

Effect of Facial Exercises on Functional Ability for Patients with Bell's Palsy

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Abstract

Background: Patients with Bell's Palsy are suffering from facial weakness, numbness or pain around the ear, eyelid closure, and sound hypersensitivity. Facial exercise therapy is the most important treatment approach for this patient which could improve facial function for moderate and chronic cases and reduce sequelae in acute cases of bell's Palsy. The role of nurse includes educating and encouraging patients to practice facial exercises **Aim of the study** was to evaluate the effect of facial exercises on functional ability for patients with Bell's Palsy. **Study design:** A quasi-experimental design with pre/post-test was utilized. **Setting:** This study was conducted in outpatient clinic of Neurology which affiliated to Ain Shams university hospital. Egypt. **Sample:** A Purposive sample of 40 patients. **Procedure:** data were collected using two tools as follow: I-Patients' demographic and medical data record. II- Patients' functional disability scale (pre/post and follow) implementation of the facial exercises for patients with Bell's Palsy. **Results:** The results showed a significant positive correlation between total physical wellbeing, social/psychological wellbeing, and Facial muscle assessment pre/post and follow up implementation of facial exercises at $p < 0.001$. **The Conclusion:** There was significant improvement, with highly statistical significance among the studied patients' physical, social/psychological wellbeing pre/post and follow up implementation of facial exercises. **Recommendation:** Patients' who have Bell's Palsy should be trained regarding facial exercise to improve functional ability.

Key words: Bell's Palsy, facial exercises functional ability

Introduction

Bell's Palsy is the most public peripheral paralysis of the facial nerve "seventh cranial nerve" facial nerve with an onset that is rapid and unilateral. Function of facial nerve is motor and parasympathetic function as well as taste to the anterior two-thirds of the tongue. It also controls salivary and lacrimal glands. The motor function of the peripheral facial nerve controls the upper and lower facial muscles (Ferreira-Penêda et al., 2018).

However, the etiology of Bell's Palsy is unclear, and this affects its treatment. Thus, it is critical to determine the causes of Bell's Palsy so that targeted treatment approaches can be developed and employed based on five factors including anatomical structure, viral infection, ischemia, inflammation, and cold stimulation responsively (Zhang et al., 2020).

Functional ability is the actual or potential capacity of individuals to perform the activities and tasks that can be normally expected. Functional ability integrates biological, psychological and social domains. It becomes increasingly important to measure the functional ability of an individual, especially related to long term care (Warner et al., 2021).

Facial exercises for Bell's Palsy promote brain-to-nerve muscle communication in the face and thus the fictional ability of all face muscles. They are usually simple to complete, and over time, help Bell's Palsy increase strength and improve coordination of facial muscles, and these exercises may involve the muscles in the nose, lips and cheeks, and safely achieve the best possible results (Heckmann et al., 2019).

Facial exercises help to increase muscle strength and to regain facial coordination from this temporary facial paralysis. Most exercises

should be done three or four times a day in short sessions, with up to 30 repetitions per each exercise. The role of nurse includes reassurance of the patients and teaching patients with Bell's Palsy to perform facial exercises and care for themselves at home is an important nursing priority (Khan et al., 2022).

A thorough and caring approach is used in the nursing care of patients with Bell's palsy in order to assist them regain optimal facial muscle function, avoid problems, and take care of their emotional wellbeing. Nurses are crucial in helping patients with Bell's palsy recover and lead better lives by putting suitable therapies into practice and working together with the medical team (Yu et al., 2023).

In addition, the role of nurses includes relieving pain, taking care of the eyes, scheduling follow-up, maintaining good oral hygiene, using a combination of warm compress therapy, warm water massage, and music-enhanced exercise to maintain muscle tone and correct facial palsy (Ho, & Markowsky, 2022).

Significance of the study

The annual incidence is estimated between 15 and 23 cases per 100,000 people, with a 12% recurrence rate. It is most common in people between the ages of 20-40 years, with higher incidences in individuals with diabetes mellitus and pregnant women. In Egypt according to statistical report of Ain Shams University Hospital, the number of patients diagnosed with Bell's Palsy was approximately (100 cases) in outpatient clinic of Neurology in year of 2022.

The nurses have a significant role in patients' management and education regarding disease consequences including exercises. Therefore, this study conducted to evaluate the effect of facial exercises for patients with Bell Palsy to prevent permanent contractures of the paralyzed facial muscles and finally improve functional status.

Aim of the Study:

The study was aimed to assess the effect of facial exercises on functional ability for patients with Bell's Palsy through the following:

1. Assessing functional ability for patients with Bell's Palsy.
2. Implementing and educating facial exercises for patients with Bell's Palsy.
3. Evaluating the effect facial exercises on functional ability for patients with Bell's Palsy.

