Comparative Study: Effect of Tele-nursing and Traditional Nursing Program regarding Lifestyle Modification among Hypertensive Patients

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Abstract

Background: The most important aspect of long term management of hypertension lies in lifestyle modification which includes diet, exercise, and social habits. **The study aimed to** compare the effect of tele-nursing and traditional nursing program regarding lifestyle modification among hypertensive patients. **Research design:** A quasi – experimental design was utilized in this study. **Setting:** The study was conducted at the Medical Outpatient Clinics in Benha University Hospitals**. The sample:** A simple random sample was utilized; the sample size was 280 patients that were divided into two equal groups. 140 hypertensive patients received traditional educational program and 140 hypertensive patients received tele-nursing educational program **Tools: Two tools were used 1):** An interviewing questionnaire to assess studied patients' socio-demographic characteristics, medical history and knowledge about hypertension and tele-nursing. **II)** Hypertension evaluation lifestyle and management scale. **Results**: 6.4% and 7.1% of tele-nursing and traditional groups respectively had good total knowledge about hypertension pre-program, however post-program increased to 82.9% and 67.9% respectively. 22.9% and 20.7% of tele-nursing and traditional groups respectively had satisfactory total lifestyle practices pre- program, which increased to 80.0% and 63.6% respectively post-program, and there were positive highly and statistically significant correlation between total knowledge and lifestyle about hypertension among tele-nursing and traditional groups respectively post- program. **Conclusion**: Tele-nursing method was more effective in enhancing patients' knowledge and lifestyle modification for hypertensive patients than traditional method. **Recommendations:** Enhance applying tele-nursing via follow up to improve hypertensive patient's adherence to a healthy lifestyle.

Keywords: Tele-nursing, traditional program, hypertension, lifestyle modification.

Introduction

Hypertension (HTN) or high blood pressure is a condition that affects the arteries that carry the blood from the heart to the rest of the body by forcefully pushing the blood against their walls, which will damage the blood vessels and low-density lipoprotein cholesterol this pressure will increase the workload on the circulatory system, causing a high risk for cardiac diseases such as stroke, aneurysm, congestive cardiac failure, and other diseases such as kidney problems, retinal hemorrhage, metabolic syndrome, and dementia **(Mushcab et al., 2023).**

Hypertension is a major reversible clinical obstacle leading to increased morbidity and mortality globally that affecting about 30–40% of the adult population in the developed countries. It affects approximately 1.3 billion people and is responsible for 7.5 million deaths a year. Despite the progress in effective medical treatment, there has been a doubling in the

incidence of HTN worldwide, especially in low and middle-income countries with a deficiency in controlling blood pressure. According to the United states of America (USA) registry, 47% of adults have HTN, and 24% of patients with HTN aren't controlled. The burdened cost was estimated at 131 billion dollars in the USA each year **(Khalfallah et al., 2023).**

The most important initial step when managing a hypertensive patient is lifestyle modification. Increased weight, high sodium intake, physical inactivity, and consumption of large amounts of alcohol, are all associated with significant elevation of blood pressure. The most important lifestyle-related factor is weight; therefore experts recommend keeping the body mass index less than 25 kg/m2. Other recommendations include limited alcohol consumption and increased physical activity. Diet should contain reduced amounts of sodium and fat. Fresh fruits, vegetables, and legumes are the most recommended nutrients **(Charchar et al., 2024).**

Tele-nursing (TN) is considered one of the most important technological events of the late twentieth century as the gateway to modern nursing care. The aim of TN is to improve patient safety and quality of care and is considered a quick access to nursing care by overcoming the geographical barriers. The use of mobile phones and communication technologies are considered part of TN. As increasing technology growth and also increasing access to nursing services, the use of TN in patient care seems to be necessary. Now, with such increasing prevalence of COVID-19, hospitals really are facing a serious challenge due to the shortage of nursing staff and preventive, diagnostic, therapeutic equipment's, especially the lack of adequate bedding relative to the population and also the impossibility of hospitalization of all these patients **(Sakinah &Nurdin., 2021)**.

