Impact of WhatsApp educational classroom on severity of symptoms and risk of fall among patients with parkinson's disease

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Abstract

Rapid changes in Parkinson's disease (PD) cause patients to lose postural stability and the ability to maintain standing balance (including frequent falls), and have difficulty managing activities of daily living. This burden has emphasized the necessity for tracking the changing trends promptly, which could inform the development of health strategies. WhatsApp,s rapid adoption among people signals that social media technologies provide a platform to promote an online health learning environment. Evaluate the impact of implementing a WhatsApp educational classroom on the severity of symptoms and the risk of falls among patients with Parkinson's disease. (Pre–post) experimental research design. Outpatient Clinic in both Assuit University Neuropsychiatric Hospital and Al-Mabara Hospital in Assiut city. (100) adult patients (male & female) with Parkinson's disease. Patient's assessment sheet,2- Unified Parkinson Disease Rating Scale (UPDRS) and 3- Morse Fall Scale (MSF) (pre, post). there was a statistically significant difference regarding the severity of symptoms and incidence of fall (p< 0.005). WhatsApp educational classroom had a positive impact on patients with Parkinson's disease in relation to the severity of symptoms and risk of falls. Develop an artificial intelligence app that is available on smart phone to all Parkinson's patients.

Keywords: Educational classroom, Parkinson's disease, WhatsApp.

Introduction

Parkinson's disease is a progressive disorder that is caused by degeneration of nerve cells in the part of the brain called the substantia nigra. when nerve cells in the brain don't produce enough of a brain chemical called dopamine leads to irregular brain activity [5].

Severity of symptoms in PD is unpredictable, with variability in outcomes across individuals, making it challenging for patients to anticipate what lies ahead. This uncertainty often fosters a fear of the unknown as patients worry about how the disease will impact their abilities, independence and quality of life, including concerns about losing autonomy, struggling in their profession, or becoming a burden to their caregivers or society [46].

Falls occurs related to balance problems, environmental hazards in patients, homes as facility flooring, bad lighting, wrong placement of furniture and tripping over carpet flooring, also side effects of drugs that can alter cognition or alertness and result in falls. The consequences of falls affect the physical health and psychosocial well-being of patients [23].

Nurses play a crucial role in the delivery of patient care, which requires an increasing demand for high-quality evidence-based practices, putting pressure on the nursing workforce to stay up to date with the latest technological advancements. In this regard, artificial intelligence (AI), especially mobile applications, has the potential to support nursing practices by facilitating the efficient management of patient data, information and care [29].

Smartphone is a growing form of AI worldwide. Smartphones can be used to track movement patterns throughout the day or record short self-conducted tasks, such as finger tapping or spiral drawing. Smart watches have demonstrated high potential as an instrument for precise quantification of movement in the context of PD analysis [47].

WhatsApp Messenger can bring improvement in patient-related awareness and communication among patients by sharing photographic evidence, critical alerts, documents that are considered unwelcome and disturbing in routine workflows,

enable groups of people to actively contribute to discussions without inhibition, and improve learners, attitudes and achievement levels. Therefore, the application is very significant in mastering spontaneous interaction in mobile learning and information exchange [24].

Significance of the Study:

From the researcher's review of the literature, it was found that more than 10 million people worldwide are living with Parkinson's disease (PD). Its prevalence has been projected to double over the next 30 years. In Egypt, the crude incidence of PD was 84 per 100,000 person/year [42]. According to the statistical report of the Neuropsychiatric Hospital at Assiut University, the total number of patients admitted with Parkinson's disease was (176) at the year ,2024while the majority of patients had severe symptoms due to negligence of treatment and follow- up[4]. Nowadays, patients seek information about health conditions, guidance in treatment, and support from online instead of traditional healthcare ways. Online communities have the potential to contribute to the quality of care by increasing patient empowerment [6].

Aims of the Study:

The aims of this study were 1- assess the severity of symptoms and risk of fall among patients with PD,2- to design and implement a WhatsApp educational classroom for patients with PD, and 3- to evaluate the impact of the WhatsApp educational classroom on the severity of symptoms and risk of fall among patients with PD.

Research Hypothesis:

1- The severity of symptoms will improve after implementing a whatsApp educational classroom.

2- The risk of falls in patients with PD will be reduced after implementing a WhatsApp educational classroom.

Patients and Methods

Research design:

(Pre – post) an experimental research design was

utilized to conduct this study.

Setting:

The study was conducted in outpatient clinics at both Assiut University Neuropsychiatric Hospital and Al-Mabara Hospital in Assiut city.

Sample:

(100) adult patients (male and female) diagnosed with PD. Age ranged from 20 to 65 years. An influence calculation estimated that to detect an impact size of patients (pre /posttest) with a p-value< 0.05 ,80% power, and a confidence level of 0.95, a sample size of 100 patients was needed.

Exclusion criteria:

- Digital illiteracy: patients and their relatives who don't have smartphone or can't deal with smart apps.

- Patients with the late stage of Parkinson's disease.