Research Hypotheses

Implementation of the facial exercises for patients with Bell's Palsy will improve their functional ability.

Subjects and Methods

Research design:

A quasi-experimental design with one group, and pre/posttest was utilized to meet the aim of the study. Quasi-experimental research is often performed in cases where a random selection cannot be performed (Trochim et al., 2016).

Setting:

This study was conducted in outpatient clinic of Neurology which affiliated to Ain Shams university hospital. The outpatients' clinics located in the ground floor of the hospital. The working days from Saturday to Thursday from 9:00 am to 1.30 pm.

Subjects:

A purposive sample of 40 patients with Bell's Palsy, were recruited in the present study from the above-mentioned setting based on the following criteria.

Inclusion criteria

Adult patients with moderate unilateral Bell's Palsy for first time clinic visit, from both genders, oriented & agreed to participate in the study

Exclusion criteria

The excluded patients who had an active psychiatric diagnosis that might affect the ability to participate in the current study.

Sample Size

As revealed from the statistical medical record department of Neurology clinic which is affiliated to Ain shams university hospital during the period of 2022, the total number of patients with Bell's Palsy were [n=100]- Taking in consideration that highest flow of patients with Bell's Palsy is in the winter season. So the sample size of the patients participating in this study were (40) patients. The sample size was calculated by adjusting the power analysis with the confidence interval to 95% with margin of error 5% and a known total population of patients using the following equation:

$$n = \left(\frac{Z_{1-\alpha/2} + Z_{1-\beta}}{ES} \right)^2$$

Standard normal deviate for $\alpha = Z\alpha = 1.960$

Standard normal deviate for $\beta = Z\beta = 1.2816$.

$\alpha =$ Standard normal deviate for $\alpha = 1.9600$.

$Z\beta =$ Standard normal deviate for $\beta = 0.8416$.

$B = (Z\alpha + Z\beta)^2 = 4.3889$. $C = (E/\Delta)^2 = 0.1111$.

$N = B/C = 39.5040$.

$n = \left(\frac{2.95+1.45}{0.1111} \right)^2 = 40$ patients

D-Tools of data collection

Tool I-Patients' demographic and medical data record

This tool was developed by the researchers and written in Arabic language to suit the level of education for the patients in study based on related literature **Togni et al (2016)**. It included two different parts divided as following:

Part 1: - It is concerned with assessment of demographic data of the patients in the study; it included (age, gender, level of education, marital status, working status, nature of work, place of residence, monthly income).

Part 2: It is concerned with assessment of patients' medical data and it included: present history as the affected side, current complaints, current medications, patient's past medical, surgical history and family history.

Tool II: Patients' Functional disability scale

It is used to assess patients' impairment due to facial neuromuscular disorder. This can be used over time to monitor the course of the condition. This tool was developed by the researchers based on the related literature **Pavese et al (2022)**, **Graciano et al (2020)**, **Di Stadio (2015)**, and **VanSwearingen & Brach (1996)**. It was written in Arabic language to assess physical, and social/ psychological well-being as follow:

• Physical wellbeing divided into 2 sections:

Section (1): Composed of five statements regarding feeding, drinking, speaking, teeth brush, and eye movements, they answered by patients in a five responses scale as follow:

Usually did with no difficulty	5
Usually did with a little difficulty	4
Usually did with some difficulty	3
Usually did with much difficulty	2
Usually did not do because of health	1

Scoring system: The total score for this section is 25 points graded as follow: from 1 to 9 points: poor physical wellbeing, from 10 to 17 points: moderate physical wellbeing, and more than 17 points: good physical wellbeing.

The absence of movement	0
A small recovery	1
A major recovery	2
A normal movement	3

Section 2): Facial muscle assessment scale: It divides the face into three areas: upper, middle, and lower. The researchers evaluate the muscle tone for each area (upper, middle, and lower) considering facial expressions as smiling, speaking, eye close, and eye brow elevation which listed in the facial exercises. The muscle capacity was expressed numerically with a grading system from 0 to 3 for each face area as follow:

Scoring system: The total score for this section was between 0 and 9 points, where 0 equals the absence of movement and 1-6 points

equals moderate movement, and 7 – 9 points equals normal movement.

