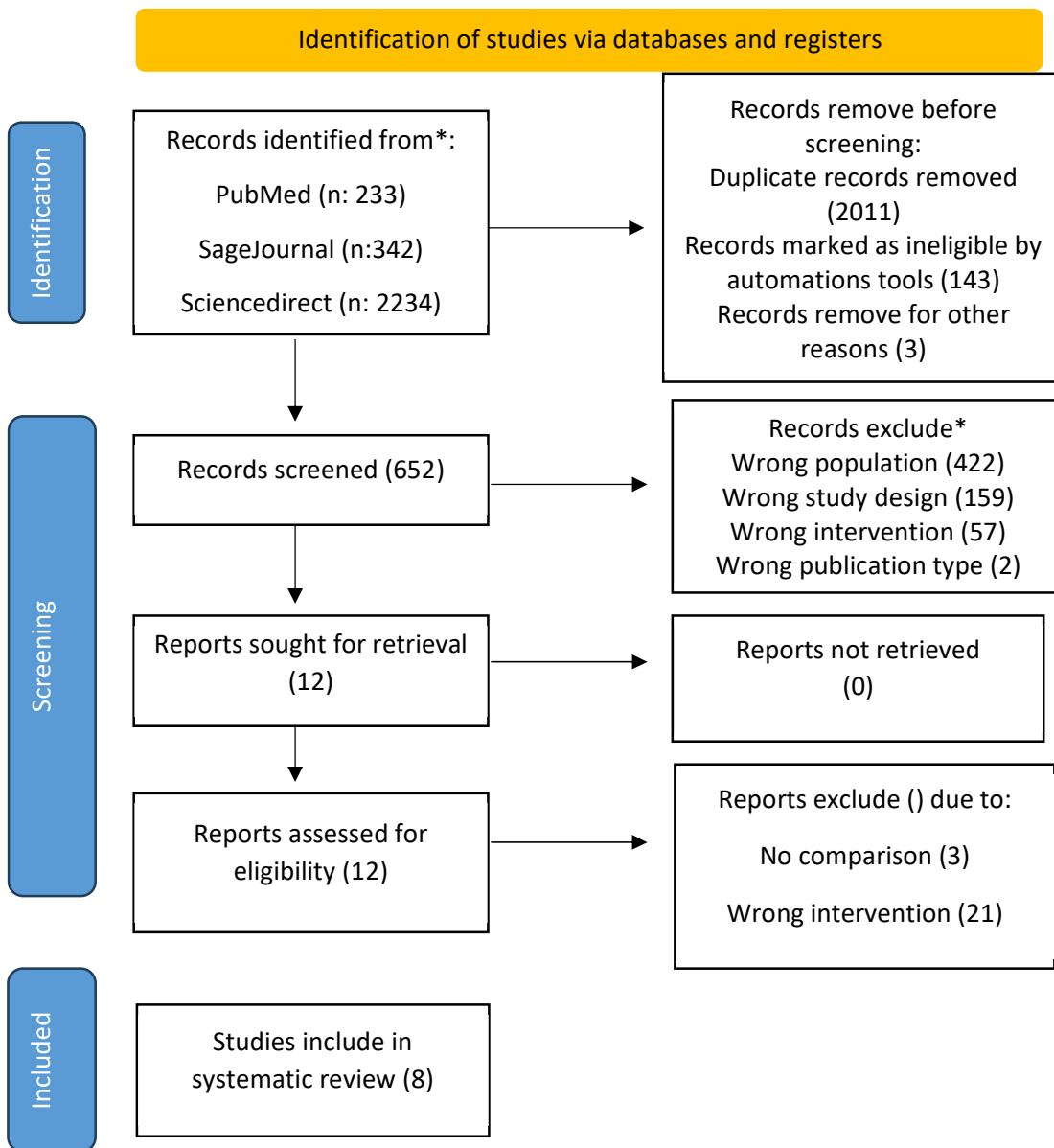


Figure 1. Article search flowchart

Only those papers that were able to satisfy all of the inclusion criteria were taken into consideration for the systematic review. This reduces the number of results to only those that are pertinent to the search. We do not take into consideration the conclusions of any study that does not satisfy our requirements. After this, the findings of the research will be analysed in great detail. The following pieces of information were uncovered as a result of the inquiry that was carried out for the purpose of this study: names, authors, publication dates, location, study activities, and parameters.