Sample Size:

The sample was of 100 patients was selected by using the following equation according to Steven K. Thompson (2012: N=total patient population size of 176 during year 2023, Z = confidence levels is 0.95 and is equal to 1.96, D= the error ratio is = 0.05, P= the property availability ratio, and neutral = 0.50. [45].

Three tools were utilized for data collection. These tools are as follows:

Tool I: Patient's assessment: This tool consisted of two parts.

Part I: Demographic patient data: It was developed to assess demographic characteristics. It included age, gender, marital status, level of education, living situation, occupation, and residence.

Part II: Patient medical data: It was developed to assess past medical history, including (diabetes type 2, hypertension, gastric problems, hyperlipidemia, and head trauma), and present medical history, which included (smoking and family history of

disease).

Tool II: Unified Parkinson Disease Rating Scale (UPDRS): The UPDRS was originally developed by Fahn et al. (1987). The scale is composed of 4 parts, two parts were used to assess the severity of symptoms of Parkinson's disease ,both nonmotor symptoms by part (1) and motor symptoms by part (3), while part (2) was used to assess the activity of daily living and lastly, part (4) was used to assess motor (physical) complications of the disease. Part (1) consisted of 13 items including intellectual impairment, hallucinations and psychosis, fatigue, depression, anxious mood, apathy, features of dopamine dysregulation syndrome, sleep problems, daytime sleepiness, pain and other sensations, urinary problems, constipation problems, light - headedness on standing. Part (2) consisted of 13 items including speech (daily conversation), salivation and drooling, chewing and swallowing, eating tasks, handwriting, doing hobbies and other activities, dressing, hygiene, turning in bed, getting out of bed, a car, or a deep chair, freezing, walking and balance, and tremor. Information obtained in these two parts are objective from patients through interview while ,part (3) done through physical examination by researcher and included 18 items to be assessed that are speech (ask patient to repeat a sentence or read averse of Koran), facial expression, rigidity, finger tapping, hand movements, pronation-supination movements of hands, toe tapping, leg agility, arising from chair, gait, freezing of gait, postural stability, posture, global spontaneity of movement (body bradykinesia), postural tremor of the hands, kinetic tremor of the hands, rest tremor amplitude, constancy of rest tremor. Finally part (4) assessed mainly by interview (objective data) but researcher also used subjective method to observe patient's dyskinesia if happened during meeting and included 6 items were dyskinesia (time spent with dyskinesia, functional impact of dyskinesia), motor fluctuations (time spent in the off state .functional impact of fluctuations, complexity of motor fluctuations), "off" dystonia (painful off-state dystonia). The scales are: Part I: Score range: 0–52, 10 and below is mild, (11 – 21) moderate and (22 – 52) severe. Part II: Score range: 0–52, 12 and below is mild,(13 – 29) moderate and (30 – 52) severe. Part III: Score range: 0–132, 32 and below is mild, (33 – 58) moderate and (59 – 132) severe. Part IV: Score range: 0–24, 4 and below is mild, (5 – 12)

moderate and (13 – 24) severe. Each item asked to the patients in all of four parts has 0–4 ratings: 0 (normal), 1 (slight), 2 (mild), 3 (moderate), and 4 (severe). patients were assessed and interviewed (pre) which means before enrolling in whats app educational classroom (group) and at (post) 3 months from enrolling in whats app educational classroom then at (post) 6 months from enrolling, if the score that was given to the patients at pre assessment phase decreased in the following post follow up phases (3 to 6 months) that mean the patient's condition improved[13].

Tool (III): Morse Fall Scale (MSF):

It was adopted from Morse et al. (1989). Used to evaluate patients at risk for falls by interviewing patients about the following 6 items: history of falling, secondary diagnosis, ambulatory aid, intravenous (IV) or IV access, gait, and mental status. Items (1, 2, 4) had no or yes answer, while items (3, 5) had open answer. For item 3 (ambulatory aid), patient's answers included none/bedrest/nurse assist, crutches/cane/walker, and furniture aids. Item 5 (gait) included normal/bedrest/wheelchair, Weak and Impaired. Lastly, item 6 only had two possibilities were: knows own limits and overestimates or forgets limits. A total score was calculated by summoning the score of all 6 items, and the patient risk of fall was classified accordingly. Scale was used by the researcher 3 times (pre), which means before enrolling in whatsApp educational classroom (group) and at (post) 3 months from enrolling then, at (post) 6 months from enrolling [31].

WhatsApp educational classroom; the idea was to give Parkinson's patients a nursing education booklet which includes information about the disease and practices to help reduce the severity of symptoms and risk of falls through the internet instead of paper though, there was a need to create a whatsApp group where patients were added and the booklet was published to all members of the group. The booklet was developed in a simple Arabic language with illustrated photos and clarified with colored figures and images.

Procedure:

This study was carried out in three phases:

I: Preparatory phase:

Tools Development:

A review of current, past, local and international related literature in the various aspects using books, articles, periodicals, magazines, and references[61] was done.