Patient education is one of the community health nurses' most important roles, and it is an essential strategy in the disease controlling process and reducing the disease complications. The needs of these patients include; educational needs toward adherence to drug treatment and side effects, mental counseling, diet, and observance of standards of care, health care and follow-up of disease outcomes certainly helped through TN. Good nutritional status is so important in HTN health outcomes. Many patients require nutritional intervention to help treat and/or prevent malnutrition which may be a serious risk factor for HTN, so it is a necessary for HTN patients to be educated and provided with needed health dietary modifications **(El bialy et al., 2022).**

Significance of the problem:

Hypertension is a highly prevalent health problem in Egypt. In an Egyptian registry, 29.2% of the adult population had HTN, and only 27.1% achieved controlled blood pressure. In Egypt, HTN is highly prevalent and is estimated to affect about 26.3% of the population older than 25 years old. About two thirds of that hypertensive population has other cardiovascular risk factors leading to aggravated cardiovascular morbidity and mortality **(Elbarbary et al., 2023).** HTN is the main cause of disability and mortality in the world. Although it is a preventable and treatable condition, it can lead to serious and life-threatening complications. Therefore, compliance with antihypertensive treatment and lifestyle modification is very essential and can prevent complications of HTN, so the study was conducted to enhance knowledge and modify lifestyle of hypertensive patients.

Aim of the study

The aim of this study was to compare the effect of TN and traditional nursing program regarding lifestyle modification among hypertensive patients.

Research hypotheses:

Null hypothesis:

- Tele-nursing program will modify lifestyle among hypertensive patients more than traditional program.

Alternative hypothesis:

- Traditional program will modify lifestyle among hypertensive patients more than TN program.

Research design: A quasi-experimental design was utilized in this study.

Setting: The study was conducted at the Medical Outpatient Clinics in Benha University Hospitals.

Sampling:- A simple random sample was utilized

Sampling size:- Sample size was calculated using the following formula

$$n= \frac{N}{1+N(e)2}$$

Where "n" is the sample size. "N" is the total number of hypertensive patients attending to the Medical Outpatient Clinics in Benha University Hospitals at year 2022

"e" is coefficient factor = 0,05. N= 982

n= 280. Total number of studied patients = 280 patients that were divided into two equal groups. 140 hypertensive patients received traditional educational program and 140 hypertensive patients who fulfilled inclusion criteria received tele-nursing educational program.

Tools: Two tools were used for data collection:

Tool 1: An interviewing questionnaire: It was consisted of three parts to assess the following:

First Part: Socio-demographic characteristics of the studied patients. It included 7 items closed ended questions about age, sex, marital status, residence, level of education, occupation and monthly income.

Second Part: Medical history of hypertensive patients consisted of 10 items closed ended questions about presence of chronic diseases , family history of HTN, duration of disease, discovering of disease by, signs and symptoms before discovering disease, number of hospital admissions due to HTN, number of visiting the outpatient clinic for follow-up HTN, number of cigarettes the patient smoked per day, problems result in smoking and current symptoms of disease.

Third part: A) It was developed to assess the patient's knowledge about HTN for both group, which included 10 closed ended questions (multiple choice type) about meaning of HTN, types of HTN, meaning of primary HTN, meaning of secondary HTN, causes, signs and symptoms, diagnosis, prevention, treatment, complication of HTN.

B) It was developed to assess tele-nursing group knowledge about tele-nursing, which included 10 closed ended questions (multiple choice type), about meaning of tele-nursing, objectives, advantages, types of tele-nursing, factors that led to spread of tele-nursing, means of communication used in tele-nursing, nursing services via tele-nursing, guidelines during tele-nursing, challenges and disadvantages of tele-nursing. **Question (No 21)** about the patients' source of knowledge about hypertension and tele-nursing.

Scoring system for knowledge about HTN and tele-nursing:

Knowledge score for each answer was given as follows: 2= Complete & correct answer,

and 1= Incomplete & correct answer, while 0 = Don't know

The total score knowledge ranged from 0 to 20. Those who achieved ≥ 75% from the total score (≥ 15 points), was considered good. While considered average if it equaled 50 - < 75% from the total score (10 - < 15points), and considered poor if it was < 50% from the total score (< 10 points).

