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Original Article

Effect of Pedometer Telenursing Instructions on Steps Count and Pulse Rate in Atrial Fibrillation Patients

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ABSTRACT

Background: Atrial fibrillation is the most frequent and well-managed arrhythmia in the world. Regular physical activity and exercise training are essential for secondary prevention of cardiovascular illnesses. Despite recent developments in holistic treatment pathways for patients with atrial fibrillation, pedometers have lately received attention as an effective tool in the promotion of physical activity. Therefore, **the aim of the study** was to evaluate the effect of pedometer telenursing instructions on steps count and pulse rate in atrial fibrillation patients. **Subject and Methods:** A quasi-experimental research design was carried out in the cardiovascular outpatient at Ain Shams and Suez-Canal UniversityHospitals. **Subject:** In this study, a convenient sample of 110 adult patients split into two equal groups "study and control" was enrolled. **Tools:** This study employed two tools: tool (I), a structured interview questionnaire to assess personal and clinical data of patients, & tool (II) a steps count and pulse rate monitoring record. **Results:** Mean±SD of steps count and pulse rate in the study group were (3585.3 ±1689.6, 4282.5±2005.3, 6400.3±2759.6) and (76.6 ±14.8, 71.0 ±8.6, 70.6 ±5.4) at the pre/post and follow-up instructions respectively with statistically significant difference between the study and the control groups at the post and follow-up phases. **Conclusion:** There was a statistically significant positive effect of pedometer telenursing instructions on steps count and pulse rate stability in atrial fibrillation patients. **Recommendation:** Design audiovisual materials about aerobic exercises that the patient with atrial fibrillation should practice to be presented during patient waiting times.

Keywords: Atrial fibrillation, Pedometer, Pulse Rate, Steps Count, Telenursing.

Introduction:

The most common clinical arrhythmia, atrial fibrillation (AF), has an increasing worldwide burden that contributes to an increase in hospitalizations and high healthcare costs. According to rates, AF occurs in around 3% of adults 20 years of age or older, with prevalence rising with age and in patients with associated conditions such as hypertension, heart failure, coronary artery disease, valvular heart disease, obesity, diabetes mellitus, and chronic kidney disease **(Elzeky et al., 2018)**. Arrhythmias can be caused by some medicines, such as those used to treat coughs and colds without a prescription, as

well as electrolyte imbalances such as potassium, sodium, calcium, and magnesium, which assist in triggering and sending electrical impulses in the heart. Furthermore, excessive alcohol use might disrupt electrical impulses, resulting in arrhythmias **(Chung et al., 2020)**

Cardiac arrhythmias are classified as bradyarrhythmias, tachyarrhythmia, and life-threatening cardiac arrhythmias, which comprise (AF), atrial flutter, supraventricular tachycardia, ventricular fibrillation, ventricular tachycardia, and ventricular tachycardia with systole **(Ameen et al., 2021)**. Cardiac arrhythmias may not produce any symptoms. Arrhythmias, in general, can cause fluttering in the chest, tachycardia or bradycardia, chest discomfort, and shortness of breath. In addition anxiety, weariness, dizziness, sweating, and fainting or near-fainting are also symptoms **(Huang & Miller, 2020).**

Cardiovascular diseases were responsible for 16 million deaths worldwide including dysrhythmias **(Jacob et al., 2018)**. AF is the most frequent dysrhythmia, affecting at least 2.3 million people in the United States alone. The origin of AF is unknown, however several variables, including neuroendocrine function, acute or chronic hemodynamics, and metabolism, may trigger atrial remodeling and have a role in the onset and development of AF. Paroxysmal atrial fibrillation occurs when a fast, unpredictable heart rate starts unexpectedly and ends naturally or with intervention within 7 days. It is also known as intermittent AF since it usually lasts less than 24 hours. According to the American Heart Association, 2.7 million Americans have some kind of AF **(Al Awady et al., 2022)**.

The most recent successful treatment of arrhythmias is based on rapid diagnosis and management, which frequently necessitates a multimodality procedure that may include synchronous electrolyte and pH correction, pharmacological measures for rate control, pressors, precise antiarrhythmic therapeutic drugs, electrical pacing, or cardioversion **(Baird, 2023)**. The European Society of Cardiology guidelines for the diagnosis and management of AF emphasize the importance of cardiopulmonary exercise testing and cardiorespiratory fitness, and state that "patients should be encouraged to engage in moderate-intensity exercise and remain physically active to prevent AF incidence or recurrence" **(Hindricks et al., 2020)**.

Pedometers are designed to detect vertical movement at the hip enabling the counting of steps and estimation of the distance walked (**Coelho et al., 2017**). The use of pedometers, which are inexpensive and easy to use, encourages monitoring and improving daily physical activity (PA) levels and enables an immediate, ongoing evaluation of daily PA targets, has recently been recognized as a valuable intervention in the promotion of PA. They need less work and are suitable for the majority of daily activities. Telenursing instructions have been shown to result in favorable improvements in health behaviors. This has included greater physical activity, a healthier diet, smoking cessation, and improved chronic disease management **(Lewis et al., 2020)**.

Telenursing refers to the delivery, administration, and coordination of care and services via information and telecommunications technology. This technology enables faster access to better services, lowers costs, facilitates simple access to the most relevant specialized talents, and improves the quality of healthcare delivery to patients. Furthermore, WhatsApp can provide comprehensive tele-nursing training and remote consultation for patients and their caregivers (**Kord et al., 2021**).