An official letter was issued from the Dean of the Faculty of Nursing to the Head of the Neurological Department and the hospital manager for the Center Upper Egypt branch (Al-Mabara hospital) to collect the necessary data, and explain the aim and contents of the study to nursing supervisors and physicians to gain their cooperation.

Content Validity and Reliability:

Content validity was revised and checked by (5) experts from Medical-Surgical Nursing staff and Medical staff at Assuit University, who reviewed tools for clarity, relevance and comprehensiveness. Minor modifications were made and correction was carried out accordingly and so the tools were designed in their final format and tested for reliability. Reliability of the tool was measured by Cronbach's alpha coefficient (r=0.72).

Pilot Study:

A pilot study on 10 patients (10%) was conducted from November 2024 to January 2025 (3 months follow-up), where a whatsApp group was created contained 10 patients along with the researcher, 3 supervisors (2 nursing and 1 medical) were added to test the clarity and applicability of the tools. In line with this pilot study, specific modifications were made. Those patients who were involved in the pilot study were included in the study. Not to mention that follow-up of patients in the whatsApp group continued to April 2025 (6 months) ,but whats app educational classroom (group) still exists to discuss or answer any concerns of patients.

II. Implementation Phase:

- Once the permission was granted to proceed with the proposed study, the researcher initiated data collection through permission from outpatient clinic physician to stay in the clinic and interview Parkinson's patient after taking physician's confirmation of medical diagnosis of case (PD) and completed medical checkup then physician referred patient to researcher, this happened after full explanation to the physician about nature and aim of research and show evidence about all formal permission that were obtained.

- The researcher conducted 3 meeting with patients; the first one was to obtain base line data, the second meeting was to perform first evaluation after 3 months from enrollment in whats app groups and lastly the third meeting was to perform the second evaluation after 6 months from enrolment, not to mention that contact with patients were maintained 24hrs a day through whats app groups during period of 6 months and remain after that only for the sake of patients.

- The first meeting; the researcher greeted the patients, introduced herself, and the purpose of the study was explained to patients who agreed to participate in the study before any data collection, which took about 1-5 min.

- After taking the patient's oral and written agreement for voluntary participation in the study, each patient involved in the study was interviewed individually to obtain base line data that were established using (tool I), then examin severity of symptoms and risk of fall that can be used as a base line for post evaluations using (tool II and tool III).

- Phone numbers of patients were taken to be added to the whatsApp group or represented family members, if patient's family members had smartphone that patients didn't have or as a direct patients, caregiver. The researcher agreed with patients and their represented families about enrollment in whatsapp groups and the scheduled of contact for follow-up to monitor their condition at two times through six months follow-up after enrollment (3 months and at 6 months).

- The meeting was conducted in the morning

in the outpatient clinic at both hospitals, but the afternoon outpatient clinic shifts were conducted only at Al-Mabara hospital because there are no afternoon outpatient clinical shifts in Assuit University Neuropsychiatric Hospital.

- The researcher answered all the patients' question about whats app educational classroom (group).

- this meeting took about from 15-20 mins that applied to patients who were highly educated or have long experience with disease, while it took from 25-30 mins that applied to patients who were basic or elementary educated.

- Whats app groups creation and activation; Scenes an effective educational class room requires a number ranged from 25 to 30 learner (patient) [2] that's why four groups were created.

- After collecting data from 10 patients whats app group was created in 12/ 11/ 2024 which called the trail group for Parkinson's disease follow up.

- After data were collected from another 90 patients, 3 whats app educational classrooms (groups) were created in the same time in 5/12/2025, each group had 30 patients in addition to researcher and 3 supervisors.

- the booklet that called nursing educational guidelines for coping with Parkinson's and managing symptoms were published to patient through whatsapp groups on three parts, the first part contain general information about Parkinson's disease.

- Patients or representative family members started asking questions some were covered in the the first part that was sent on whats app, the researcher began explaining the information more clearly to patients until fully understood, other questions that not covered in the booklet, the researcher answered them after doing some research and consulting the supervisors, where

second part where sent after one week from first one covering both patient questions and nursing education on how to deal with severe symptoms.

- The third part send also after one week from sending second part and covering risks of fall and how to avoid or manage it.

- Some clarifications required sending pictures and videos to make it simple and enhance understanding.

- Both researcher and patients used a message or a voice record as a way of communications on whats app groups, a formal emojie were used such as 👍, 👌, 🙏

- Initially, whenever a patient would ask a question in one group, after answering it, both question and response were shared across the other groups to maximize the benefits for everyone, however overtime, it was observed that the patients primarily received the information without actively engaging. That's why, instead of sharing the information the approach shifted to post only the question or concern allowing patients to respond if they had similar concerns or experiences.

III- Evaluation Phase:

- In this phase the researcher assessed severity of symptoms and risk of fall using (Tool II and Tool III) post three (3) and post six (6) months from patient enrolment.

- The collection of data lasted through the period from November 2024 to August 2025.

