

# Bell's Palsy Post COVID-19 Vaccination: A Retrospective Cross-Sectional Study in a Single Tertiary Center

Rohaizam Japar Jaafar<sup>1</sup>, Kalaiselvi Thuraisingam<sup>1</sup>, Asfa Najmi Mohamad Yusof<sup>2</sup>, Iskandar Hailani<sup>1</sup>

<sup>1</sup>Department of Otorhinolaryngology—Head & Neck Surgery (ORL-HNS), Hospital Kuala Lumpur, Kuala Lumpur, Malaysia

<sup>2</sup>Department of Otorhinolaryngology—Head & Neck Surgery (ORL-HNS), Hospital Umum Sarawak, Kuching, Malaysia

Email: konno\_81@yahoo.com

**How to cite this paper:** Jaafar, R.J., Thuraisingam, K., Yusof, A.N.M. and Hailani, I. (2023) Bell's Palsy Post COVID-19 Vaccination: A Retrospective Cross-Sectional Study in a Single Tertiary Center. *Journal of Biosciences and Medicines*, 11, 47-53. <https://doi.org/10.4236/jbm.2023.1112005>

**Received:** August 26, 2023

**Accepted:** December 2, 2023

**Published:** December 5, 2023

Copyright © 2023 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

**Introduction:** Bell's palsy is an uncommon adverse effect of the COVID-19 vaccine that has been reported in clinical trials. Even though a few studies have linked the vaccination to Bell's palsy, the actual mechanism is uncertain. **Objectives:** To describe the demographic data and COVID-19 vaccines-related data with Bell's palsy in a tertiary centre of Malaysia, Hospital Kuala Lumpur. **Methods:** A retrospective cross-sectional study was observed among vaccinated recipients who developed Bell's palsy within 60 days and sought treatment in the Otorhinolaryngology Department Hospital Kuala Lumpur, Malaysia between 1<sup>st</sup> May 2021 and 30<sup>th</sup> November 2021. The demographic data, clinical history, and vaccination history were collected from clinical records. The facial paralysis was graded according to the House-Brackmann grading system. **Results:** A total of 26 patients with a mean age was 38.5 years; higher incidence in younger age, below 60 years old (n = 24), specifically 18 - 30 years old (n = 11). We observed an equal number in relation to gender and onset (after the first or second dose) of facial palsy. Predominantly were Malay (n = 21) and only 6 patients had comorbidities. We found there was no difference in regard to the type of vaccine among Bell's palsy patients; Pfizer (n = 9), followed by Sinovac (n = 9) and AstraZeneca (n = 8). **Conclusion:** Bell's palsy was found to be a possible adverse event of the COVID-19 vaccine. Younger groups were noted as susceptible to this rare adverse effect. However, the benefits of vaccination outweigh the risk of Bell's palsy, which has a good prognosis. More research with larger samples is needed to determine the true relationship between vaccination and Bell's palsy.

## Keywords

Bell's Palsy, COVID-19, Vaccination

## 1. Introduction

Bell's palsy is an acute idiopathic lower motor neuron facial palsy. Although the cause of Bell's palsy is unclear, it is believed that the mechanism of the lower motor neuron lesion is related to facial nerve inflammation and edema linked to a virus [1]. The facial asymmetry can cause acute impairment by affecting their facial expression and ability to eat and drink [1]. As Bell's palsy is a temporary impairment, the majority of patients (up to 70%) will recover without treatment in 6 weeks while 90% of cases are completely resolved with corticosteroid treatment by 9 months [2]. However long-term complications of in-complete recovery of facial weakness can lead to significant morbidity, as well as anxiety and distress [1].

Previously there was increased incidence of Bell's palsy after receiving influenza and meningococcal vaccine. However, the significant causal link has not been established [1]. Similar occurrences of unilateral facial palsy have been reported in the event of COVID-19 vaccination. Several cases reported of Bell's palsy after receiving Pfizer/BioNTech (BNT162b2), Moderna, CoronaVac (Sinovac) and Oxford/AstraZeneca vaccines [1] [3] [4].

Patient safety and vaccine efficacy were prime concerns to achieve comprehensive vaccination coverage in a short period. The National COVID-19 Immunization Programme ensured a safe and effective vaccination to combat the pandemic. Our government has adopted a systematic approach to its vaccine acquisition efforts through diplomatic relations and strategic international cooperation with other countries, manufacturers, world health bodies, and affiliates. We aimed to review COVID-19 vaccines-related Bell's palsy and the essential characteristics of COVID-19 vaccine recipients in Malaysia. These will serve as relevant information for a future pandemic and thus assist healthcare front liners in making vaccination decisions, particularly for high-risk groups.