The importance of critical care nurse specializing in dysrhythmia management lies in their training for symptomatic relief, comfort promotion, and emergency actions in fatal dysrhythmias, which include assessing the disturbed rhythm, obtaining a 12-lead ECG to identify the type of dysrhythmia, and maintaining adequate oxygen to reduce heart workload **(Urden et al, 2020)**. In addition, when administering medications as directed, the nurse should monitor for potential adverse drug responses and provide targeted nursing care. The nurse should execute timely and secure defibrillation and other cardiac life support techniques in circumstances such as ventricular fibrillation and cardiac arrest to maintain oxygen delivery to essential organs **(Lough et al., 2020)**.

Significance of the study:

Arrhythmias affect around four million persons in Egypt **(Statistics by Country for Arrhythmias, 2022)**. Furthermore, 230 patients were hospitalized at Ain Shams and Suez-Canal University Hospitals in Egypt from the first of February 2023 to the end of May 2023 owing to AF illness according to **(Annual Statistic of Ain Shams & Suez-Canal University Hospitals, 2023)**. The magnitude of the study is to decrease morbidity, mortality, financial expenditures, and length of hospital stay. Hence, this research was carried out in order to evaluate the effect of pedometer telenursing instructions on steps count and pulse rate of atrial fibrillation patients.

Walking exercise is a simple and safe type of isotonic training that can be used to reduce pain, improve joint function, and increase muscle strength even in the most seriously ill patients who are overweight, ultimately helping to improve functional capacity, health status, and social comfort. Simple and inexpensive pedometers are typically thought to be useful for patients since they offer a summary of daily steps and enhance exercise tolerance **(Gucuk & Erkuran, 2020)**.

Aim of this study:

The study aimed to evaluate the effect of pedometer telenursing instructions on steps count and pulse rate in atrial fibrillation patients.

Operational definitions:

Pedometers: These are basic technology that records an individual's daily steps and pulse rate.

Telenursing: Providing consultation for patients and their caregivers using social media and telephone applications.

Hypothesis:

H_1: Pedometer telenursing instructions may have a significant effect on adjusting the steps count and pulse rate in atrial fibrillation patients.

Subject and Methods

Design of research: Quasi-experimental research design were utilized to fulfill the aim of this study which attempts to determine a causal relationship by applying intervention to one group and comparing the outcome with a control group and the sample was selected non-randomly (Polit &Beck, 2020).

Research setting: This research was carried out at the Cardiovascular Outpatients at Ain Shams and Suez Canal UniversityHospitals.

Research subject: Ultimately, 110 adult male and female AF patients made up the convenient sample after a 10% dropout of patients who refused to complete the study or disappeared for any other cause. The sample patients were divided into two equal groups randomly, with 55 patients receiving both standard hospital treatment and the planned pedometer-based telenursing instructions in the study group and 55 adult patients receiving only standard hospital care in the control group.

Sample size:

The sample size may be determined by using the following method, which is based on data from the literature **(Elzeky et al., 2018)** and takes into account a level of significance of 5% and a power of research of 80%:

$$n = \frac{(Z\alpha/2 + Z\beta)^2 \times 2(SD)^2}{d^2}$$

where, SD = standard deviation obtained from the previous study; Zα/2, for 5% this is 1.96; Zβ, for 80% this is 0.84 and d, for the expected difference. Therefore,

$$n = \frac{(1.96 + 0.84)^2 \times 2(8.79)^2}{(4.7)^2} = 54.8$$

According to the calculation above, 55 samples were needed for each group. The following factors were taken into consideration while choosing the research participants: Adult patients, aged 20 to 60 years old, with AF, diagnosed for at least six months who are willing to participate in the study. Every participant had at least one ECG-documented episode of AF, was a conscious patient with communication skills, and had an Android Smartphone for follow-up through the Pedometer-Step Counter App. Patients with mental illnesses, associated conditions that restrict physical activity, such as stroke, lung disease, morbid obesity, and patients undergoing surgical procedures were among the exclusion criteria.

Tools of data collection: Two tools were utilized in order to gather data for the current study.

Tool (I): Structured Interview Questionnaire:

The researchers created it by using basic Arabic language after reviewing significant and recent literature **(Hinkle et al., 2022)**. It included two parts that needed 5-0 minutes to be completed:

1st Part: Demographic data of the studied patients: It included six items regarding age, gender, marital status, degree of education, residency, and occupation.

2nd Part: Clinical characteristics: It included five items with regard to duration of AF, type of AF, associated symptoms, co-morbid diseases, and medication use.

Tool (II): Steps count and pulse rate monitoring record: It was adapted from **(Elzeky et al., 2018)**, and included two parts that needed 5-10 minutes to be completed:

1st Part: The steps count record that was monitored and recorded by the patients through the pedometer and documented by the patients with feedback for the change in steps count by WhatsApp program and documented by the researchers in the monitoring record.

Scoring system: The scoring levels were categorized as follows:

Normal steps count: It should range from 8000–10,000 steps per day.

Below normal steps count: If steps count below 8000 per day.

Above normal steps count: If steps count above 10,000 per day. **(El-Zeky et al., 2018).**

2nd Part: Pulse rate record that was monitored by patients through telephone application and reported to the researchers through WhatsApp to be recorded in the monitoring record.

Scoring system:

Normal pulse: For healthy adults ranges from 60 to 100 beats per minute.

Bradycardia: If the heart rate is below 60 beats per minute.

Tachycardia: If the heart rate is above 100 beats per minute. **(Hinkle et al., 2022).**

Ethical considerations:

Ethical approval was obtained from the research ethics committee of the Faculty of Nursing at Suez Canal University code (201/2/2023). Official approval was obtained by the researchers from the hospitals' and facilities" official managers to direct the research. Patients were asked to affirm their permission in writing, including their right to remain in the research or to withdraw from it at any time. The study's benefits and drawbacks were explained by the researchers along with the intended patient outcomes.