Social/Psychological wellbeing: it was composed of five statements regarding feeling peaceful, feeling social, family/partner acceptance, sleep well (6-8hrs), and job commitment. They answered by patients in a Likert scale as follow:

All the time	6
Most of the time	5
A good bit of the time	4
Some of the time	3
A little bit of the time	2
None of the time	1

Scoring system: The total score is 30 points graded as follow: from 1 to 10 points: poor

a) Warm Up

Area of face		Steps
1	Sides of forehead	Massage both sides using little circles.
2	Forehead	Massage both sides using circle movements.
3	Forehead	Massage across forehead in a zig zag pattern.
4	Cheeks	Massage in little circles from your ear down to the corner of your mouth.
5	Jaw line	Massage in little circles along your jawline.
6	Chin	Massage both sides of chin using little circles.

b) Face Balance Exercises

Area of face		Steps
7	Top lip	Gently pull top lip forward.
8	Bottom lip	Gently pull bottom lip forward.
9	Cheek	Gently massage cheeks in a downward direction.
10	Cheek	Open your mouth to make a big 'O' shape, massage cheeks in a downward direction.
11	Lips	Put your pointer finger in front of your lips and gently kiss your finger.
12	Lips	Use a paper tissue. Gently blow on the tissue.

social/psychological wellbeing, from 11 to 20 points: moderate social/psychological wellbeing, and more than 20 points: good social/psychological wellbeing,

Facial Exercises Manual

It was developed by the researchers in Arabic language guided by images, based on reviewing the recent and relevant literatures (Khan et al., 2022 & Warner et al., 2021). The manual was handed out for every patient; composed of three parts as follow: **Part (1):** Introduction about Bell's Palsy. **Part (2):** Importance of facial exercises on fictional ability of patients with Bell's Palsy. **Part (3):** Facial exercises steps one by one guided with imaginary figures for each face area as follow:

c) Facial Exercises

Face movement		Steps
13	Frown	Frown.
14	Eye brow raise	Raise eyebrows.
15	Nose wrinkle	Wrinkle your nose – imagine you are smelling a beautiful flower.
16	Peek-a-boo Smile	You will need a piece of paper. Cover the side of your face that is learning and give a small side on your strong side.
17	Peek-a-boo Smile	You will need a piece of paper. Cover the side of your face that is strong and give a small side on your learning side.
18	Smile	Small smile on both sides.
19	Sad face	Do a sad face.
20	Smile Practice	Make a 'smile book' or watch a funny video to practice your smile.

d) Lip Exercises

Lip Action		Steps
21	Peanut butter	Run your tongue across your top lip, like you are licking off some peanut butter.
22	Lip pops	Make your lips pop.
23	Raspberries	Blow a raspberry.
24	Cheek puffs	Puff your cheeks up with a small amount of air. Now try to move it from side to side.
25	Oo	Round your lips to make an 'oo' sound. Use your helper fingers.
26	Oo	Round your lips to make an 'oo' sound. Without your helper fingers.

e) Jaw and Mouth Exercises

Focus		Steps
27	Tongue poke	Put your fingers on your jaw joint and poke your tongue out.
28	Mouth open	Put your tongue behind your bottom teeth and open mouth.
29	Ah	Open mouth to say 'ah'
30	M	Close your mouth to make an 'm' sound.

f) Eye Exercises

Focus		Steps
31	Manual blink	Look down and place the back of your pointer finger just below your eyebrow. This should close your eye.
32	Eye stretch	Look down and place the back of your pointer finger just below your eyebrow to close your eye. Then look up.
33	Lid stretch	Look down and put the back of your pointer finger just below your eyebrow to close your eye. Then gently stretch your eyebrow up with your other hand.

Tools validity and reliability

The manual and instruments were revised by a panel of seven experts "Four professors of Medical Surgical Nursing, and Two professors of Neurology Medicine and one assistant professor of Physical Therapy for content validity" for

clarity, relevance, comprehensiveness, understanding, and easiness for administration. Based on the opinion of a panel of experts some modifications were done, and then the final form was developed.

Reliability: Alpha Cronbach test was used to measure the internal consistency of the study tools. In which patient demographic and medical record was reliable at (0.87), and patients' functional disability scale was reliable at (0.81).

Preparatory phase:

Administrative design: The necessary official approvals were obtained from the managers of the Ain Shams University Hospital. Letters of request were issued to them from the Faculty of Nursing at Ain Shams University explaining aim of the study and its expected outcomes.

Ethical considerations:

The research approval was obtained from Scientific Research Ethical Committee in Faculty of Nursing at Ain Shams University before starting the study. The researchers clarified the aim of the study to the subjects included in the study. A written consent was secured from each patient after being informed about the nature, purpose and benefits of the study. Patients were also, informed that participation is entirely voluntary and could withdraw at any time without giving reasons. Confidentiality and anonymity of the data was assured. Moreover, the intervention used in the current study is safe and not causing any harm to participants.

Pilot Study:

Once permission was granted to proceed the proposed study, a pilot study was carried out before starting data collection from 8 patients in the previously mentioned setting according to the inclusion criteria and excluded from the main sample to evaluate feasibility, the clarity, applicability of the tools, and calculate the time needed to collect data to detect any potential hindrances that might meet the researchers and restrict with data collection.