QUALITY ASSESSMENT AND DATA SYNTHESIS

Each author did their own study on the research that was included in the publication's title and abstract before making a decision about which publications to explore further. The next step will be to evaluate all of the articles that are suitable for inclusion in the review because they match the criteria set forth for that purpose in the review. After that, we'll determine which articles to include in the review depending on the findings that we've uncovered. This criteria is utilised in the process of selecting papers for further assessment. in order to simplify the process as much as feasible when selecting papers to evaluate. Which earlier investigations were carried out, and what elements of those studies made it appropriate to include them in the review, are being discussed here.

RESULT

Using reputable resources like Science Direct, PubMed, and SagePub, our research team first gathered 2809 publications. A thorough three-level screening strategy was used to identify only eight papers as directly relevant to our ongoing systematic evaluation. Next, a thorough study of the entire text and further examination of these articles were selected. Table 1 compiles the literature that was analyzed for this analysis in order to make it easier to view.

Table 1. The litelature include in this study

Author	Origin	Method	Sample	Result
Alanazi, F et al., 2022 ¹⁰	Saudi Arabia	This cross-sectional study was carried out in the Qurayyat region of Saudi Arabia. The retrospective medical records were searched from 2015–2020 of patients diagnosed with Bell’s palsy at Qurayyat General Hospital and King Fahad hospital.	279	We identified 279 cases of Bell’s palsy from the medical records of the hospitals from the years 2015 to 2020, accounting for 46.5 cases per year and an incidence rate of 25.7 per 100,000 per year. Out of 279 patients with Bell’s palsy, only 171 returned the questionnaire accounting for a response rate of 61.2%. Out of 171 patients with Bell’s palsy, females (n = 147, 86.0%) accounted for the majority of cases. The most affected age group among participants with Bell’s palsy was 21–30 years (n = 76, 44.4%). There were 153 (89.5%) cases who reported Bell’s palsy for the first time. The majority of the participants experienced right-sided facial paralysis (n = 96, 56.1%). Likelihood ratio test revealed significant relationship between exposure to cold air and common cold with age groups ($\chi^2(6, N = 171) = 14.92, p = 0.021$), $\chi^2(6, N = 171) = 16.35, pp = 0.012$ respectively. The <i>post hoc</i> analyses revealed that participants in the age group of 20–31-years were mostly affected due to exposure to cold air and common cold than the other age groups. The main therapeutic approach preferred was physiotherapy (n = 149, 87.1%), followed by corticosteroids and antivirals medications (n = 61, 35.7%), acupressure (n = 35, 20.5%), traditional Saudi herb medicine (n = 32, 18.7%), cauterization by hot iron rod (n = 23, 13.5%),

				supplementary therapy ($n = 2$, 1.2%), facial cosmetic surgery ($n = 1$, 0.6%) and no treatment ($n = 1$, 0.6%). The most preferred combined therapy was physiotherapy (87.6%) with corticosteroid and antiviral drugs (35.9%), and acupressure (17.6%).
Ragaban, A et al., 2024 ¹¹	Saudi Arabia	A retrospective cross-sectional study was conducted to obtain data from medical records using the best care system for patients with facial nerve palsy.	123	The study involved 123 patients, with 0.0164% prevalence. Bell's palsy was the most common etiology, accounting for 81.8% of cases, followed by head injuries, dental trauma, otitis media, stroke, and head and neck tumors. Obesity was the most significant risk factor, followed by upper respiratory problems. Hypertension and diabetes exert similar effects. Facial asymmetry, ophthalmic complications, and eye twitching were the most common complaints followed by speech difficulties, psychological and social effects, mouth twitching, and synkinesis.
Varga, E et al., 2023 ¹²	Hungary	Data was obtained from the Clinical Center of the University of Debrecen, on Bell's palsy patients who were treated at the hospital between January 1, 2015 and December 31, 2021.	613	Of the 613 patients analyzed, 5.87% had recurrent paralysis, and the median time interval between episodes was 315 days. Hypertension was significantly associated with Bell's palsy recurrence. Moreover, seasonal distribution analysis revealed that the number of Bell's palsy episodes was higher in colder seasons, with spring and winter having a significantly higher number of episodes than summer and autumn.
Mancini P, et al., 2019 ¹³	Italy	A retrospective analysis of patients affected by BP and RBP were performed to define the signs and symptoms associated with recurrence and the outcomes.	341	Twenty-four patients presented two or more episodes of facial palsy, representing a recurrence rate of 7%. Associated symptoms (e.g. retroauricular pain, taste disorder, dry eye etc.) were similar between BP and RBP patients. RBP occurred at older age than primary episode ($p = 0.03$). Recurrence was a risk factor for delayed recovery ($p = 0.02$), although final facial function was similar between the two groups. In conclusion, no significant differences were found between primary BP patients and RBP patients in