Tools Validity and Reliability

A panel of seven specialists in cardiac medicine and medical-surgical nursing evaluated the tools' content validity, finding that they were clear, relevant, thorough, easy to fully comprehend, applicable, and simple to administer. No changes were required. For tools reliability, Cronbach's alpha value of both the questionnaire, and mean steps count was 0.902, and of the pulse rate was 0.896.

Pilot study

To evaluate the usefulness and clarity of the suggested tools, a pilot study including 11 patients, or 10% of the overall research population, was conducted. Those patients were part of the main results since no changes were made. It was put into effect at the beginning of March 2023.

Fieldwork:

The data collection started from the middle of March 2023 to the middle of August 2023. Every week, the researchers were accessible for four days. The researchers contacted patients through scheduled phone appointments after their discharge from the clinic to ensure the continuity of pedometer telenursing instructions and address any questions regarding the explained instructions. The study patients met in the waiting area of the

Cardiovascular Outpatient affiliated with Ain Shams and Suez-Canal University Hospitals. Four stages were used to carry out the study's application: assessment, planning, implementation, and evaluation.

Assessment phase: In accordance with the allowing specifications, the researchers began to enroll the patients to be investigated. All of the data-gathering techniques were used to conduct individual interviews with those who provided written consent. The data collected acted as preintervention or baseline data and helped the researchers prepare pedometer telenursing instructions.

Planning phase: Making use of the assessment findings and relevant literature, from **(Bittner et al., 2021, Bowie, 2021 & Baird, 2023)**, the researchers designed a pedometer telenursing instructions to train the studied patients and improve their steps count and pulse rate. The pedometer telenursing instructions included a theoretical and a practical part.

Implementation phase: During a period of six months, the researchers made four weekly visits to the study settings, from 9:00 am to 2:00 pm. The researchers divided the study group into subgroups with 5-6 patients in each. Pedometer telenursing instructions were presented by the researchers with purchasers that included images to the study group and their caregiver, who asked the studied patients to download the pedometer steps counter application then feedback was obtained by the researchers through WhatsApp.

The theoretical part was implemented through four sessions, with each session taking around 15 - 45 minutes. A simple explanation that included AF meaning, manifestations, causes, risk factors, complications, and the importance of a pedometer, physical exercises, and telenursing instructions was done by the researchers using brochures and videos.

The practical part included demonstration and redemonstration of pedometer telenursing instructions till the patients' adequate practice level was attained. It was implemented through eight sessions, and each session took around 45- 60 minutes. During the trial period, the patients in the control group did not take part in pedometer telenursing instructions, and they were given ordinary hospital care only which also involved reviewing the patient's medical history, doing a physical exam, addressing the patient's questions, providing information on the dosage of marivan and INR monitoring, providing comments on the findings, providing written educational materials about the diet of cardiac patients, and administering the patient's medications. The primary goal of the walking exercise was to i ncrease patients' average daily st p counts by 3,000 cumulative aerobic steps over t heir baseline value on five Days or more per week. In order to gradually increase from the baseline st eps per day for weeks 2 through 12, patients were given weekly targets for their unique daily step c ounts.

Patients were trained to walk at a speed of 100 ste ps per minute, which caused a mild, perceptible i ncrease in breathing depth and rate while enablin g patients to speak with minimal effort.

The second goal is to achieve baseline and aerobic walking steps of 8000–10,000 per day. Weekly phone follow-up: The patient receives a call every week that lasts 10 to 15 minutes and is intended to record their previous day's step count reading, give them feedback on their readings, give them their new step count goals, discuss with them any obstacles to using a pedometer or walking, and encourage them to walk more.

Step count and pulse rate were measured at the beginning, fourth, eighth, and twelfth weeks in the study group in order to analyze the impact of the pedometer telenursing instructions, whereas only the first and twelfth weeks were measured in the control group.

Evaluation phase: This phase was done through steps count and pulse rate measuring to the study and control groups immediately after pedometer telenursing instructions implementation and follow-up after two months using the same study tools.

Administrative design:

After the explanation of the study's aim and objectives, official permission was obtained from the general manager of Ain Shams and Suez-Canal University Hospitals, and approval was obtained from the director of the cardiovascular outpatient clinic.

Statistical design:

Version 25.0 of SPSS for Windows was used to conduct the statistical analysis (SPSS, Chicago, IL). Standard deviation (SD) and mean (±) were used to express normally distributed continuous data. Numbers and percentages were used to convey categorical data. With continuous data, the one-way analysis of variance (ANOVA) test was utilized to compare more than two variables. The chi-square test was utilized to compare variables with categorical data, or the Fisher's exact test if appropriate. With continuous data, correlations between two variables were examined using the correlation coefficient test. Calculations were made about the reliability (internal consistency) test of the study's questionnaires. At $p<0.05$, statistical significance was established.

The researchers utilized these statistical designs to determine that pedometer telenursing instructions may have a significant effect on adjusting the steps count and pulse rate in atrial fibrillation patients.

Result:

Table (1): shows that the research group's mean age was 52.1 ± 6.2, and 53.8 ±5.6 years old among the control group. Females were more common as they represented 60.0% of the study group and 63.6% of the control group. While 80.0% of the participants are married inthe study group and 81.8% of the control group. Concerning educational level, illiteracy was dominant among 69.1% and 72.7% of both groups respectively. 70.9% and 76.4% of both groups respectively are living in rural areas. Regarding occupation, 81.8% and 83.6% of the study and control groups respectively didn't have work. These results present without statistically significant difference between the study and control groups of all personal data (P> 0.05).