Field work

-The researchers were demonstrating the facial exercises with the two professors of neurology and physical therapy to ascertain the application of the steps one by one and in the right manner before application on patients.

-The study was carried out within four months from the beginning of November 2023 to end of March 2024. The study data collected for 3 times during three phases as pretest, posttest and follow up phase:

I-Pretest phase: This phase was done through filling the patient demographic and medical data record and patients' functional disability scale from the patients after explaining the purpose of the study and written consent was taken.

- The baseline assessment was completed and ended with Facial muscle assessment scale (consumed about 20 minutes for each patient).

- The study subjects were divided into small groups; the group comprised of 4 to 5 patients for each session.

- The facial exercises manual was given for each group of patients with demonstration and re-demonstration of each exercise. The researchers demonstrated the components of the manual to the patient through sessions around 30-40 minutes for group in the waiting area outside the clinic.

- The patients instructed to repeat each exercises at least 3 times/day and for at least 10 repetitions for each type of exercises at home.

- The researcher's patient's relationships were continued through telephone/WhatsApp for any questions, and for patient follow up.

II- Posttest phase: This phase starting 2 weeks later after implementation of facial exercises. The researchers collect data from same group of patients using the same data collection tools.

Follow up phase: This phase starting 3 months later after implementation of facial exercises. The researchers collect data from same group of patients using the same tools and

Statistical Design:

The data was coded and entered using a personal computer. Statistical Package for Social Science (SPSS) version 20 was utilized. Data were obtainable using descriptive statistics in the form of frequencies and percentages. T-test was utilized as an inferential statistic was used to investigate the effect of facial exercises on the functional disability scale at three times: pre, posttest, and posttest implementation of the exercise. The chi-square test was used to identify

the relationship between qualitative variables and Mean± SD also was used. Statistical significance was considered at p-value ≤ 0.05 , and <0.001 was considered highly significant.

Results

Table (1) reveals that 50% of the patients were in age group of 35- < 45 with mean age of 32.7 ± 11.6 . As regards their gender, 62.5% of them were females, 50% have intermediation education 75% are working, regarding nature of work 50% employed in moderate work and only 37.5 in heavy work. Concerning marital status 75% of patients are married and 87.5% of patients reside in urban areas qualifications, and ultimately 75% of patients have insufficient monthly income.

Table (2) reveals that all of patients have complains of headache, unable to smile and also (87.5, 75%, 75%) have taste problems, tearing problems and ear pain respectively. Also all of patients receiving corticosteroids and 37% receiving antivirals, 50% of patients have no bad habits, and 50% have history of HTN and DM, 62% have no family history of Bell's Palsy from the second degree.

Table (3) clarifies significant improvement, with highly statistical significance among the studied patients' physical wellbeing pre/post and follow up implementation of facial exercises at $p = <0.001$.

Figure (1) shows percentage distribution of studied patients' according total physical

wellbeing pre/post and follow up implementation of facial exercises.

Table (4) clarifies significant improvement, with highly statistical significance among the studied patients' social/psychological wellbeing pre/post and follow up implementation of facial exercises at $p = <0.001$.

Figure (2) reveals percentage distribution of studied patients' according total social/psychological wellbeing pre/post and follow up implementation of facial exercises.

Table (5) shows significant improvement, with highly statistical significance in studied patients' Facial muscle assessment pre/post and follow up implementation of facial exercises at $p = <0.001$.

Figure (3) shows percentage distribution of studied patients' according total facial muscle assessment pre/post and follow up implementation of facial exercises.

Table (6) shows a significant positive correlation between total physical wellbeing, social/psychological wellbeing, and Facial muscle assessment pre/post and follow up implementation of facial exercises at $p = <0.001$.

Table (7) shows a significant relation regarding patient's complains pre/post and follow up implementation of facial exercises at $p = <0.001$.

Table (1): Percentage distribution of demographic data of the studied patients (n= 40).

Items	Studied Patients (n=40)	
	No	%
Age		
• 20- < 35	15	37.5
• 35- < 45	20	50.0
• 45 and more	5	12.5
Mean ± SD	32.7± 11.6	
Gender		
• Female	25	62.5
• Male	15	37.5
Qualification		
• Primary	13	32.5
• Intermediate	20	50
• High education	7	17.5
Working		
• Yes	30	75
• No	10	25
Nature of work		
• Sedentary work	5	12.5
• Moderate work	20	50
• Heavy work	15	37.5
Marital status		
• Married	30	75
• Unmarried	10	25
Residence		
• Urban	35	87.5
• Rural	5	12.5
Monthly Income		
• Sufficient	10	25
• Insufficient	30	75

Table (2): Percentage distribution of medical data among the studied patients (n= 40).