Tool II: HTN Evaluation Lifestyle and Management (HELM) Scale: That was modified to assess patient's healthy lifestyle which adopted from **(Hill et al., 2000; Schapira et al., 2012).** The scale was divided into three categories: always (3), sometimes (2) and never (1). It was developed to assess the patients' healthy lifestyle practices, which included 39 questions about **nutrition** included 9 items **Treatment and follow up** included 5 items. **Physical activity** included 6 items. **Rest and sleep** included 5 items. **Psychological health** included 10 items, and **finally social activity** included 4 items.

These scores were summed up, converted into percentage and divided into: **Total scores of lifestyle = 117 points**, **satisfactory:** when the total score more than ≥ 60% = ≥ 70.2 points, **unsatisfactory:** when the total score less than < 60% = < 70.2 points.

Ethical consideration:

The study approval was obtained from Scientific Research Ethical Community, Faculty of Nursing, Benha University before starting the study. Ethical code **REC.CHN.P 68**. All ethical considerations were issued; formal consent was being obtained from each hypertensive patient before conducting the interview and give them a brief orientation to the purpose of the study. They were also reassured that the all information gathered would be in a confidential manner and used only for the purpose of the study. No names were required on the forms to ensure anonymity and confidentiality. They were also informed about their rights to withdraw at any time from the study without giving any reasons.

Reliability:

All tools for data collection were tested for its reliability using test retest reliability. The reliability of the study instrument was tested using Cronbach Alpha. Reliability for tele-nursing group knowledge =0.792, for traditional group =0.781 and for tele-nursing group lifestyle =0.762 and traditional group = 0.742 indicating good reliability of the instrument. It was acceptable inters the consistency.

Validity of the tools:

The tool validity was done by five experts in Community Health Nursing Specialty, Faculty of Nursing, 2 from Mansoura University and 3 from Benha University who reviewed the tool for clarity, relevance, completeness, applicability and gave their opinion.

Pilot study:

The pilot study was conducted on 10% of the studied sample size represented 28 patients. The pilot study was aimed to test the feasibility, clarity, applicability of the tools and time needed to fill each sheet, completing the sheet consuming time about 10 to 15 minutes. No modifications were done, so the pilot study sample was included to the total sample.

Developing and implementation program (telenursing & traditional) this was done according to the following phases:

I) Assessment phase: Pre-test the data was collected by the previously mentioned tools through giving each hypertensive patient

questionnaire to collect the baseline data as a pre-intervention assessment for both groups.

II) Planning phase: After identifying the needs of patients in the assessment phase, the researchers developed nursing educational program about patients knowledge, life style and control measures regarding HTN. It emphasized the areas of deficit in knowledge about HTN disease: meaning, types, causes, signs and symptoms, prevention, and management.

III) Implementation phase: Approvals to conduct the study and implementation of the program was obtained by submission of an official letter issued from the Dean of Faculty of Nursing, Benha University requesting acceptance and cooperation for data collection the top administrator inform the directors. The data was collected from 280 hypertensive patients, the researcher met the patients at Medical Outpatient Clinics in Benha University Hospitals 3 days/week over a period of six months from the beginning of May 2024 up to the end of October 2024 from 9am to 1pm. The average number of interviewed hypertensive patients were between 3-4 patients /day. The program was divided into six sessions (4 theoretical and 2 practical) for both groups; the average time of each session was 30–45 minutes. The program was provided by the researcher to ensure providing complete, consistent and accurate knowledge about hypertension disease and how to control it for the patients through traditional and tele-nursing nursing program.

For tele-nursing group: The researcher created whats App group and added tele-nursing group phone numbers, whats App group created to send the link of zoom sessions and sent explanatory videos and power point files through the group and health education was provided through zoom application. Zoom link: https://us05web.zoom.us/j/83465517451?pwd =ISYI3ao8ICVs OF4z4Gxb7Lcd5G3wgB.1.