As the Bell's palsy requires prompt evaluation of the head and neck region, most cases in Hospital Kuala Lumpur are referred and managed by ENT team. Here we would like to share our experience in Hospital Kuala Lumpur regarding Bell's palsy post COVID-19 vaccination.

## 2. Methodology

A retrospective cross-sectional study at the Otorhinolaryngology (ORL) outpatient department of Hospital Kuala Lumpur, Malaysia between 1<sup>st</sup> May 2021 and 30<sup>th</sup> November 2021. The diagnosis of Bell's palsy was confirmed clinically. A total of 26 cases of Bell's palsy data were collected from health record data. Inclusion criteria include Bell's palsy onset within 60 days either after the first or the second vaccine dose with complete data from clinical records. A Cerebral Vascular Accident (CVA), Ramsay Hunt syndrome, history of Bell's palsy, and age below 18 were excluded. All baseline characteristics of the patient, clinical history and history of vaccination were collected. The facial paralysis was graded

according to the House-Brackmann grading system [5], in which.

**Grade 1:** Normal—Normal facial function in all areas

**Grade 2:** Mild dysfunction

Gross: Slight weakness noticeable on close inspection; may have very slight synkinesis

At rest: Normal symmetry and tone

Motion

Forehead: Moderate to good function

Eye: Complete closure with minimum effort

Mouth: Slight asymmetry

**Grade 3:** Moderate dysfunction

Gross: Obvious but not disfiguring difference between two sides; noticeable but not severe synkinesis, contracture and/or hemifacial spasm

At rest: Normal symmetry and tone

Motion

Forehead: Slight to moderate movement

Eye: Complete closure with effort

Mouth: Slightly weak with maximum effort

**Grade 4:** Moderately severe dysfunction

Gross: Obvious weakness and/or disfiguring asymmetry at rest: normal symmetry and tone

Motion

Forehead: None Eye: incomplete closure Mouth: asymmetric with maximum effort

**Grade 5:** Severe dysfunction

Gross: Only barely perceptible motion

At rest: Asymmetry

Motion

Forehead: None

Eye: Incomplete closure

Mouth: Slight movement

**Grade 6:** Total paralysis

No movement

There is no specific data on Bell's palsy prevalence locally. Even more, there was no data on inactivated vaccination causing Bell's palsy locally and internationally. Therefore, assuming 1% based on Bell's palsy effect following influenza vaccination. By using a universal sampling, all patients were included in the study.

Based on Krejcie and Morgan's (1970) table for determining sample size, for a given population (N) of 30 with confidence 95% and margin of error (e) 5.0%, a sample size of 28 would be needed to represent a cross-section of the population. However, using a universal sampling, we will collect all the data within the time frame (1<sup>st</sup> May 2021 and 30<sup>th</sup> November 2021).

### 3. Results

A total of 26 patients presented with ipsilateral lower motor neuron facial palsy within 6 months. The age group ranged from 22 to 61 years old, with a mean age of 38.5 years. The majority were in the younger age group; 18 - 30-year-old ( $n = 11$ ), and the least number was found in older age 60 and more ( $n = 2$ ). There was equal distribution in gender ( $n = 13$  each). The majority were Malay 80.7% ( $n = 21$ ) followed by Indian ( $n = 2$ ), Chinese ( $n = 2$ ), and Bangladeshi. Most of the patients 76.9% ( $n = 20$ ) were healthy without any comorbidity. Except only 6 of them have comorbidities.

Further vaccination-related history showed most of the patients 50% ( $n = 13$ ) presented with Bell's palsy within the first week after receiving the vaccine. The onset of facial palsy is as early as day 1 to day 47 after vaccination. Equally distribution was observed number of Bell's palsy after first and second dose vaccine ( $n = 13$  each). We found that Bell's palsy was quite similar in number; Pfizer vaccine ( $n = 9$ ), Sinovac ( $n = 9$ ) and AstraZeneca ( $n = 8$ ) (summarized in **Table 1**).

### 4. Discussion

The first vaccination phase in Malaysia was launched in February 2021 and lasted until April 2021. This phase focused on the frontliners in the public and private healthcare sectors, essential services, defense, and security. The second phase was initiated in April 2021 and lasted until August 2021. Apart from maintaining the frontliners, senior citizens (those aged 60 and over), people with chronic diseases (such as heart disease, obesity, diabetes, and high blood pressure), and people with disabilities or special needs were included. The third vaccination phase targeted the adult population, anyone over 18 years old (both citizens and non-citizens) and lasted from 20 May 2021 until 20 February 2022.