Table (2): shows that 65.5% of the study

group and 58.2% of the control group had AF for 2- <4 years, almost all patients of both groups 90.9%, and 85.5% respectively were diagnosed with permanent AF. Regarding associated symptoms, the majority of patients 89.1% in the study and 87.3% of the control groups had fatigue respectively. In the control group, hypertension was more common 70.9% than in the study group 56.4% as a comorbid disease with no significant difference. Regarding medications group use, 94.5%, and 100.0% of the study group in addition to 90.9% and 98.2% of the control group were on rate control and anticoagulation therapy correspondingly with no significant difference. Regarding all clinical data, the findings indicate no statistically significant difference between the two groups.

Table (3): reveals no statistically significant difference between the study and control groups in the pre-intervention phase concerning the step count and pulse rate. However, during the post-intervention and 2-month follow-up phases, there is a statistically significant difference between the study and control groups. The table also shows a statistically significant difference in the mean steps count and pulse rate post-intervention with the highest improvement at the follow-up phase.

Table (4): represents no statistically significant association between the personal data of the studied patients and the total mean score for steps count and pulse rate at the post-intervention and at the follow-up phase after 2 months; except in the relationship between occupation and the total mean score for steps count at the post-intervention phase, there was a statistically significant difference with (P=0.038*).

Figure (1): clarifies a statistically significant positive correlation between mean steps count and pulse rate for the study group at post–intervention (R=0.306, P=0.023*).

Figure (2): illustrates a statistically significant positive correlation between mean steps count and pulse rate for the study group at follow-up after 2 months (R=0.288, P=0.033*).

Table (1): Percentage distribution of the studied groups according to demographic data (N=110)

Demographic Data	The studied groups				Chi-Square / Fisher's exact test	
	Study Group N=55		Control Group N=55			
	N	%	N	%	X^2	P value
Age (Years)						
30 – < 50	7	12.7	5	9.1		
50 – 60	48	87.3	50	90.9	0.374	0.541
Mean ±SD	52.1 ±6.2		53.8 ±5.6		1.548	0.125
Gender						
Male	22	40.0	20	36.4		
Female	33	60.0	35	63.6	0.154	0.695
Marital Status						
Single	11	20.0	10	18.2		
Married	44	80.0	45	81.8	0.059	0.808
Educational Level						
Illiterate	38	69.1	40	72.7		
Read / Write	8	14.5	9	16.4		
Secondary	6	10.9	4	7.3		
University	3	5.5	2	3.6	0.710	0.871
Place of Residence						
Urban	16	29.1	13	23.6		
Rural	39	70.9	42	76.4	0.421	0.516
Occupation						
Not Working	45	81.8	46	83.6		
Working	10	18.2	9	16.4	0.064	0.801

Table (2): Percentage distribution of studied groups according to clinical characteristics (N=110)

Clinical Characteristics	The studied groups				Chi-Square / Fisher's exact test	
	Study Group N=55		Control Group N=55			
	N	%	N	%	X^2	P value
Duration of AF						
< 2 years	7	12.7	9	16.4		
2 - < 4 years	36	65.5	32	58.2		
4 or More years	12	21.8	14	25.5	0.639	0.726
Type of AF						
Paroxysmal	2	3.6	3	5.5		
Persistent	3	5.5	5	9.1		
Permanent	50	90.9	47	85.5	0.793	0.673
Associated Symptoms						
Dyspnea	41	74.5	45	81.8	0.853	0.356
Palpitations	42	76.4	44	80.0	0.213	0.644
Chest pain	12	21.8	14	25.5	0.201	0.654
Drowsiness	37	67.3	44	80.0	2.295	0.130
Fatigue	49	89.1	48	87.3	0.087	0.768
Insomnia	28	50.9	27	49.1	0.036	0.849
Comorbid Diseases						
Hypertension	32	58.2	39	70.9	1.947	0.162
CAD	15	27.3	13	23.6	0.192	0.662
Rh heart disease	24	43.6	17	30.9	1.905	0.167
Valvular disease	31	56.4	22	40.0	2.949	0.085
DM	9	16.4	5	9.1	1.310	0.252
Medications Group Use						
Rate Control	52	94.5	50	90.9	0.539	0.463
Rhythm Control	1	1.8	3	5.5	1.038	0.308
Anticoagulation Therapy	55	100.0	54	98.2	1.009	0.315

Table (3): Distribution of the studied groups in relation to mean scores of steps count and pulse rate (N=110)

Steps count and pulse rate	Study Group N=55	Control Group N=55	Student's T – Test	
	Mean ±SD	Mean ±SD	T	P value
Mean Step Count				
Pre – Intervention	3585.3 ±1689.6	3306.2 ±1613.3	0.886	0.377
Post – Intervention	4282.5 ± 2005.3	3358.1 ±1622.3	2.657	0.009*
Follow – Up	6400.3 ±2759.6	3486.5 ±1662.5	6.707	<0.001**
One-way ANOVA	T=24.471, P<0.001**	T=0.177, P=0.837		
Mean Pulse Rate				
Pre – Intervention	76.6 ±14.8	74.0 ±12.9	0.997	0.321
Post – Intervention	71.0 ±8.6	74.9 ±11.3	2.036	0.041*
Follow – Up	70.6 ±5.4	75.1 ±6.1	4.090	<0.001**
One-way ANOVA	T=5.763, P=0.004*	T=0.171, P=0.843		

Table (4): Association between the personal data of AF patients and mean steps count and pulse rate for the study group post intervention and follow-up after 2 months (N=55)