- This phase include both 2and 3 meeting.

- The second meeting; occurred after 3 months from enrolling in whats app educational classroom (group) where the researcher obtained feedback from patient about what had been educated in whats app classroom, if the group meet patient needs,

answer his questions.

- Patient were instructed that if they had any embarrassing problems and didn't want to share it with others, they can send it to researcher personal whats app unless they don't care and wanted to see if others had the same problems and questions only relates to their conditions or disease itself .

- post assessment test was performed to evaluate effect of whats app educational classroom (whats app group) on severity of symptoms and risk of fall.

- Patient was instructed that there will be another post evaluation test after another 3months

- Third meeting occurred after 6 months from enrolling in whats app educational classroom (group) where the researcher performed the second post evaluation test, and developed a final conclusion about patient condition and success of whats app educational classroom (group) and assure the patient that the group will continue to support the patient.

Statistical Analysis:

Data entry was done using a compatible personal laptop computer by the researcher. All data was entered into statistical packages for the social sciences (SPSS) version 16.0 software for analysis and excel for figures. The content of every tool was analysed, categorized and then coded by the researcher.Categorical variables were described by number and percent, where continuous variables described by mean and standard deviation (Mean, SD). Chi-square test and fisher exact test accustomed to compare between categorical variables where compare between continuous variables by t-test and anova test. A two-tailed test in which $p < 0.05$ was considered statistically significant.

Results

Table 1: Frequency distribution of demographic characteristics for (PD) patients (n= 100).

Variables	Studied patients	
	No	%
Age groups		
20< 30	19	18.8
30 < 40	7	6.9
40 <50	12	11.9
50≤ 65	62	61.4
Sex		
Male	43	42.6
Female	57	56.4
Marital status		
Single	21	20.8
Married	60	59.4
Divorced	1	1.0
Widow	18	17.8
Educational level		
Read and write	11	10.9
Primary school	9	8.9
Secondary school	4	4.0
High education	25	24.8
Others(institute)	51	50.5
Occupation		
Employed	26	25.7
Unemployed	66	65.3
Student	8	7.9

Living situations		
Live alone	3	3.0
Live with others	97	96.0
Residence		
Urban	66	65.3
Rural	34	33.7

Table 2: Frequency distribution of medical data for (PD) patients (n=100).

Variables	Studied patients	
	No	%
Present medical history		
Smoking		
yes	14	14.1
no	86	85.9
Family history of Parkinson's disease		
yes	46	45.5
no	54	53.5
Past medical history		
Diabetes type 2	31	30.7
Hypertension	52	51.5
Gastric problems	57	56.4
Hyperlipidemia	41	40.6
Head trauma	28	27.7

Table 3: Frequency and percentage distribution of Unified Parkinson Disease Rating Scale (UPDRS) for (PD) patients before implementing whats app educational classroom (n= 100).

Unified Parkinson Disease Rating Scale (UPDRS)	Normal No(%)	Slight No(%)	Mild No(%)	Moderate No(%)	Severe No(%)
Part 1: Non motor symptoms					
1. Intellectual impairment	21(21%)	16(16%)	43(43%)	13(13%)	7(7%)
2. Hallucinations and psychosis	36(36%)	20(20%)	23(23%)	18(18%)	3(3%)
3. Fatigue	3(3%)	8(8%)	33(33%)	42(42%)	14(14%)
4. Depression	28(28%)	10(10%)	35(35%)	22(22%)	5(5%)
5. Anxious mood	18(18%)	11(11%)	35(35%)	27(27%)	9(9%)
6. Apathy	51(51%)	9(9%)	27(27%)	11(11%)	2(2%)
7. Features of dopamine dysregulation syndrom	65(65%)	10(10%)	19(19%)	3(3%)	3(3%)
8. Sleep problems	24(24%)	8(8%)	23(23%)	39(39%)	6(6%)
9. Daytime sleepiness	31(31%)	22(22%)	25(25%)	17(17%)	5(5%)
10. Pain and other sensations	1(1%)	4(4%)	30(30%)	47(47%)	18(18%)
11. Urinary problems	32(32%)	12(12%)	35(35%)	13(13%)	8(8%)
12. Constipation problems	34(34%)	8(8%)	36(36%)	19(19%)	3(3%)
13. Light headedness on standing (orthostatic hypotension)	24(24%)	19(19%)	33(33%)	14(14%)	10(10%)
Part 2: Activities of daily living					
1. Speech	52(52%)	10(10%)	26(26%)	10(10%)	2(2%)
2. Salivation and drooling	51(51%)	19(19%)	22(22%)	6(6%)	2(2%)
3. Chewing and swallowing	43(43%)	19(19%)	28(28%)	7(7%)	3(3%)
4.Eating tasks	1(1%)	15(15%)	44(44%)	29(29%)	11(11%)