We received few types of COVID-19 vaccine from different manufacturing companies including Pfizer-BioNTech (Comirnaty), Sinovac (CoronaVac) and Oxford-AstraZeneca (ChAdOx1-S) [4]. There has been no publication in Malaysia regarding the vaccine side effect of Bell's palsy yet. A survey on the adverse effects of the COVID-19 vaccination was conducted on 428 vaccinated people. Pain or swelling at the injection site, fatigue, myalgia, and fever were the most common adverse effects [6] while Bell's palsy is not listed as it is such a rare condition.

So far there is no clear evidence between association between Bell's palsy and COVID-19 vaccine. There are few hypotheses that can trigger Bell's palsy. The mRNA-based vaccine is thought to be involved in autoimmune phenomenon by either mimicking the host molecule or bystander activation of dormant auto-reactive T cells [7]. It is also can induce innate immune activation and produce interferon proteins by a combined effect of mRNA and lipids. Another possible mechanism is an activation of latent herpes simplex type 1 infections in the geniculate ganglia of facial nerve [8]. While, inactivated vaccine such as Sinovac (CoronaVac) is postulated to affect immune reaction. Inactivated virus is used as

**Table 1.** Demographic data of patients with bell's palsy after recent vaccination.

Patient No.	Age	Gender	Race	Comorbidities	Vaccination Date	Onset	Brand
1	57	M	M	NKMI	12 <sup>th</sup> May 2021 (1 <sup>st</sup> )	4 <sup>th</sup> June 2021 ( <b>D23</b> )	AZ
2	38	M	C	NKMI	14 <sup>th</sup> June 2021 (1 <sup>st</sup> )	15 <sup>th</sup> June 2021 ( <b>D1</b> )	AZ
3	32	F	M	NKMI	13 <sup>th</sup> June 2021 (1 <sup>st</sup> )	21 <sup>st</sup> June 2021 ( <b>D8</b> )	AZ
4	57	F	I	DM, HPT	23 <sup>rd</sup> June 2021 (1 <sup>st</sup> )	29 <sup>th</sup> June 2021 ( <b>D7</b> )	Sinovac
5	31	F	M	NKMI	21 <sup>st</sup> June 2021 (1 <sup>st</sup> )	1 <sup>st</sup> July 2021 ( <b>D10</b> )	AZ
6	44	M	M	DM, HPT	7 <sup>th</sup> July 2021 (1 <sup>st</sup> )	9 <sup>th</sup> July 2021 ( <b>D2</b> )	Sinovac
7	23	F	M	NKMI	13 <sup>th</sup> July 2021 (1 <sup>st</sup> )	14 <sup>th</sup> July 2021 ( <b>D1</b> )	Sinovac
8	27	M	M	NKMI	15 <sup>th</sup> July 2021 (1 <sup>st</sup> )	16 <sup>th</sup> July 2021 ( <b>D1</b> )	AZ
9	61	M	M	HPL	17 <sup>th</sup> July 2021 (2 <sup>nd</sup> )	19 <sup>th</sup> July 2021 ( <b>D2</b> )	Sinovac
10	45	M	I	NKMI	12 <sup>th</sup> June 2021 (2 <sup>nd</sup> )	21 <sup>st</sup> July 2021 ( <b>D40</b> )	Pfizer
11	57	M	M	VITILIGO	2 <sup>nd</sup> July 2021 (1 <sup>st</sup> )	28 <sup>th</sup> July 2021 ( <b>D26</b> )	AZ
12	27	F	M	NKMI	26 <sup>th</sup> July 2021 (2 <sup>nd</sup> )	29 <sup>th</sup> July 2021 ( <b>D3</b> )	AZ
13	24	M	BANG	NKMI	27 <sup>th</sup> July 2021 (1 <sup>st</sup> )	30 <sup>th</sup> July 2021 ( <b>D3</b> )	Pfizer
14	28	F	M	NKMI	29 <sup>th</sup> July 2021 (1 <sup>st</sup> )	3 <sup>rd</sup> August 2021 ( <b>D4</b> )	Pfizer
15	36	F	M	NKMI	1 <sup>st</sup> August 2021 (2 <sup>nd</sup> )	8 <sup>th</sup> August 2021 ( <b>D7</b> )	Sinovac
16	28	F	M	NKMI	25 <sup>th</sup> June 2021 (2 <sup>nd</sup> )	12 <sup>th</sup> August 2021 ( <b>D47</b> )	Pfizer
17	52	F	M	NKMI	21 <sup>st</sup> August 2021 (1 <sup>st</sup> )	23 <sup>rd</sup> August 2021 ( <b>D2</b> )	Sinovac
18	60	M	M	DM, HPT	31 <sup>st</sup> July 2021 (2 <sup>nd</sup> )	30 <sup>th</sup> August 2021 ( <b>D30</b> )	Pfizer
19	51	M	C	NKMI	10 <sup>th</sup> August 2021 (2 <sup>nd</sup> )	2 <sup>nd</sup> September 2021 ( <b>D23</b> )	Pfizer
20	27	F	M	NKMI	3 <sup>rd</sup> August 2021 (2 <sup>nd</sup> )	5 <sup>th</sup> September 2021 ( <b>D35</b> )	Sinovac
21	39	F	M	NKMI	25 <sup>th</sup> July 2021 (2 <sup>nd</sup> )	5 <sup>th</sup> September 2021 ( <b>D42</b> )	Sinovac
22	22	M	M	NKMI	12 <sup>th</sup> August 2021 (2 <sup>nd</sup> )	8 <sup>th</sup> September 2021 ( <b>D36</b> )	Sinovac
23	24	F	M	NKMI	12 <sup>th</sup> August 2021 (1 <sup>st</sup> )	15 <sup>th</sup> September 2021 ( <b>D34</b> )	Pfizer
24	24	M	M	NKMI	16 <sup>th</sup> August 2021 (2 <sup>nd</sup> )	22 <sup>nd</sup> September 2021 ( <b>D37</b> )	Pfizer
25	30	M	M	NKMI	26 <sup>th</sup> September 2021 (2 <sup>nd</sup> )	17 <sup>th</sup> October 2021 ( <b>D21</b> )	AZ
26	58	F	M	DM, HPT, HPL	5 <sup>th</sup> November 2021 (2 <sup>nd</sup> )	11 <sup>th</sup> November 2021 ( <b>D6</b> )	Pfizer