First session: At the beginning of the first session, the researcher introduced herself to hypertensive patients, an orientation to the intervention was given, took oral informed consent of hypertensive patients and explained the aim of the study, set an agreement on the number, time and duration of sessions. The researcher provided a trust, warm and secured atmosphere between hypertensive patients and relieved anxiety, tension and increased motivation for participate in all sessions of the nursing intervention provided introduction about meaning of program about its basic rules and expectations of hypertensive patients for both groups and apply zoom application for tele-nursing group only. **Second session:** Define hypertension, define types of hypertension, mention risk factors of hypertension, mention causes of hypertension for both groups. Define tele-nursing, objective of tele-nursing, important of tele-nursing, means of communication used in tele-nursing, for tele-nursing group only. **Third session:** Enumerate signs and symptoms of hypertension and discuss complications of hypertension for both groups. List the advantages, disadvantages, challenges, factors that led to spread of tele-nursing, nursing services via tele-nursing and guidelines during tele-nursing for tele-nursing group only. **Fourth session:** Discuss methods of management of hypertension and identify importance of follow up for hypertension disease, identify importance of exercise for modifying life style and explain how the patients modify life style for both groups. **Fifth session:** Apply nutrition and Exercise (relaxation technique) for both groups. **Sixth**

session: Demonstrate how to measure blood pressure for both groups.

IV) Evaluation phase: This evaluation was conducted on the studied patients two times; first time (pre-test): before the nursing program implementation (using all parts of tools) for the patients who were being studied, and second time: After six months the researcher made another interview with the patients of traditional group for post-test reassessment after the nursing program implementation by using tool I part three (A) and tool II only in the Outpatient Clinic.

For tele-nursing group: used technology as an online Google form to collect data after the nursing program implementation by using tool I, part three (A&B) and tool II only. An online Google form link https://docs.google.com/forms/d/1jQwsRdCD_8MhrJYcXNI2k4nLkqBpuX11-dgiKLmqAao/edit

Statistical Analysis:

The collected data were organized, tabulated and analyzed using appropriate statistical test. The data were analyzed by using the Statistical Package for Social Science (SPSS), version 21, that was used to calculate frequencies and percentages mean and standard deviation, also statistical significance and associations by using Chi-square test, it was a test used to study association between two qualitative variables and correlation (r) to detect the association between the variables for (p- value).

The observation difference and associations were considered as following: Highly statistically significance $p \leq 0.001$. Statistically significance $p < 0.005$. Not statistically significant $p > 0.005$

Results:

Table (1): Shows that; 39.3% and 35.0% of tele-nursing and traditional groups respectively aged from 35-40 years old with the mean ±SD41.29±5.48 and 40.19±5.64 years respectively. 57.9% and 50.7% of tele-nursing and traditional groups respectively were males. 36.4% and 43.6% of tele-nursing and traditional groups respectively were married. 40% of tele-nursing and traditional groups had above average education. 70.0% and 63.6% of tele-nursing and traditional groups respectively were working. The same table also shows that there were no statistically significant differences found among studied patients regarding their socio-demographic characteristics $P > 0.05$.

Table (2): Shows that; 57.1% and 65.7% of tele-nursing and traditional groups respectively didn't suffer from any chronic diseases. 73.6% and 72.9% of tele-nursing and traditional groups respectively had family history of hypertension from first degree. 85.0% and 90.0 % of tele-nursing and traditional groups respectively had hypertension from less than 5 years. 57.1% and 62.9% of tele-nursing and traditional groups respectively discovered the disease by measuring blood pressure. 34.3% of tele-nursing group didn't suffer from any signs and symptoms before discovering disease, while 27.1% of traditional group suffered from headache

Figure (1): Represents that; 6.4% and 7.1% of tele-nursing and traditional groups respectively had good total knowledge about HTN pre-program, however post program increased to 82.9% and 67.9% respectively, while 60.7% and 58.6% of tele-nursing and traditional groups respectively had average knowledge pre-program compared by 12.1 %

and 24.2% of tele-nursing and traditional groups respectively post program, while 32.9% and 34.3% of tele-nursing and traditional groups respectively had poor knowledge pre-program and decreased to 5.0% and 7.9% respectively post-program.

Figure (2): Represents that; 1.4% of tele-nursing group had good total knowledge about tele-nursing pre-program, however post- program increased to 73.6%, while 6.4% of them had average total knowledge pre-program compared by 17.1 % post program, and 92.2% of them had poor knowledge pre-program, while post-program decreased to 9.3%.

Table (3): Shows that; there were statistically significant difference between tele-nursing and traditional groups regarding their all items of total lifestyle practices post-program ($p < 0.05$) except lifestyle practice of rest and sleep there was highly statistically significant difference ($p \leq 0.001$).