Items	Studied Patients (n=40)	
	No	No
Affected side		
• Right	15	37.5
• left	25	62.5
Current complains*		
• Inability to close eye	30	75
• Inability to smile	40	100
• Tearing problems	30	75
• Taste problems	35	87.5
• Salivary problem	25	62.5
• Dropping of the mouth	25	62.5
• Ear pain	30	75
• Headache	40	100
Current Medications*		
• Corticosteroids	40	100
• Antiviral	15	37.5
Habits		
• Smoking	15	37.5
• Alcohol	5	12.5
• None	20	50
Other comorbidities		
• Yes (DM, HTN)	30	75
• No	10	25
Past surgery		
• Yes	20	50
• No	20	50
Family history		
• Yes	15	37.5
• No	25	62.5
• 1st degree	15	37.5
• 2nd degree	20	50
• 3rd degree	5	12.5

* Non-mutually exclusive

Table (3): Comparison between mean and standard deviation of the studied patients' regarding physical wellbeing pre/post and follow up implementation of facial exercises

Items	Studied Patients (n=40)			Pre &post		Post &follow-up	
	Pre Mean \pm SD	Post Mean \pm SD	Follow-up Mean \pm SD	t- test	P-value	t-test	P-value
Feeding	1.7 \pm 2.0	2.9 \pm 2.1	3.4 \pm 1.7	3.645	<0.001**	4.938	<0.001**
Drinking	2.1 \pm 0.7	2.9 \pm 1.6	4.1 \pm 1.1	4.587	<0.001**	5.989	<0.001**
Speaking	3.0 \pm 0.2	3.7 \pm 1.2	3.8 \pm 0.8	5.441	<0.001*	6.437	<0.001**
Teeth brush	2.2 \pm 1.2	2.6 \pm 1.9	3.1 \pm 1.3	5.221	<0.001*	6.441	<0.001**
Eye movements	3.2 \pm 1.8	2.9 \pm 2.3	3.7 \pm 1.2	5.625	<0.001*	6.582	<0.001**

*Significant at p < 0.05

**Highly Significant at P< 0.001

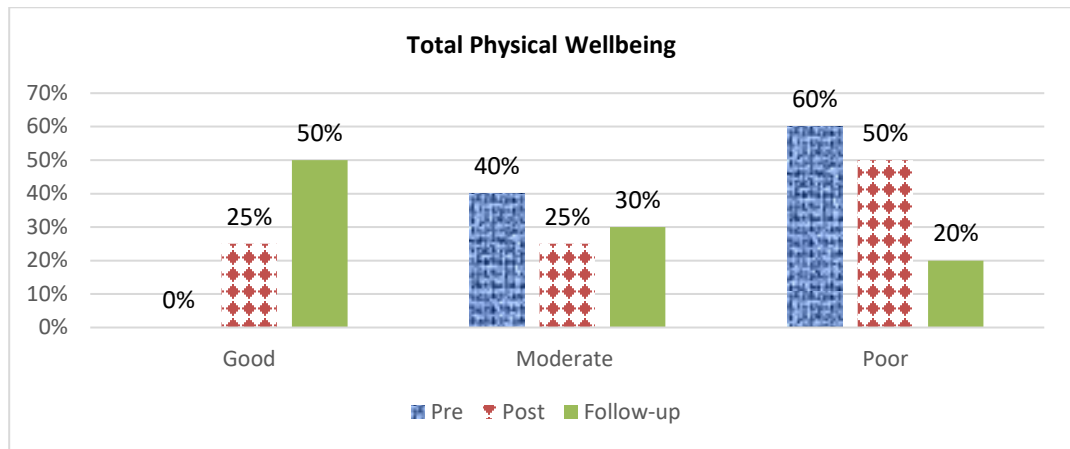


Figure (1): Percentage distribution of studied patients’ according total physical wellbeing pre/post and follow up implementation of facial exercises

Table (4): Comparison between mean and standard deviation of the studied patients 'regarding social/psychological wellbeing pre/post and follow up implementation of facial exercises

Items	Studied Patients (n=40)			Pre & post		Post & follow-up	
	Pre Mean ± SD	Post Mean ± SD	Follow-up Mean ± SD	t-test	P-value	t-test	P-value
Feeling peaceful	2.1±2.0	3.3 ± 2.1	3.9 ± 1.7	3.432	<0.001**	5.538	<0.001**
Feeling social	2.6±1.2	3.1 ± 1.6	3.3 ± 1.4	4.757	<0.001**	5.580	<0.001**
Partner/Family acceptance	2.3±0.4	2.8 ± 1.3	3.3 ± 0.5	4.265	<0.001**	5.337	<0.001**
Sleep well (6-8hrs)	2.2±1.0	2.8 ± 0.9	3.0 ± 1.3	5.321	<0.001**	6.534	<0.001**
Job commitment	2.2±1.8	2.9 ± 1.9	3.8 ± 1.7	3.312	<0.001**	4.510	<0.001**