M (male), F (Female), BANG (Bangladeshi), NKMI (Not known any medical illness), DM (diabetes mellitus), HPT (hypertension) HPL (hyperlipidaemia), 1<sup>st</sup> (1<sup>st</sup> dose of vaccination), 2<sup>nd</sup> (2<sup>nd</sup> dose of vaccination) D (day), AZ (Astra Zeneca).

a vaccine to against viral illness which already well known to have a variety of viral antigens that may affect the immune response in a larger group of patients [2].

The mRNA-based vaccine such as Pfizer/BioNTech or Moderna is a new type of vaccine in medical history. It is using mRNA molecule to stimulate the immunity by recognizing the targeted virus protein. It is simple and quick to pro-

duce thus it is widely used in many parts of the worlds. From 2 clinical trial of these vaccines had reported 7 cases of Bell's palsy in the vaccinated group of 35,000 patients [4]. The Bell's palsy was reported as a rare adverse event in the European Medicines Agency approved summary of product characteristic Pfizer and Moderna vaccine [2]. Cirillo and Doan reported the incidence of Bell's palsy in the mRNA vaccine groups was 1.5 - 3 times higher than expected in general population [9]. In contrast, few studies reported no significant relation of Bell's palsy and BNT162b2 [10] [11]. In contrast, our data showed 3 major vaccines were no difference in relation to Bell's palsy.

There is not much published data regarding risk of facial palsy following inactivated vaccine. A case series and nested case control study among Hong Kong population showed increased risk of Bell's palsy after CoronaVac vaccination. The risk to get facial palsy was similar with previous research done by precious study was 1.5 - 3 times higher following mRNA vaccine [2].

Side effect of vaccine in general showed higher incidence in female and younger age group that was found in local data [6]. In addition, the side effect of vaccine was observed more after second dose especially Pfizer receiver [6]. Those who received the Sinovac vaccine had lower risk of side effects than Pfizer and Oxford/AstraZeneca receivers [6].

WHO reported 67.8% female developed facial palsy following mRNA COVID-19 vaccination. In contrast, Wan found higher incidence of Bell's palsy post CoronaVac vaccination were men (68%). There was no gender difference was observed in recipients of BNT162b2 [2]. Our data showed equal gender distribution developed Bell's palsy however we found younger people are mostly affected as showed in our data. Patients with Bell's palsy 92% were younger below 60-year-old. It can be attributed due to age related decline in immune response. Malay was higher incidence as Malay is the largest race in our country. The timing onset of Bell's palsy were higher 50% within first week of vaccination showed strongly suggest that it may related to vaccine injection in regards of what type of vaccine. We recommend further surveillance and more research in regard of this matter.