				terms of symptoms, palsy severity and presence of comorbidities. Delayed facial nerve function recovery in RBP did not affect the final outcome. Treatment of facial nerve recurrences must be the same of the primary episode, although the presence of prodromal symptoms may alert the patient and early corticosteroid treatment may be commenced even before the onset of paresis.
Mustafa, AHK & Sulaiman, AM., 2018¹⁴	Sudan	The study is a retrospective cross sectional hospital based study. The study was carried out in Khartoum Teaching Dental Hospital and in the Physiotherapy Department of Khartoum Teaching General hospital.	746	A total number of 746 cases were studied . Fifty five percent of them were females and the remaining 45% were male. Around 38% of them were in the group 21-40 year. Fifty seven percent of the patients were affected on the right side of the face. Winter was the commonest season of the onset where 53.5% of the cases occurred.
Yoo, MC et al., 2021¹⁵	South Korea	To evaluate the prognosis of children with Bell's palsy and identify the predictive value of specific factors that contribute to complete recovery, a retrospective cohort study was conducted of all patients with Bell's palsy who visited the outpatient clinic of our university hospital between January 2005 and December 2020.	88	Factors recorded for each patient included age, sex, side affected by palsy, time between symptom onset and start of treatment, treatment methods, and the House–Brackmann grade (H–B) grade. The results of the multivariable analysis revealed that the lower degree of initial facial nerve paralysis presented as H–B grade II–IV was a significant favorable prognostic factor (OR: 3.86; 95% CI: 1.27–11.70; $p < 0.05$). Our results showed that the most important factor influencing the complete recovery of Bell's palsy in children was the lower initial H–B grade at initial presentation.
Yoo, MC et al., 2020¹⁶	South Korea	This retrospective cohort study included 1364 patients with Bell palsy treated at the	1364	In total, 1364 patients with primary Bell palsy (718 [52.6%] women) and a mean (SD) age of 47.7 (16.7) years were enrolled. The overall rate of favorable outcome, which was defined as an H-B grade of

		<p>outpatient clinic of the Department of Otolaryngology at the Kyung Hee University Hospital, Seoul, Republic of Korea, between January 1, 2005, and December 31, 2017.</p>		<p>I or II at the 6-month follow-up visit, was 80.6% (1099 of 1364 patients). Of 1099 patients who had a favorable outcome at 6 months, 343 (31.2%) were younger than 40 years. Of 1364 patients, 1053 (77.2%) had moderate facial dysfunction (H-B grade III or IV). No pathological spontaneous fibrillation activity (ie, good electromyography [EMG] results) was detected on EMG in 937 of 1364 patients (68.7%), 492 (36.1%) had controlled hypertension, and 673 (49.3%) were treated with oral corticosteroids alone. Multivariable analysis revealed that the following factors were associated with favorable outcome: age younger than 40 years (odds ratio [OR], 1.56; 95% CI, 1.09-2.22), an initial H-B grade of III or IV (OR, 2.62; 95% CI, 1.93-3.57), good EMG results after 2 weeks of treatment (OR, 3.38; 95% CI, 2.48-4.61), absence of diabetes (OR, 1.43; 95% CI, 1.04-2.36), and control of hypertension (OR, 1.64; 95% CI, 1.16-2.33).</p>
<p>Zohrevandi, B et al., 2014¹⁷</p>	<p>Iran</p>	<p>In this retrospective study, all patients with peripheral facial paralysis, referred to the emergency department of Poursina hospital, Rasht, Iran, from August 2012 to August 2013, were enrolled.</p>	<p>121</p>	<p>121 patients with peripheral facial paralysis were assessed with a mean age of 47.14±18.45 years (52.9% male). The majority of patients were observed in the summer (37.2%) and autumn (33.1%) and the recurrence rate was 22.3%. The most common grades of nerve damage were IV and V based on House-Brackman grading scale (47.1%). Also, the most frequent signs and symptoms were ear pain (43.8%), taste disturbance (38.8%), hyperacusis (15.7%) and increased tearing (11.6%). There were not significant correlations between the severity of palsy with age (p=0.08), recurrence rate (p=0.18), season (p=0.9), and comorbid disease including hypertension (p=0.18), diabetes (p=0.29), and hyperlipidemia (p=0.94). The patients with any of following symptoms such as ear pain (p<0.001), taste disturbance (p<0.001), increased tearing (p=0.03), and</p>