Personal data	Steps Count		Pulse Rate	
	Post – Intervention	Follow – Up after 2 months	Post – Intervention	Follow – Up after 2 months
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD
Age (Years)				
30 – < 50	5002.0 ±2438.8	7278.3 ±3158.3	65.0 ±8.7	67.1 ±5.4
50 – 60	4074.4 ±2015.5	6272.3 ±3072.5	70.9 ±10.5	71.1 ±5.3
Student's T – Test	T=1.109, P=0.272	T=0.806, P=0.423	T=1.429, P=0.159	T=1.822, P=0.074
Gender				
Male	4292.8 ±1827.8	6728.0 ±2962.4	72.0 ±11.3	72.1 ±4.5
Female	3721.7 ±1669.5	6392.0 ±2674.6	68.9 ±9.7	69.5 ±5.8
Student's T – Test	T=1.197, P=0.237	T=0.437, P=0.664	T=1.063, P=0.293	T=1.790, P=0.079
Marital Status				
Single	3810.3 ±1777.9	6894.6 ±2715.0	67.9 ±12.1	70.0 ±5.7
Married	3985.1 ±1750.6	6434.4 ±2808.2	70.8 ±10.0	70.7 ±5.4
Student's T – Test	T=0.295, P=0.769	T=0.489, P=0.627	T=0.810, P=0.422	T=0.382, P=0.704
Educational Level				
Illiterate	3713.5 ±1704.9	6482.2 ±2586.7	69.3 ±10.4	70.5 ±5.5
Read / Write	5273.1 ±1305.7	6804.6 ±2864.7	70.0 ±11.8	70.5 ±5.7
Secondary	4118.3 ±2018.2	6920.2 ±2958.8	73.5 ±7.9	70.8 ±5.0
University	3083.3 ±915.1	5558.0 ±2665.9	75.3 ±13.6	71.0 ±8.2
One way ANOVA	F=2.228, P=0.096	F=0.207, P=0.890	F=0.532, P=0.662	F=0.013, P=0.998
Place of Residence				
Urban	3704.5 ±1766.6	6195.1 ±2783.3	67.5 ±11.1	69.8 ±5.1
Rural	4050.9 ±1743.3	6662.4 ±2791.0	71.3 ±10.0	70.9 ±5.6
Student's T – Test	T=0.667, P=0.508	T=0.564, P=0.575	T=1.234, P=0.223	T=0.709, P=0.482
Occupation				
Not Working	3722.0 ±1662.8	6430.8 ±2784.8	70.1 ±10.4	70.5 ±5.4
Working	4976.7 ±1798.9	6957.0 ±2812.7	70.5 ±10.6	70.8 ±5.8
Student's T – Test	T=2.128, P=0.038*	T=0.540, P=0.592	T=0.106, P=0.916	T=0.151, P=0.881

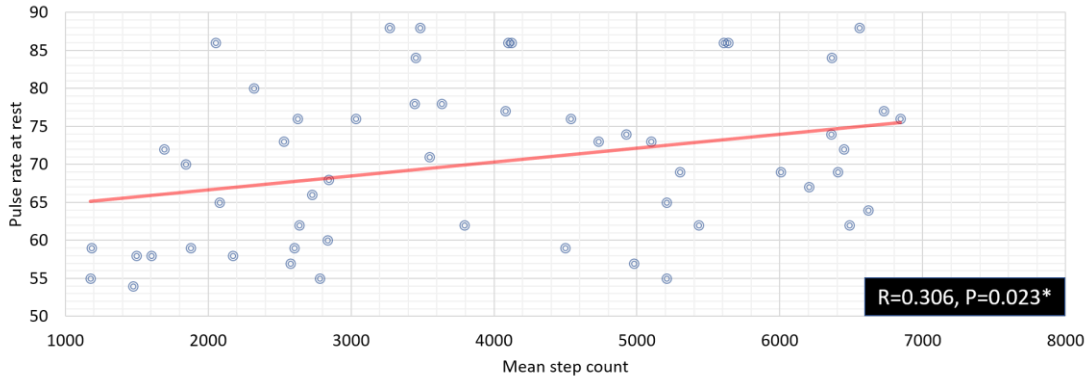

Figure (1): Correlation between mean steps count and pulse rate for study group at post-intervention phase

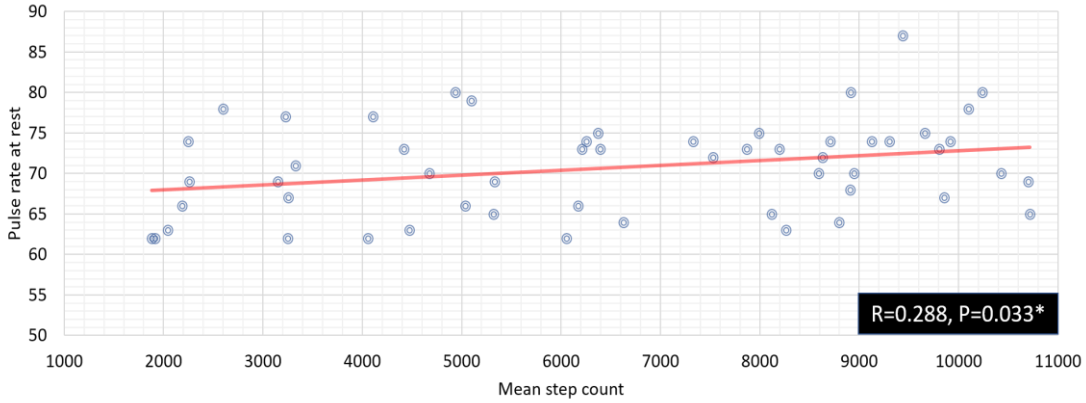

Figure (2): Correlation between mean steps count and pulse rate for study group at follow–up phase after 2 months

Discussion:

Around the world, atrial fibrillation is becoming more common. It is known that the prevalence of atrial fibrillation generally increases with age. The number of people who suffer from atrial fibrillation is predicted to increase by two or three times by 2050. Atrial fibrillation affects around 1% of people globally, although its prevalence increases to about 9% in people over 75. The lifetime risk of atrial fibrillation increases to 22% at 80 years of age. Furthermore, atrial fibrillation has been linked to men more frequently than women and is more common in whites than in blacks **(Peters and Woodward., 2019)**.