There are several limitations, as our data is very small. The number could be underrated as we are not able to get data from patients with Bell's palsy who went to private clinics and other hospitals. However, as a tertiary hospital in Malaysia, the data might be representative.

In general, Bell's palsy is a good prognosis. More than 90% of Bell's palsy cases will be recovered completely within 6 months after prompt corticosteroid treatment [2]. The beneficial effects of the COVID-19 vaccine far outweigh the risk of this generally self-limiting adverse event.

## 5. Conclusion

We found that non comorbidities, younger people were mostly affected within the first weeks of vaccination. However, we cannot conclude the vaccine is directly the cause of Bell's palsy. It is a possible adverse effect. Further studies are

needed with a sufficient sample size are needed to evaluate the association between Bell's palsy and the COVID-19 vaccine.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

### References

- [1] Burrows, A., Bartholomew, T., Rudd, J. and Walker, D. (2021) Sequential Contralateral Facial Nerve Palsies Following COVID-19 Vaccination First and Second Doses. *BMJ Case Report*, **14**, e243829. <http://doi.org/10.1136/bcr-2021-243829>
- [2] Wan, E.Y.F., Chui, C.S.L., Lai, F.T.T., Chan, E.W.Y., Li, X., Yan, V.K.C., *et al.* (2021) Bell's Palsy Following Vaccination with mRNA (BNT162b2) and Inactivated (CoronaVac) SARS-CoV-2 Vaccines: A Case Series and Nested Case-Control Study. [https://doi.org/10.1016/S1473-3099\(21\)00451-5](https://doi.org/10.1016/S1473-3099(21)00451-5)
- [3] Colella, G., Massimiliano, O. and Cirillo, N. (2021) Bell's palsy following COVID-19 Vaccination. *Journal of Neurology*, **268**, 3589-3591. <http://doi.org/10.1007/s00415-021-10462-4>
- [4] Vaccines and Related Biological Products Advisory Committee. (2020) FDA Review of Efficacy and Safety of Pfizer-BioNTech COVID-19 Vaccine Emergency Use Authorization Request. <https://www.fda.gov/media/144337/download>
- [5] House, J.W. and Brackmann, D.E. (1985) Facial Nerve Grading System. *Otolaryngology—Head and Neck Surgery*, **93**, 146-147. <https://doi.org/10.1177/019459988509300202>
- [6] Elnaem, M.H., Taufek, N.H.M., Rahmanet, N.S.A., *et al.* (2021) COVID-19 Vaccination Attitudes, Perceptions, and Side Effect Experiences in Malaysia: Do Age, Gender, and Vaccine Type Matter? *Vaccines*, **9**, 1156. <https://doi.org/10.3390/vaccines9101156>
- [7] Principi, N. and Esposito, S. (2020) Do Vaccines Haze a Role as a Cause of Autoimmune Neurological Syndrome? *Front Public Health*, **8**, 361. <https://doi.org/10.3389/fpubh.2020.00361>
- [8] Murakami, S., Mizobuchi, M., Nakashiro, Y., Doi, T., Hato, N. and Yanagihara, N. (1996) Bell's Palsy and Herpes Simplex Virus: Identification of Viral DNA in Endoneurial Fluid and Muscle. *Annals of Internal Medicine*, **124**, 27-30. <https://doi.org/10.7326/0003-4819-124-1-Part-1-199601010-00005>
- [9] Cirillo, N. and Doan, R. (2021) Bell's Palsy and SARS-CoV-2 Vaccines—An Unfolding Story. *The Lancet Infectious Diseases*, **21**, 1210-1211. [https://doi.org/10.1016/S1473-3099\(21\)00273-5](https://doi.org/10.1016/S1473-3099(21)00273-5)
- [10] Shemer, A., Pras, E., Einan-Lifshitz, A., Dubinsky, B. and Hetch, I. (2021) Association of COVID-19 Vaccination and Facial Nerve Palsy A Case-Control Study. *JAMA Otolaryngology—Head & Neck Surgery*, **147**, 739-743. <https://doi.org/10.1001/jamaoto.2021.1259>
- [11] Renoud, L., Khouri, C., Revol, B., *et al.* (2021) Association of Facial Paralysis with mRNA COVID-19 Vaccines: A Disproportionality Analysis Using the World Health Organization Pharmacovigilance Database. *JAMA Internal Medicine*, **181**, 1243-1245. <https://doi.org/10.1001/jamainternmed.2021.2219>