*Significant at p < 0.05

*Highly Significant at P< 0.001

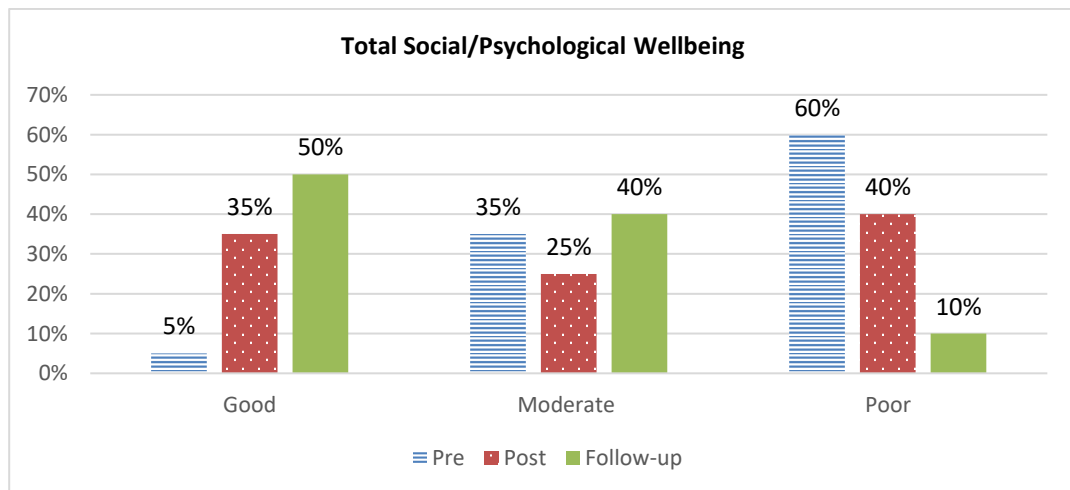


Figure (2): Percentage distribution of studied patients’ according total social/psychological wellbeing pre/post and follow up implementation of facial exercises

Table (5): Comparison between mean and standard deviation of the studied patients' regarding Facial muscle assessment pre/post and follow up implementation of facial exercises

Items	Studied Patients (n=40)			Pre &post		Post &follow-up	
	Pre X± SD	Post X ± SD	Follow-up X ± SD	t-test	P-value	t-test	P-value
The absence of movement	1.1±0.1	0.8 ± 0.2	0.7 ± 0.2	4.537	<0.001**	5.654	<0.001**
A small recovery	2.1±1.2	2.9 ± 1.8	3.1 ± 2.9	3.657	<0.001**	4.989	<0.001**
A major recovery	2.5±0.6	2.9 ± 1.3	3.2 ± 0.5	4.645	<0.001**	5.846	<0.001**
A normal movement	0.9±0.5	1.2 ± 0.8	1.9±1.3	5.354	<0.001**	6.645	<0.001**

*Significant at $p < 0.05$ *Highly Significant at $P < 0.001$

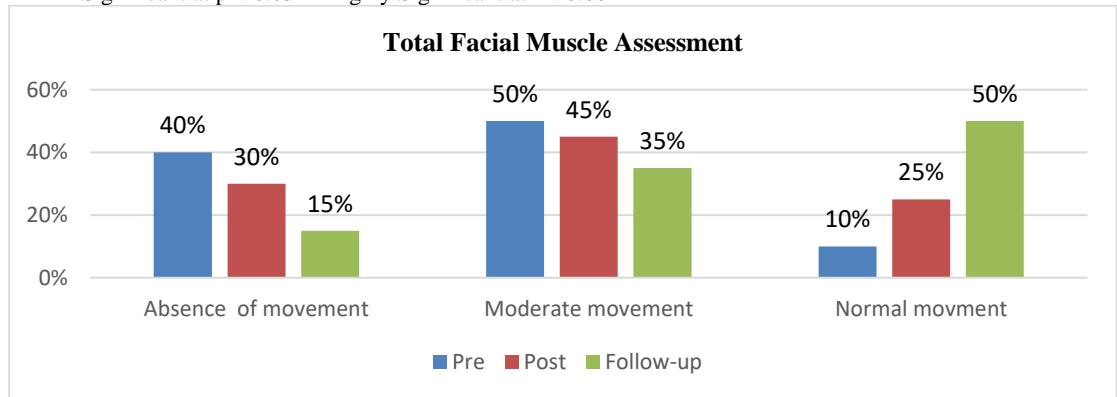


Figure (3): Percentage distribution of studied patients' according total facial muscle assessment pre/post and follow up implementation of facial exercises

Table (6): Correlation between total physical wellbeing, social/psychological wellbeing, and facial muscle assessment pre/post and follow up implementation of facial exercises (n=40).