Unified Parkinson Disease Rating Scale (UPDRS)	Normal No(%)	Slight No(%)	Mild No(%)	Moderate No(%)	Severe No(%)
5. Handwriting.	11(11%)	12(12%)	28(28%)	24(24%)	25(25%)
6. Doing hobbies and other activities	1(1%)	18(18%)	35(35%)	32(32%)	14(14%)
7. Dressing	23(23%)	10(10%)	32(32%)	19(19%)	16(16%)
8. Hygiene	24(24%)	13(13%)	28(28%)	20(20%)	15(15%)
9. Turning in bed	27(27%)	15(15%)	35(35%)	17(17%)	6(6%)
10. Getting out of bed, a car, or a deep chair	22(22%)	15(15%)	35(35%)	23(23%)	5(5%)
11. Freezing	30(30%)	14(14%)	38(38%)	11(11%)	7(7%)
12. Walking and balance	14(14%)	16(16%)	41(41%)	23(23%)	6(6%)
13. Tremor	0(0%)	20(20%)	31(31%)	36(36%)	13(13%)
Part 3: Motor symptoms					
1. Speech difficulties	51(51%)	11(11%)	26(26%)	10(10%)	2(2%)
2.facial expression	45(45%)	14(14%)	19(19%)	21(21%)	1(1%)
3. Rigidity	24(24%)	18(18%)	34(34%)	17(17%)	7(7%)
4.finger tapping	43(43%)	22(22%)	24(24%)	7(7%)	4(4%)
5.hand movements	0(0%)	21(21%)	30(30%)	34(34%)	15(15%)
6.pronation-supination movements of hands	46(46%)	11(11%)	32(32%)	10(10%)	1(1%)
7. Toe tapping	38(38%)	11(11%)	27(27%)	19(19%)	5(5%)
8.leg agility	31(31%)	10(10%)	29(29%)	24(24%)	6(6%)
9.Arising from chair	22(22%)	15(15%)	35(35%)	23(23%)	5(5%)
10.Gait	22(22%)	27(27%)	39(39%)	8(8%)	4(4%)
11.Freezing of gait	30(30%)	14(14%)	38(38%)	10(10%)	8(8%)
12.Postural stability	20(20%)	20(20%)	38(38%)	18(18%)	4(4%)
13.Posture	31(31%)	21(21%)	32(32%)	13(13%)	3(3%)
14. Global spontaneity of movement (body bradykinesia)	18(18%)	44(44%)	20(20%)	13(13%)	5(5%)
15.Postural tremor of the hands	14(14%)	26(26%)	35(35%)	16(16%)	9(9%)
16.Kinetic tremor of the hands	14(14%)	18(18%)	35(35%)	21(21%)	12(12%)
17.Rest tremor amplitude	0(0%)	20(20%)	33(33%)	33(33%)	14(14%)
18.Constancy of rest tremor	0(0%)	22(22%)	35(35%)	34(34%)	9(9%)
Part 4: Motor complications					
Time spent with dyskinesia	30(30%)	17(17%)	27(27%)	17(17%)	9(9%)
. Functional impact of dyskinesia	31(31%)	16(16%)	26(26%)	18(18%)	9(9%)
Time spent in the off state	29(29%)	12(12%)	22(22%)	31(31%)	6(6%)
4.Functional impact of fluctuations	29(29%)	12(12%)	23(23%)	29(29%)	7(7%)
5.Complexity of motor fluctuations	29(29%)	12(12%)	22(22%)	29(29%)	8(8%)
6.Painful off-state dystonia	64(64%)	12(12%)	13(13%)	9(9%)	2(2%)

Table (4): Relationship Between Pre , Post (3 and 6 Months) after implementing whats app educational classroom according to Unified Parkinson Disease Rating Scale (UPDRS) for (PD) patients (n= 100).

UPDRS	Pre		Post 3 Month		Post 6 Month		Test Used	P.value
	No	%	No	%	No	%		
Non motor symptoms								
no non motor symptoms	0	0.0	0	0.0	2	2.0	97.02	<0.001**
Mild (1 to 10)	11	11.0	19	19.0	61	61.0		
Moderate (11-21)	38	38.0	61	61.0	21	21.0		
Sever (22 to 52)	51	51.0	20	20.0	16	16.0		
Mean±SD(range)	21.78±8.14(6-40)		16.55±7.92(1-45)		11.74±10.93(0-45)		30.44	<0.001**
Activities of daily living								

normal ADL	0	0.0	0	0.0	1	1.0		
Mild (1-12)	23	23.0	27	27.0	61	61.0		
Moderate (13-29)	49	49.0	57	57.0	23	23.0	45.59	<0.001**
Sever (30-52)	28	28.0	16	16.0	15	15.0		
Mean±SD(range)	23.13±10.91(3-50)		19.16±9.85(3-52)		14.26±12.44(0-49)		15.98	<0.001**
motor symptoms								
Mild (1-32)	56	56.0	81	81.0	83	83.0		
Moderate (33-58)	43	43.0	18	18.0	15	15.0	25.33	<0.001**
Sever (59-132)	1	1.0	1	1.0	2	2.0		
Mean±SD(range)	29.16±13.25(3-63)		23.39±11.96(3-69)		19.43±14.01(2-61)		13.95	<0.001**
Motor complications								
no complications	18	18.0	15	15.0	30	30.0		
Mild (1-4)	16	16.0	19	19.0	30	30.0	47.87	<0.001**
Moderate (5-12)	28	28.0	55	55.0	29	29.0		
Sever (13-24)	38	38.0	11	11.0	11	11.0		
Mean±SD(range)	9.1±6.87(0-24)		6.77±5.28(0-23)		4.63±5.66(0-24)		14.00	<0.001**