Atrial fibrillation can be caused by a variety of factors, including congenital heart disease, aging, underlying cardiac conditions (valvular, coronary artery, and structural heart diseases), hypertension, increasing alcohol intake, and obstructive sleep apnea. Atrial fibrillation can arise from any condition that leads to inflammation, stress, damage, and ischemia to the heart's electrical system and structure; but, in certain instances, the reason is iatrogenic **(Nesheiwat et al., 2022)**

So, this study aimed to evaluate the effect of pedometer telenursing instructions on steps

count and pulse rate in atrial fibrillation patients and hypothesized that pedometer telenursing instructions may have a significant effect on adjusting the steps count and pulse rate in atrial fibrillation patients.

Demographic data of the present study revealed no statistically significant differences between the study groups, with the majority of patients' ages ranging from fifty to sixty years old. This may be due to normal physiological changes associated with the aging process. This finding is in agreement with **Zubaid et al., (2017)** whose study titled "Characteristics of a patient with atrial fibrillation in the Arab Middle East Gulf Survey of Atrial Fibrillation Events (Gulf SAFE) Investigators" which was conducted in six Middle East countries support the previous findings where mean age of patients with AF was fifty-seven years.

As regards gender; females were more prevalent than males. This finding comes in agreement with **El-Zeky et al. (2018),** in a study entitled " Effect of a pedometer-based aerobic walking program on steps count and resting heart rate among atrial fibrillation patients", research was carried out in the governorate of Daqahlya and revealed that women frequently experience AF more frequently than men. While this result goes in the opposite line with **Wang et al. (2022),** in a study entitled "A Meta-Analysis of Randomized Controlled Trials on Ivabradine and Atrial Fibrillation ", who concluded that males made up half of the patients under study.

In terms of residency, the results of the current study showed that around 75% of the study and control groups resided in rural regions. This is consistent with **World Bank Statistics' (2015**) findings that AF was more common in rural than urban locations in Egypt and China. A higher frequency of cardiac arrhythmias, particularly AF, which is more common in older females than men, may be caused by Egypt's higher prevalence of rural people, poor socioeconomic level, and poor quality of health care services in rural areas in developing nations.

Both the study and control groups' patients developed persistent AF in the majority. This finding is consistent with the RE-LY AF registry study by **McAlister et al. (2020)**, which included Egypt among the 46 nations examined, and found that in Africa and the Middle East, respectively, around four-fifths and three-quarters of the population under study have persistent AF. Furthermore, according to a research titled " Atrial Fibrillation: Conceptual Paradigm Shift Resulting in Modified Treatment Approaches in Developing Nations" **Kar, (2016)**, the distribution of AF types in Western Europe was equal. This contrasts with the findings of the current study, which show that Western Europe is not representative of the world at large. This may be the result of the high prevalence of rheumatic heart disease (RHD) in developing nations as previously mentioned, which is always detected after it has progressed due to a lack of medical personnel in rural areas. This results in the late detection of heart disease that is noncompliant and causes permanent AF,

where restoring or maintaining sinus rhythm is never an option.

Regarding the comorbid condition linked to AF in this research Over 50% of the research group had HTN, valvular heart disease, in addition over two-fifths of the research group had RHD as well as in the control group two-thirds had HTN, two-fifths had valvular heart disease and about one-third had RHD. This is consistent with **El-Zeky et al. (2018)** who illustrated that, regarding the study team less than half had HTN, more than half had valvular heart disease and two-fifths had RHD; and in the control group more than half had HTN, two-fifths had valvular heart disease and more than one-fifth had RHD.

All AF patients should begin treatment with rate control. The use of rate control is ongoing in situations of chronic and permanent AF. Rate regulation works to keep ventricular response under control in those with paroxysmal AF during the episode of AF. In this research, most of both groups comply with rate control medication. This study is in agreement with **Martin et al, (2014)** entitled "Ivabradine-induced atrial fibrillation: a meta-analysis of randomized controlled trials", which conducted rate control medication was prominent as it aims for a resting pulse rate between 60 and 80 beats per minute and 90 to 115 beats per minute during moderate exercise.

Regarding steps count, this study found that the mean steps count for both the study and control groups prior to the intervention was outside of the normal range. This is in accordance with **Shipe, (2009)** whose study titled "The impact of a pedometer intervention on the participants' patterns of physical activity during cardiac rehabilitation", undertaken in the USA with patients undergoing cardiac rehabilitation and found that the baseline mean steps count for both groups was poor at a sedentary level, with more than half of those surveyed falling into this category.

As well, this research parallels **Kaminsky, (2013)** research entitled "A pilot research examining a pedometer-based physical activity intervention for individuals starting a routine cardiac rehabilitation program" conducted in the USA and discovered that the baseline mean step count for both groups on non-cardiac rehabilitation days was low at the sedentary level. Additionally, two studies done in Brazil and the USA found that, respectively, three-quarters and three-fifths of cardiac patients were sedentary level **(Paula, 2015; Savage and Ades, 2008)**.

Furthermore, this research is in line with a Norwegian study of AF patients, which found that after three months, patients in the exercise group had much lower resting pulse rates than those in the control group (3 b/m), with no statistically significant difference between the two groups. Another research on diabetes patients in India found that those who participated in an aerobic walking program using a pedometer saw a substantial drop in their resting pulse rate of 8 beats per minute, whereas there was no change in the control group and no significant difference between the two groups **(Shenoy et al., 2010)**. Researchers' points of view included that moderate exercise as walking neutralizes pulse rate and

improves steps count in addition to weight reduction.