Figure (3): Represents comparison between the two studied groups regarding their total lifestyle pre and post-program. 22.9% and 20.7% of tele-nursing and traditional groups respectively had satisfactory total lifestyle practices pre- program and increased to 80.0% and 63.6% of them respectively post-program.

Table (4): Shows that; there were highly statistically significant correlation between total knowledge about HTN and socio-demographic characteristics (sex and income) among tele-nursing and traditional groups post-program **($p \leq 0.001$).** There was statistically significant correlation between total knowledge about HTN and socio-demographic characteristics (age and level of education) among tele-nursing and traditional groups post-program **($p < 0.005$).**

Table (5): Shows that; there were statistically significant correlation between total lifestyle practices and all items of socio-demographic characteristics among TN group while except sex and residence among traditional group post-program **($p < 0.005$).**

Table (6): Shows that; there were positive highly statistically significant correlation between total knowledge and lifestyle practices among TN group post-program ($p \leq 0.001$) and there was positive statistically significant correlation between total knowledge and lifestyle practices among traditional group post-program ($p < 0.005$).

Table (1): Socio-demographic characteristics of studied patients (tele-nursing and traditional groups) (n=280).

Socio-demographic characteristics	Tele-nursing group (n=140).		Traditional group (n=140)		X^2	p-value
	No	%	No	%		
Age\years						
30->35	22	15.7	33	23.6	2.96	.397
35- >40	55	**39.3**	49	**35.0**		
40->45	13	9.3	14	10.0		
45 – 50	50	35.7	44	31.4		
Mean ±SD	41.29±5.48		40.19±5.64			
Sex						
Male	81	**57.9**	69	**50.7**	2.06	.150
Female	59	42.1	71	49.3		
Marital status						
Single	15	10.7	20	14.3	4.74	.191
Married	51	**36.4**	61	**43.6**		
Divorced	49	35.0	33	23.6		
Widowed	25	17.9	26	18.6		
Residence						
Urban	80	57.1	68	51.4	2.06	.151
Rural	60	42.9	72	48.6		
Level of education						
Secondary	45	32.1	37	26.4	2.52	.471
Above average	56	**40.0**	56	**40.0**		
University	27	19.3	37	26.4		
Postgraduate	12	8.6	10	7.1		
Occupation						
Works	98	**70.0**	89	**63.6**	1.30	.253
Not worked	42	30.0	51	36.4		
Income						
Enough only	28	20.0	23	16.4	.59	.439
Not enough	112	80.0	117	83.6		

Table (2): Medical history of studied patients (tele-nursing &traditional groups) (n=280)

Medical history	Tele-nursing group (n=140).		Traditional group (n=140)		X^2	p-value
	No	%	No	%		
Presence of chronic diseases						
Arthritis	60	42.9	48	34.3	2.17	.141
None	80	**57.1**	92	**65.7**		
Family history of hypertension						
First degree	103	**73.6**	102	**72.9**	1.62	.443
Second degree	16	11.4	22	15.7		
None	21	15.0	16	11.4		
Duration of disease\ years						
<5years	119	**85.0**	126	**90.0**	1.60	.206
5-10 years	21	15.0	14	10.0		
Discovering disease by						
Measuring blood pressure	80	**57.1**	88	**62.9**	1.52	.467
Feeling signs and symptoms of disease	32	22.9	24	17.1		
Visiting the doctor	28	20.0	28	20.0		
Signs &symptoms before discovering disease						
Headache	27	19.3	38	**27.1**	5.75	.124
Chest pain	42	30.0	37	26.4		
Nosebleeds	23	16.4	31	22.1		
Nothing	48	**34.3**	34	24.3		