Items		Total Physical Wellbeing		
		Pre	Post	Follow-up
Total Social/Psychological Wellbeing	r	0.775	0.830	0.897
	p	<0.001**	<0.001**	<0.001**
Total Facial Muscle Assessment	r	0.823	0.850	0.989
	p	<0.001**	<0.001**	<0.001**

Table (7): Relation between studied patients complains pre/post and follow up implementation of facial exercises (n= 40).

Items	Studied Patients (n=40)		
	Pre	Post	Follow up
• Inability to close eye	30 (75)	24 (60)	19 (47.5)
• Inability to smile	40 (100)	35 (87.5)	29 (72.5)
• Tearing problems	30 (75)	25 (62.5)	20 (50)
• Taste problems	35 (87.5)	25 (62.5)	18 (45)
• Salivary problem	25 (62.5)	20 (50)	17 (42.5)
• Dropping of the mouth	25 (62.5)	21 (52.5)	17 (42.5)
• Ear pain	30 (76)	23 (57.5)	20 (50)
• Headache	40 (100)	29 (72.5)	21 (52.5)
X ± SD	37.3 ± 2.7	28.4 ± 5.6	24.4 ± 4.6
T1 between pre & post tests	36.8*		
T2 between post & follow-up tests	30.5*		

*Significant at $p < <0.001$

Discussion

Bell Palsy is considered a non-progressive neurological disorder with acute onset of ipsilateral seventh cranial nerve paralysis. People with facial paralysis develop a droop on one side of the face and sometimes both sides. Early diagnosis and effective management is very important for rapid recovery. Facial exercises lead to greater improvements in facial movement and symmetry (**Rajangam et al., 2024**).

The current study's discussion was predicated on the data obtained based on the aim of the study which aimed to evaluate the effect of facial exercises on functional ability for patients with Bell's Palsy. Regarding demographic characteristics, the current study showed that, the mean and standard deviation of the studied patients was 32.7 ± 11.6 and about two thirds of them were females. This is contradicted with **Alharbi et al., (2023)** who reported that the majority of the studied patients were males with 38.9 (9.3) mean and standard deviation in their study entitled "Effect of neural mobilization in Bell's Palsy: A randomized controlled trial". This means that Bell's Palsy is not correlated to gender.

Regarding marital status and work condition of the studied patients, the result showed that more than two thirds of the patients were married and had work. This result is in accordance with **Ko et al., (2023)** who found that majority of the studied patients were married and had an employment in a study entitled "A pilot survey examining satisfaction for integrated medicine based on critical pathways for acute facial Palsy" In relation to the affected side of the face, this study represented that more than three fifths of patients had affection on the left side. This result goes in the same line with **Urban et al., (2020)**, in a study entitled "Prognostic factors for the outcome of Bells' Palsy: A cohort register-based study" and found that, about three fifths of the studied patients had left side Bells' Palsy.

Concerning the studied patients' current complains, the results revealed that, all of the studied patients complained from headache and inability to smile, also the majority of them had taste problems, pain and inability to close the eye. These findings are in accordance with **Chae et**

al., (2023) who found that, the most common prodromal symptoms were postauricular pain, sensory decline in the tongue, headache on the affected side in their study entitled "Association between clinical symptoms, electrodiagnostic findings, clinical outcome, and prodromal symptoms in patients with Bell's palsy". This confirms that patients with Bell's palsy are suffering from multiple symptoms according to the affected side.

Regarding comorbidities among the studied patients, the results of the current study revealed that, more than two thirds of them had diabetes and hypertension. From the researches point of view, this may be due to the consequences of chronic diseases. This result is in disagreement with **Yoo et al., (2020)** who found that 36.1% of the study subjects had controlled hypertension in a study entitled "Evaluation of factors associated with favorable outcomes in adults with Bell Palsy" On the other hand, the study goes on the same line with **Guerrero-de Ferran et al., (2023)** who found that main associated disease was arterial hypertension in (40%) patients, followed by Diabetes Mellitus in (36.30%) in a study entitled " Ocular and palpebral manifestations of facial Palsy: An epidemiologic descriptive study".