Chi square test for qualitative data between the two groups- One-way Anova T-test quantitative data between the Three groups or more *Significant level at P value < 0.05, ** Highly significant level at P value < 0.01

Table (5): Frequency and percentage distribution of Morse Fall Scale of the studied patients during pre/ post (3, 6month) after implementing of whats app educational classroom (No. 100).

	Pre		Post 3 Month		Post 6 Month	
Morse Fall Scale	No	%	No	%	No	%
History of Falling						
no	57	57.0	87	87.0	83	83.0
yes	43	43.0	13	13.0	17	17.0
Secondary Diagnosis						
no	36	36.0	37	37.0	37	37.0
yes	64	64.0	63	63.0	63	63.0
Ambulatory Aid						
None/bedrest/nurse assist	45	45.0	49	49.0	66	66.0
Crutches/cane/walker	47	47.0	43	43.0	27	27.0
Furniture	8	8.0	8	8.0	7	7.0
IV or IV access						
no	32	32.0	74	74.0	75	75.0
yes	68	68.0	26	26.0	25	25.0
Gait						
Normal/bedrest/wheelchair	28	28.0	28	28.0	57	57.0
Weak	59	59.0	65	65.0	36	36.0
Impaired	13	13.0	7	7.0	7	7.0
Mental Status						
Knows own limits	95	95.0	98	98.0	96	96.0
Overestimates or forgets limits	5	5.0	2	2.0	4	4.0

Table (6): Relationship Between Pre , Post (3 and 6 Months) after implementing whats app educational classroom according to Morse Fall Scale for (PD) patients (n= 100).

Morse Fall Scale	Pre		Post 3 Month		Post 6 Month		X2/F	P.Value
	No	%	No	%	No	%		
no risk of fall	2	2.0	5	5.0	16	16.0		
High Risk 45 and high	65	65.0	27	27.0	24	24.0		
Moderate Risk 25-44	24	24.0	48	48.0	23	23.0	71.94	<0.001**
Low Risk 1-24	9	9.0	20	20.0	37	37.0		
Mean±SD(range)	52.65±26.6(0-125)		34.95±21.64(0-110		30.45±29.79(0-125)		20.03	<0.001**

*Chi square test for qualitative data between the two groups - One-way Anova T-test quantitative data between the Three groups or more *Significant level at P value < 0.05, ** Highly significant level at P value < 0.01*

Table (1): shows that as regard Personal data the majority of age for studied patients ranged from 50 to 65 (61.4%) , more than half of them were Females and married (56.4% & 59.4%) respectively. Also, the majority of the studied patients were unemployed, reside in urban areas (65.3% &65.3%) respectively and almost all live with family members (96.0%). As regard to the educational level, it was found that about have of patients graduated from the institute (50.5%).

Table (2): Clarifies that as regard medical data most of the studied patients were nonsmokers with percentage (85.9%) and more than half had no family history of Parkinson's disease (53.5%). The highest percentage studied patients had gastric problems (56.4%).

Table (3); Clarifies that considering non motor symptoms the highest percentage of patients suffer from moderate to severe pain or extreme cold or hot sensations (47.0% & 18.0%) respectively, followed by moderate to severe fatigue (42.0% & 14.0%). As regard activities of daily living a quarter of patients had sever difficulty in handwriting (25.0%) followed by severe difficulty in performing dressing, hygiene and eating tasks(16.0%, 15.0% & 11.0%) respectively. Not to mention that more than have can speak normally . in the light of motor symptoms about third of studied patients suffer from moderate resting tremor (33.0%) as main cardinal symptoms of (PD). As for motor complications the highest percentage of studied patients suffered from moderate motor fluctuations (31.0%).

Table (4); Illustrates that there was a highly statistical significance difference as regard severity of symptoms and motor complications among the studied patients in pre / post (3 and 6 months) after implementation of whats app educational classroom.

Table (5); shows that during three times of patients assessment and follow up there was fluctuations in the management and improvement in risk of falling that illustrated in the following : more than half (57.0%) of studied patients had no history of falling in pre assessment that significantly increased in to (87.0%) in post 3 month but return to decrease in the post6 month follow up to (83.0%),but Mental Status awareness percentage fluctuated (95.0, 98.0 & 96.0) respectively.

Table (6); Illustrates that there was a statistical significance difference as regard to risk of fall among the studied patients in pre / post (3 and 6 months) after implementation of online educational class room.