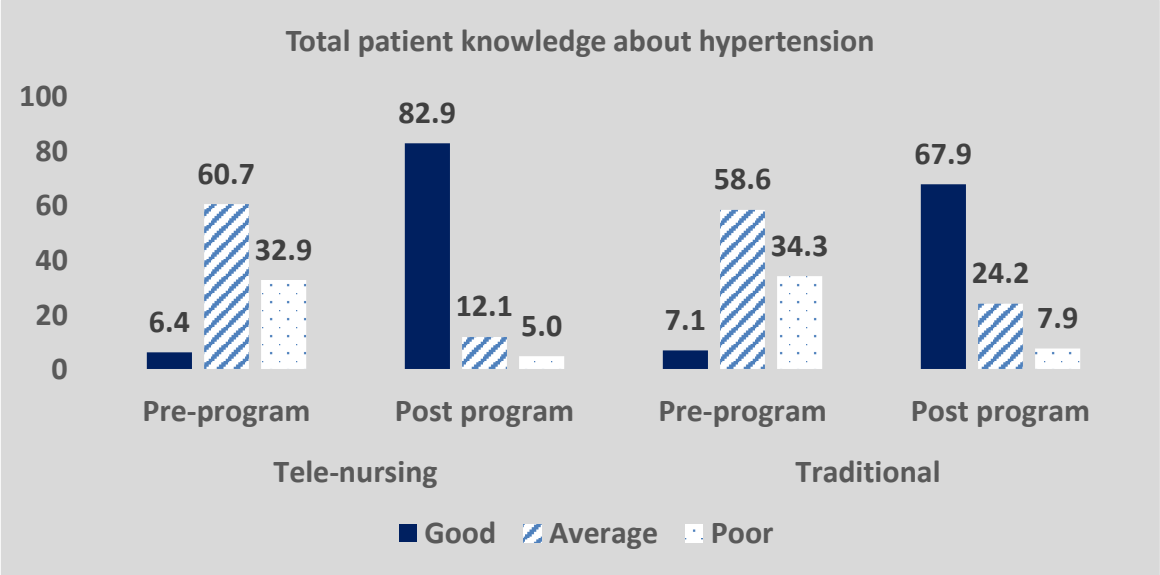

Figure (1): Percentage distribution of studied patients (tele-nursing and traditional groups) regarding their total knowledge level about HTN pre and post-program (n=280)

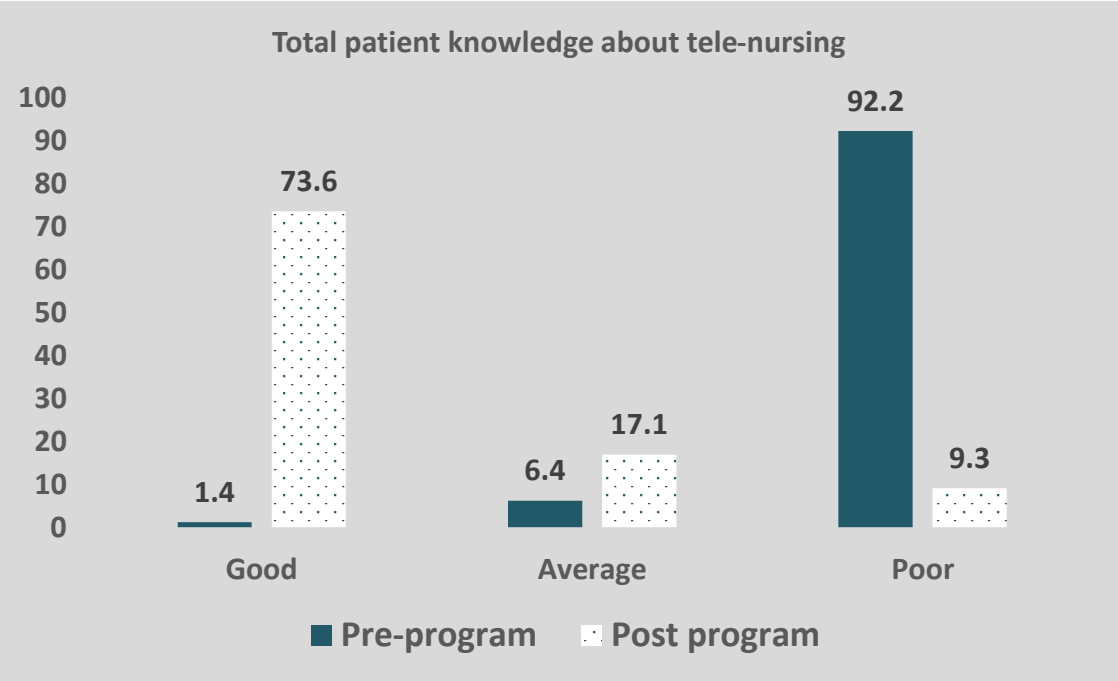

Figure (2): Percentage distribution of studied patients (tele-nursing group) regarding their total knowledge level about tele-nursing pre and post program (n=140)

Table (3): Total lifestyle practices of studied patients (tele-nursing and traditional groups) about HTN pre and post-program (n=280).