Regarding physical wellbeing among the studied patients, there was significant improvement, with highly statistical significance among the studied patients' physical wellbeing including feeding, drinking, speaking, teeth brush and eye tearing pre/post and follow up implementation of facial exercises at $p < 0.001$. This result may be due to the positive effect of facial exercises on physical function. This result is supported by **Mishra, and Sayed (2021)**. In their study entitled "Effects of mime therapy with sensory exercises on facial symmetry, strength, functional abilities, and the recovery rate in Bell's Palsy patients" who showed statistically significant improvements between two groups in physical component after implementation of exercises.

The result also goes in the same line with **Choi, and Shin (2016)**, in their study entitled "Effects of a facial muscle exercise program including facial massage for patients with facial Palsy" and stated that, facial muscular function of

the experimental group improved significantly compared to the control group. This result reflects the positive effect of facial exercises due to increase blood flow to facial muscles. This approved that facial exercises have a real role in improving the disease consequences for such group of patients.

Before implementation of the exercises the result showed negative effects of altered facial expression on psychosocial functioning were more severely affected patients with bell Palsy. This result is in agreement with **Siemann,et al., (2023)** with evidence in literature that indicates that Bell's Palsy may be associated with a specific deficit in the processing of a subset of negative emotions including sadness and fear and anxiety there is also a potential detrimental aspect in having an altered facial expression may have an impact on emotion processing.

Regarding social/psychological wellbeing among the studied patients, there was significant improvement, with highly statistical significance among the studied patients' social/psychological wellbeing including Feeling peaceful, Felling social, Partner/family acceptance, Sleep well and Job commitment pre/post and follow up implementation of facial exercises at $p = <0.001$. From the researcher's point of view, this might be due to social/psychological condition improvement after performing facial exercises repetitively. In a similar, recent study carried out by **Hotton et al. (2020)**, who found improvements in social function over time to closely coincide with improvements in facial function.

Regarding facial muscle assessment among the studied patients, there was significant recovery, with highly statistical significance among the studied patients. Facial muscle assessment including absence of movement, small recovery, major recovery and normal movement pre/post and follow up implementation of facial exercises at $p = <0.001$. This may be due to that majority of the studied patients their age less than 45 years which is an important factor of rapid recovery with the effect of exercises. These findings are incongruent with those of the study carried out by **Parveen, et al (2023)** who concluded in this study that

neuromuscular electrical stimulation shows significant improvement in Bell's Palsy with facial muscle exercises is more effective in improving facial function and reducing facial disability shows faster recovery. The results of current study go in the same line with **Khan, et al (2022)** who illustrated that, there were statistically significant differences in the effectiveness of facial exercise therapy for greater functional recovery of patients diagnosed with belly Palsy.

The current study revealed significant improvement, with highly statistical significance in studied patients' Facial muscle assessment pre/post and follow up implementation of facial exercises. This findings are in agreement with those of **Gatidou et al. (2021)** who in their own systematic review concluded that facial exercises along with Mirror Therapy is an effective approach to improve facial symmetry and neuromuscular retraining through feedback leads to improvement of symptoms in different stages.

The results revealed that, there was a significant positive correlation between total physical wellbeing, social/psychological wellbeing, and facial muscle assessment pre/post and follow up implementation of facial exercises at $p = <0.001$. These results go in the same line with the study entitled "Psychosocial functioning in patients with altered facial expression: a scoping review in five neurological diseases" which conducted by **Rasing et al., (2023)** and conclude a positive correlation among all health domains after application of facial exercises. This correlation was seen for the patients with acquired facial weakness and psychosocially affected. These results as well agreed with the study conducted by **Bruins, et al., (2021)** who stated is his study "Associations between clinician-graded facial function and patient-reported quality of life in adults with peripheral facial palsy" the correlation between the facial function and social function domain was weaker than the correlation between facial function and physical function.

In relation to patients complains pre/post and follow up. The result showed a significant improvement after implementation of exercises. The finding goes in the same line with Khan et al (2022), and found that, the studies strengthen the

benefits of facial exercise therapy early in recovery and add to evidence of the value in chronic cases.

Conclusion

The current study revealed a substantial improvement in functional ability among Bell's Palsy patients after implementation of facial exercises. There was significant improvement, with highly statistical significance among the studied patients' physical, social/psychological wellbeing pre/post and follow up implementation of facial exercises at $p = <0.001$. Also there was significant positive correlation between total physical wellbeing social/psychological wellbeing, and facial muscle assessment pre/post and follow up implementation of facial exercises at $p = <0.001$.

Recommendations

Based on the finding of the present study, the researchers recommended the following

- Patients' who have Bell's Palsy should be trained regarding facial exercises to improve functional ability.
- A simplified, comprehensive and illustrated booklet including facial exercises description should be introduced to the patients Bell's Palsy.
- Replicate the study on a greater number of patients to generalize findings of the present study.

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