Regarding the steps count and pulse rate, this study found no statistically significant differences between the study and control groups during the pre-intervention phase. However, the study and control groups vary statistically significantly during the post-intervention and 2-month follow-up phase. The table also shows a statistically significant difference in the mean steps count and pulse rate post-intervention with the highest improvement at the follow-up phase. As well, shown for the study group, there was a highly statistically significant relation between mean steps count and pulse rate at the follow-up phase. Moreover, this study showed a statistically significant positive correlation between mean steps count and pulse rate for the study group at the post-intervention phase. This is inconsistent with **El-Zeky et al. (2018)**, who reported that there was not a statistically significant difference between the two groups.

Conclusion:

The current study consummated that the pedometer telenursing instructions had a statistically significant effect on adjusting pulse rate and steps count in AF patients. Also, there is a statistically significant positive correlation is present between mean steps count and pulse rate for the study group at the post-intervention and at 2 months follow-up, which confirmed the study hypothesis.

Recommendations:

The current study recommends the following:

A designed audiovisual material should be offered for AF patients during outpatient waiting time that shows aerobic exercises that they should practice.

- Conducting a training program for cardiology nurses about pedometer and telenursing instructions.
- Replication of the current study on a larger probability sample is recommended in order to achieve generalization of the results.

References:

AlAwady, M., Metwally,Y., Seddik, E., & Abd Elhamid., A. (2022). Epidemiological Study of Atrial Fibrillation, *The Egyptian Journal of Hospital Medicine*, 87: 1691-1694. DOI: 10.21608/EJHM.2022.229375

Ameen, D., Maarouf, D., & Khalifa, A. (2021). Cardiac Dysrhythmia Interpretation Knowledge Enhancement Nursing Protocol. *Egyptian journal of nursing and health science*. 2(2): 165, DOI: 10.21608/EJNHS.2021.196025.

Annual Statistics of Ain Shams & Suez-Canal University Hospital. (2023), Accessed in Jan, 2023.

Baird, M.S. (2023). Manual of Critical Care Nursing-E-Book: Nursing Interventions and Collaborative Management. 8th ed. Elsevier Health Sciences. © 23-113.

Bittner, A., Paredes, A., Vergara, I., & Eckardt, L. (2021). Patient with Presyncope and Variable PR Interval and QRS Morphology. *Journal of Medical Case Reports*, 3(11), 1390-1392.

Bowie, M. (2021). Understanding current procedural terminology and HCPCS coding systems. Cengage Learning. 2nd ed. 113-115.

Chung, M., Eckhardt, L., Chen, L., Ahmed, H., Gopinathannair, R., Joglar, J., & Trulock, K. (2020). Lifestyle and Risk Factor

Modification for Reduction of Atrial Fibrillation: A Scientific Statement from the American Heart Association. *Circulation*, 141(16): 750-772, doi: 10.1161/CIR.0000000000000748.

Coelho, C., Reboredo, M., Valle, F., Malaguti, C., Campos, L., Nascimento, L. & Pinheiro, B.(2017). Effects of an unsupervised pedometer-based physical activity program on daily steps of adults with moderate to severe asthma: a randomized controlled trial. *Journal of Sports Sciences*. ISSN: 0264-0414 (Print) 1466-447X (Online) *Journal homepage*: http://www.tandfonline.com/loi/rjsp20. *JOURNAL OF SPORTS SCIENCES*. https://doi.org/10.1080/02640414.2017.1364402

Elzeky, M., Abd Allah, K., Sherief, W., & Salama, H. (2018). Effect of pedometer based aerobic walking program on steps count and resting heart rate among atrial fibrillation patients. *Mansoura Nursing Journal (MNJ)*; 5 (1):17-32, doi: 10.21608/MNJ.2018.150595.

Gucuk, S., & Erkuran, N. (2020). Improving the effects of pedometer use in individuals 65 years of age and older, under the supervision of family physician. MOJ Gerontol Ger, 1(2), 48- 52. *European Journal of Molecular & Clinical Medicine*. ISSN 2515-8260 Volume 07, Issue 9,DOI: 10.15406/mojgg.2017.01.00011

Hindricks, G., Potpara, T., Dagres, N., Arbelo, E., Bax, J., & Dilaveris, P. (2020). The Task Force for the diagnosis and management of atrial fibrillation of the European Society of Cardiology (ESC) Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. *Eur. Heart J.* , 42, 373–498, doi:10.1093/eurheartj/ehaa612

Hinkle, J., Cheever K., & Overbaugh, K. (2022). Brunner & Suddarth's Textbook of Medical-Surgical Nursing, 15th edition, Wolters Kluwer, Chapter 26 (Management of Patients with Dysrthmias and conduction problems, ©.*1972-1984*. ISBN/ISSN: 9781975161033

Huang, S., & Miller, J. (2020). Catheter Ablation of Cardiac Arrhythmias e-book. 1st ed. Elsevier Health Sciences. Printed in China *CTPS*. ©54-55, 12(7), ISSN 1755-5302

Jacob, J., Tryambake, R., Jamdade, V., & Sakhardande,V. (2018). A study to Assess the Effect of Planned Teaching Program on Knowledge Regarding Interpretation of Cardiac Arrhythmias and its Management among Staff Nurses in Selected Hospitals of Pune City. *Journal of Nursing and Care*; 7(4), 1-2, DOI:10.4172/2167-1168.1000463.