Total lifestyle about HTN		Pre						Post					
		Tele-nursing n=140		Traditional n=140		X^2	p-value	Tele-nursing n=140		Traditional n=140		X^2	p-value
		No	%	No	%			No	%	No	%		
Nutrition	Satisfactory	37	26.4	46	32.9	1.38	.239	109	77.9	88	62.9	7.55	.006*
	Unsatisfactory	103	73.6	94	67.1			31	22.1	52	37.1		
Treatment &follow up	Satisfactory	27	19.3	19	13.6	1.59	.206	112	80.0	89	63.6	9.32	.002*
	Unsatisfactory	114	81.7	121	86.4			28	20.0	51	36.4		
Exercise & physical effort	Satisfactory	25	17.9	21	15.0	.416	.519	108	77.1	90	64.3	5.58	.018*
	Unsatisfactory	115	82.1	119	85.0			32	22.9	50	35.7		
Rest &sleep	Satisfactory	18	12.9	17	12.1	.033	.857	117	83.6	88	62.9	15.31	.000**
	Unsatisfactory	122	87.1	123	87.9			23	16.4	52	37.1		
Psychological level	Satisfactory	19	13.6	18	12.9	.031	.860	104	74.3	87	62.1	4.76	.029*
	Unsatisfactory	121	86.4	122	87.1			36	25.7	53	37.9		
Social activities	Satisfactory	36	25.7	35	25.0	.019	.891	110	78.6	92	65.7	5.75	.016*
	Unsatisfactory	104	74.3	105	75.0			30	21.4	48	34.3		

** Highly statistically significant difference (p ≤0.001) * Statistically significant difference (p<0.005)

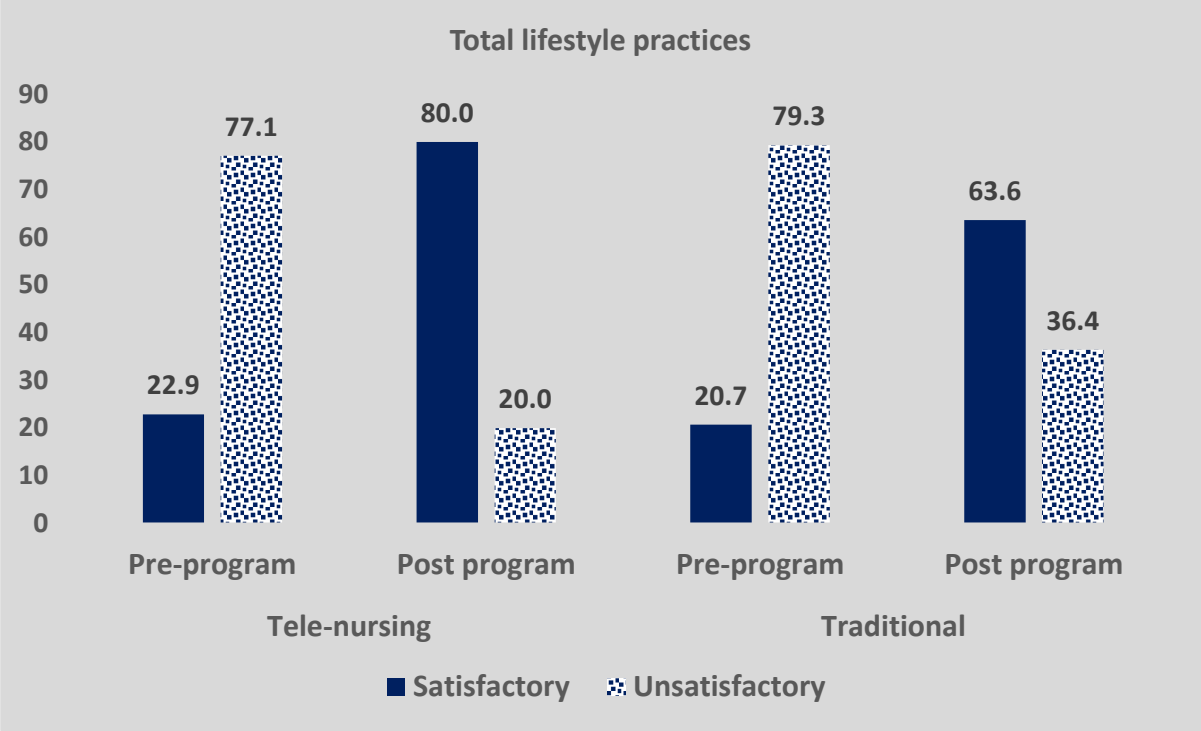

Figure (3): Percentage distribution of studied patients (tele-nursing and traditional groups) regarding their total lifestyle practices about hypertension pre and post program (n=280).