				Hyperacusis (p<0.001) have more severe palsy.
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DISCUSSION

Facial nerve palsies are a common and significant presentation specifically to ear, nose, and throat (ENT) surgeons but also in general medical practice. The facial nerve is a fundamental structure both for communication and emotion, and as such, functional impairment can lead to a significant deterioration in the quality of life. A key element in the initial assessment of a patient presenting with facial weakness is distinguishing between a lower motor neuron (LMN) versus an upper motor neuron (UMN) palsy, as the likely causes and, therefore, treatment for these vary significantly. Applying anatomy to clinical history and examination, a clinician can identify the probable cause of facial nerve palsy and subsequently direct management appropriately.¹⁸⁻²⁰

Bell palsy is an idiopathic weakness or paralysis of the face of peripheral nerve origin, with acute onset. It affects 20–30 persons per 100 000 annually, and 1 in 60 individuals will be affected over the course of their lifetime. The major cause of Bell palsy is believed to be an infection of the facial nerve by the herpes simplex virus. As a result of this viral infection, the facial nerve swells and is compressed in its canal as it courses through the temporal bone. Recovery of facial nerve function is an important outcome that guides treatment recommendations. The initial severity of facial weakness provides valuable prognostic information for facial recovery. Commonly used facial grading instruments (e.g., House–Brackmann and Sunnybrook scales) quantify the severity of facial weakness. Patients with mild to moderate paresis have higher rates of recovery than those with severe or complete paresis. In a large, single-institution cohort study, recovery rates of 61% and 94% were documented in patients with complete and incomplete paralysis, respectively.^{21,22}(Almeida)(Wang)

The cause of Bell's palsy is uncertain. It is thought that re-activated herpes virus at the geniculate ganglion of the facial nerve may play a key role in the development of Bell's palsy. Herpes simplex virus (HSV)-1 has been detected in up to 50% of cases by some researchers. However, one study demonstrated the replication of HSV, herpes zoster virus [HZV], or both, in <20% of cases. Herpes zoster-associated facial palsy more frequently presents as zoster sine herpette (without vesicles), although 6% of people develop vesicles (Ramsay Hunt syndrome). Infection of the facial nerve by HZV initially results in reversible neuropraxia, but irreversible Wallerian degeneration may occur. Treatment plans for the management of Bell's palsy should recognise the possibility of HZV infection.²³

Spontaneous recovery does occur; therefore, the role of treatment remains questionable. Corticosteroids are the primary treatment, with a standard 60 to 80 mg daily regimen for approximately 1 week. Evidence reveals that combined corticosteroids and antivirals can improve outcomes compared with using corticosteroids alone. However, a meta-analysis in 2009 found that steroids alone were the treatment of Bell palsy, and the addition of antivirals did not meet statistical significance. Patients with severe facial nerve palsy (House-Brackmann IV or higher) can be offered combination therapy with steroids and antivirals. No significant increase in adverse reactions from antivirals compared to placebo or corticosteroids is reported. Patients should receive guidance on using eye lubrication and applying a patch to the affected eye before bedtime, aiming to minimize the risk of corneal abrasion.^{24,25}

CONCLUSION

Bell's palsy is a common but still controversial disease, with unknown etiology until now. Modern literature showed that up to 80 percent of the patients will recover without treatment, however, favorable outcome was recorded by using vasodilators, neurotrophic and corticosteroid therapy and the initiation of steroid treatment within three days from the onset of symptoms increased the chance of complete recovery. Our hope is that this study will help clinicians manage Bell's palsy and prevent recurrences.

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