Kaminsky, L., Jones, J., Riggin, K., & Strath, S. (2013). A pedometer-based physical activity intervention for patients entering a maintenance cardiac rehabilitation program: a pilot study. *Cardiovasc Diagn Ther*, 3(2), 73–79. https://doi.org /10.3978/ j.issn.2223-3652.2013.03.03.

Kar, S. (2016). Atrial Fibrillation: Paradigm Shift in Concept Leading to Change in Treatment Strategies in the Developing World, *Anatomy & Physiology: Current nA Research* 6(3), 6–7. DOI: 10.4172/2161-0940.1000212

Kord,Z., Fereidouni,Z., Mirzaee, M., Alizadeh, Z.,& Zaj,P. (2021) Telenursing home care and COVID-19: a qualitative study. Published online at Jun 28. doi: 10.1136/bmjspcare-2021-003001

Lewis, Z., Ottenbacher, K., Fisher, S., Jennings, K., Brown, A., Swartz, M.,Martinez, E., & Lyons, E.(2020). Effect of Electronic Activity Monitors and Pedometers on Health: Results from the TAME Health Pilot Randomized Pragmatic Trial. I*nt. J. Environ. Res. Public Health* , 17, 6800. https://doi.org/10.3390/ijerph17186800

Lough, M., Stacy, K., & Urden., L. (2020). Priorities in Critical Care Nursing-E-Book, Caring for the Critically Ill patient & Cardiovascular Therapeutic Management, 8th ed., Canada, Elsevier,© 1/194. eBook ISBN: 9780323544955

Martin, R., Pogoryelova, O., Koref, M., Bourke, J., Teare, M., & Keavney, B. (2014). Atrial fibrillation associated with ivabradine treatment: meta-analysis of randomized controlled trials. Heart; 100: ©. 1506–1510.

Available at: https://www.ncbi.nlm.nih.gov/pubmed/24951486.Accessed in august 8, 2022. doi: 10.1097/FJC.0000000000001209

McAlister, F., Mian, R., Oldgren, J., Wallentin, L., & Healey, J. (2020). Hypertension prevalence but not control varies across the spectrum of risk in patients with atrial fibrillation: A RE-LY atrial fibrillation registry sub-study; 15(1): e0226259.15. doi: 10.1371/journal.pone.0226259

Nesheiwat, Z., Goyal, A., Jagtap, M., Shammas, A., & Regional, M. (2022). Overview of nurses' role in management of patient with atrialfibrillation. *International Journal of Nursing and Health Research*. 4, 1, 15-19. https://www.researchgate.net/publication/358807768

Paula, T., Viana, L., Neto, A., Leitão, C., Gross, J., & Azevedo, M. (2015). Effects of the DASH Diet and Walking on Blood Pressure in Patients With Type 2 Diabetes and Uncontrolled Hypertension: A Randomized Controlled Trial. *Journal of Clinical Hypertension* (Greenwich, Conn.), 17(11), 895–902. https://doi.org/ 10.1111/ jch.12597.

Peters, S. & Woodward, M. (2019). Established and novel risk factors for atrial fibrillation in women compared with men. *Heartjnl*;105 (3):226-234. doi: 10.1136/heartjnl-2018-313630.

Polit, F., & Beck, T. (2020). Nursing Research: Generating and Assessing Evidence for Nursing Practice. (11th Edition). *Philadelphia*: Wolters Kluwer Health ISBN: 197511065X, 9781975110659.

Savage, P., & Ades, P. (2008). Pedometer step counts predict cardiac risk factors at entry to cardiac rehabilitation. *Journal of Cardiopulmonary Rehabilitation and Prevention*, 28: 370-377-379. https://doi.org/10.1097/HCR.0b013e31818c3b6d.

Shenoy, S., Guglani, R., & Sandhu, J. S. (2010). Effectiveness of an aerobic walking program using heart rate monitor and pedometer on the parameters of diabetes control in Asian Indians with type 2 diabetes. *Primary Care Diabetes*, 4(1), 41–45. https://doi.org/10.1016/j. pcd. 2009.10.004.

Shipe, M. (2009). The Effects of a Pedometer Intervention on The Physical Activity Patterns of Cardiac Rehabilitation Participants, University of Tennessee, *Published Doctorate Thesis*, https://trace.tennessee.edu/utk_graddiss/95

Statistics by Country for Arrhythmias. (2022). Extrapolation of prevalence rate of arrhythmias to countries and regions. Available at: http://www.rightdiagnosis. com/a/arrhythmias/stats-country.htm

Urden, L., Stacy, K., & Lough, M. (2020). Priorities in Critical Care Nursing-E-Book, Caring for the Critically Ill patient & Cardiovascular Therapeutic Management, 8th ed., Canada, Elsevier, ©:1/194. ISBN: 9780323544955.

Wang, Z., Wang, W., Li, H., Zhang, A., Han, Y., Wang, J., & Hou, Y. (2022). Ivabradine and Atrial Fibrillation: A Meta-Analysis of Randomized Controlled Trials. *Cardiovasc Pharmacol*. 1;7 9(4):549-557. doi: 10.1097/FJC.0000000000001209.

World Bank Statistics. (2015). Retrieved from http://data. worldbank.org /indicator/ SP. RUR. TOTL. ZS.

Zubaid, M., Rashed, W., Alsheikh-Ali, A., Almahmeed, W., Shehab, A., Sulaiman, K., AlZakwani, I., Alqudaimi, A., Asaad N., & Amin, H. (2017). Characteristics of patient with atrial fibrillation in the Arab Middle East Gulf Survey of Atrial Fibrillation Events (Gulf SAFE) Investigators. *Journal of Cardiovascular Quality and Outcomes*; 4: ©. 477-482. Available at: https://www.ncbi.nlm.nih.gov/pubmed/21772004.

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