Discussion

There is an increasing trend in the use of whatsapp application within clinical settings. This method is being considered as a valuable tool for delivering educations, emphasizing the need for effective classrooms to provide such care to improve patient outcomes[22].

The goal of WhatsApp educational classroom is to achieve maximum functional independence,

safety,and wellbeing [15].

Regarding demographic characteristics of the patients; the current study revealed that; the majority of studied patient their age more than fifty-three in which these findings supported by Ranjan& Rai., (2024) who reported that the mean age of patients were more than fifty three, [38] but this study disagree with Roohani et al., (2011) who reported that the mean age of Parkinson's patients were more than sixty five as researcher studied different age group range (16-99) years and different region (Iran) while in this study majority of patient ranged from 50 to 65 and study conducted in Egypt [39].

The current study revealed that, more than half of studied sample were female and married, this result was congruent with González-Zamorano et al., (2024) [16] who mentioned that about 63.4 % were female. Also disagree with a study conducted by Clementino et al., (2021) who revealed that 65.6% of participants were male , this may be due to higher male exposure to environmental factors like heavy metals compositions difference in china[9]. In the same time Clementino et al., (2021) agreed that more than half of the studied patients were married[9].

In relation to education and occupation, living situations and residence the present study revealed that the highest percentage of studied patients were unemployed graduated from the institute, live in urban areas and almost all live with family members.This study finding was in the same line with a study conducted by Rafferty et al., (2021) who founds that urban areas show a higher prevalence of PD, particularly among lower-income graduates, which correlates with increased unemployment rates[36],while Heimrich et al., (2023) mentioned that most individuals with PD live with family[19]. Also disagree with Gustafsson et al., (2015) who stated that 24% of higher graduated remaining employed after ten years of diagnosis[18].

From the researcher opinion; Parkinson's was prevalenced in the study among married women above 50 years due to reaching menopause age that cause drop in estrogen hormone level that used to provide protection from PD, also physical and cognitive symptoms of PD could lead to unemployment, an acceptable level of education and dependence on others, not to mentions all environmental factors in urban areas.

Regarding medical data; the result of the present study revealed that highest percentage of the studied patients have past history of gastric problems. These finding supported by Demailly et al., (2024) who stated that About 65% of PD patients report GI dysfunction, including constipation, delayed gastric emptying, excessive salivation, malnutrition and dysphagia [11].But dis agree with Majhi et al., (2022) who mentioned that approximately 89.74% of PD patients have undergone at least one surgery in their lifetime, with a significant correlation to cranial or brain surgeries, this could be related to likelihood of developing (PD) as a common risk factor rather than GI dysfunction[26] .

The current study; revealed that a significant majority of patients were nonsmokers with more than half didn't had family history of Parkinson's disease. This study in line with Hershey & Perlmutter., (2014) who stated that there is an inverse relationship between smoking and PD, indicating that smokers have a lower risk of developing the disease compared to nonsmokers, suggesting a potential protective effect of smoking against PD[20] . While Arienti et al., (2024) mentioned that the absence of a family history in over half of the patients suggests that environmental factors may play a more significant role in the etiology of PD[3] .

On the other hand this finding contradicted by YÜCEL et al., (2024) who demonstrated that family history is noted in of PD patients, with first-degree relatives showing a higher risk, and this because it is presenting earlier than sporadic cases[49] while Majeed & Hassin., (2024) in the line of smoking mentioned that smoking is associated with increased oxidative stress and inflammation in PD patients, leading to mitochondrial dysfunction which develop or worse PD conditions[25].

From the researcher opinion; The relationship between the central nervous system and the enteric nervous system (ENS) contributes significantly to

development of (PD) in patients, presence of Lewy bodies in the ENS can disrupt normal gastrointestinal function [40], and because of our Egyptian society traditions that but restrictions on female about smoking who represent significant majority in our study. that's also applied to no family history of disease which mean cause mostly environmental not genetic in which male commonly exposed as in construction and mining jobs which is not suitable for female .

Regarding severity of symptoms; study result represented that, the highest percentage of the studied sample had moderate to severe pain followed by fatigue as non-motor symptoms that supported by Nogueira et al., (2024) who stated that Patients with Parkinson's disease (PD) often report chronic pain, which is one of the most complex non-motor symptoms [34] and with Diaconu et al., (2024) which report lower prevalence rates of fatigue , such as 46.54% [16]. This contrasts with Minibajeva et al., (2023) that reported among the studies reviewed, the highest percentage of patients experiencing fatigue was found in a cohort study from Latvia, where 95.3% of participants reported fatigue as a non-motor symptom followed by pain . That's because of using the Parkinson's Fatigue Scale, and also stated that more than half of patients can speak normally while a highest percentage had sever difficulties in performing activity of daily living as (handwriting, dressing and hygiene) respectively[30] . Likewise Manchev et al., (2015) were in the same line as they pointed that speech impairments are present in 41.9% of PD patients, indicating that more than half can speak normally[28] .

This finding disagree with Savić, G., (2017) who reported that despite the ability to speak, the quality of speech may still be affected, with issues in phonation and articulation being common, this may be due to studding patients at late stage of the disease[43]. While Sage, . J., (2016) agreed that A high percentage of PD patients experience severe difficulties in ADL, particularly in handwriting, dressing, and hygiene and many patients lose independence in ADL[41]. This finding is contradicted with Yilmaz et al., (2023) who mentioned that Approximately 66.3% of PD patients maintain independence in ADLs which clarifies as

low levels of nonmotor symptom severity correlate with increase performance in ADLs [48] .

In consideration to motor symptoms the study reveal that the highest percentage of patients had moderate to severe resting tremors. This finding agreed with Gupta et al., (2020) who reported that approximately 58.2% of PD patients exhibit sever resting tremors[17], on the contrary Fernandez et al., (2016) stated that the severity of resting tremors can vary, indicating that 78% of patients with mild tremors this caused by treatment with levodopa-carbidopa intestinal gel[14] .

The study finding showed that the highest percentage of studied patients had moderate complexity in motor fluctuation which is supported by Cardoso & Tolosa., (2024) [7], but disagreed by Carpi et al., (2023) who stated that one-third of patients reporting non-motor fluctuations clarifying that because focus is often on motor fluctuations, the treatment of non-motor symptoms suggests a more complex clinical management landscape for PD patients[8].

Regarding impact of whats app educational classrooms on severity of symptoms; the result of the present study reported that there was a statistical significant difference pre/post implementation of whats app educational classrooms regarding severity of symptoms. This finding supported by Ali & Hussein., (2020) who found that an education program led to a notable reduction in daily OFF hours and improvements in both motor and non-motor symptoms, indicating the effectiveness of structured educational approaches with UPDRS scores decreasing significantly[1].

From the researcher opinion; after education and discussion about PD via WhatsApp, there was a significant decrease in severity of symptoms which could be related to mental and psychological improvements that comes from interactions with other members sharing experience and receive emotional support, while patients feel privacy in their comfortable zone.

Regarding risk of fall; the study showed that almost all study patients were aware and understand own limits and more than half had no risk of fall which

increased at3and 6 month of follow-ups to (87.0% and 83.0%) respectively. In accordance with current study results Majid et al., (2024) support this finding as they stated that a significant majority of PD patients demonstrated awareness of their symptoms and limitations, that was essential as patients also reported no risk of fall [27] . This results disagree with Nguyễn et al., (2024) who reported a significant portion of PD patients still face risks, such as falls, that may be related to age and disease progression[33] . Also with Siciliano et al., (2021) demonstrating that PD patients frequently overestimated their cognitive abilities compared to objective measures, with 13.33% classified as "Overestimators", This overestimation correlates with a lack of awareness of cognitive deficits, that is prevalent in neurological conditions like PD[44].

Regarding impact of whats app educational classrooms on risk of fall; the study result stated that there was a statistical significant difference pre/post implementation of whats app educational classrooms regarding risk of fall. This finding agree with Oh et al., (2024) who mentioned that an educational program significantly increased fall prevention knowledge, behavior, and efficacy among patients, with all results showing statistical significance (p < .001) [35]. likewise Mutrika, & Hutahaean., (2022) who reported an educational intervention increased patient perception of fall risk, with 86% of participants showing improved understanding and a 91% increase in knowledge[32] .

From the researcher opinion; whats app educational classrooms enhance patients' knowledge about environmental hazards, and behavior regarding fall prevention, leading to improved outcomes.

 it is important to consider the variability in program design and patient populations. Also using whats app as a method of delivery, increases patient engagement, and specific health conditions.

Conclusion:

The study findings supported all research hypotheses as it had been proven that there was an improvement in patients outcomes(reduction on severity of symptoms and risk of fall) after six months from enrolment in whatapp groupsin which the severity of symptoms and risk of fall were decreased among patients who enrolled in WhatsApp educational classroom.

Recommendations:

Using zoom applications to have face to face interactions with all Parkinson's patients all at the same time in conference meeting, creating AI mobile application containing tips and advices about that chronic disease or help them to monitoring their symptoms all the time.

Abbreviations

PD: Parkinson's disease

UPDRS: Unified Parkinson Disease Rating Scale

MSF: Morse Fall Scale

AI: Artificial intelligence

Declaration

Ethics approval and consent to participate:

Research proposal was approved from Ethical Committee within the Faculty of Nursing , Assiut university with the ethical code number(1120240877). There is no risk for study subject during application of the research. The study was following common ethical principles in clinical research. Oral and written consent was obtained from patient or guidance that is willing to participate within the study, after explaining the nature and purpose of the study. Written consent, It was written in Arabic as the target population were Egyptians.Confidentiality of the subject data was assured. They were informed that participation is voluntary and that patients could withdraw at any time of the study. Anonymity was considered during collection of data.

Consent for publication:

No personal or private data was included in the research study

Availability of data and materials:

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interest:

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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