Table (4): Correlation between total knowledge and socio-demographic characteristics among studied patients (tele-nursing and traditional) pre and post program (n=280)

Socio-demographic characteristics	Total knowledge about HTN							
	Pre				Post			
	Tele-nursing n=140		Traditional n=140		Tele-nursing n=140		Traditional n=140	
	R	p-value	r	p-value	r	p-value	r	p-value
Age	.087	.306	.112	.189	.169	.045*	.206	.015*
Sex	.008	.927	.130	.124	.554	.000**	.378	.000**
Marital status	.079	.352	.011	.898	.240	.004*	.075	.379
Residence	.086	.311	.007	.930	.413	.000**	.045	.598
Level of educational	.106	.214	.127	.136	.178	.035*	.203	.016*
Occupation	.063	.457	.013	.883	.466	.000**	.013	.876
Income	.036	.677	.060	.479	.469	.000**	.536	.000**

** Highly statistically significant difference (p ≤0.001) * Statistically significant difference (p <0.005).

Table (5): Correlation between total lifestyle practices and socio-demographic characteristics among studied patients (tele-nursing and traditional) pre and post program (n=280)

Socio-demographic characteristics	Total lifestyle practices of hypertensive patients							
	Pre				Post			
	Tele-nursing n=140		Traditional n=140		Tele-nursing n=140		Traditional n=140	
	r	p-value	r	p-value	r	p-value	r	p-value
Age	.199	.019	.014	.873	.539	.006*	.791	.023*
Sex	.041	.634	.072	.395	.568	.049*	.375	.076
Marital status	.191	.024	.070	.411	.552	.041*	.737	.029*
Residence	.204	.016	.110	.195	.332	.031*	.374	.076
Level of educational	.181	.033	.084	.326	.300	.008*	.619	.042*
Occupation	.078	.362	.048	.569	.272	.013*	.700	.033*
Income	.033	.698	.222	.008	.897	.011*	.973	.003*

*** Statistically significant difference (p <0.005).**

Table (6): Correlation between total knowledge and lifestyle practices among studied patients (tele-nursing and traditional) pre and post program (n=280).

Total lifestyle Practices	Total knowledge							
	Pre				Post			
	Tele-nursing n=140		Traditional n=140		Tele-nursing n=140		Traditional n=140	
	r	p-value	r	p-value	r	p-value	r	p-value
	.406	.212	.489	.29	.619	.001**	.482	.004*

**** Highly statistically significant difference (p ≤0.001) * Statistically significant difference (p <0.005).**

Discussion:

Poorly controlled HTN is a significant public health concern all over the world, in term of morbidity, mortality, and economic burden. The goal of HTN treatment is to prevent death and complications through maintaining the blood pressure at 140\90 mm hg or lower. Lifestyle modification is the first line of intervention for all patients with HTN, but pharmacological is still the cornerstone for the disease treatment to reduce the high blood pressure and to prevent complications. Tele-

nursing enables access to care and the export of nursing services through the use of technology. It is an effective tool for general lifestyle modification practices to improve health status and reduce blood pressure, which prevents the effects of HTN complications **(Kappes et al., 2023).**

According to socio-demographic characteristics of studied patients the findings of the present study revealed that, more than one third of tele-nursing and traditional groups aged ranged from 35 to 40 years old with the mean ±SD41.29±5.48 and 40.19±5.64 years respectively.

Regarding level of education the present study showed that, two fifths of both groups had above average education. This finding disagreed with **Raesi et al., (2021)**, who studied "The impact of education through nurse-led telephone follow-up (tele-nursing) on the quality of life of COVID-19 patients" in Egypt (n= 120 patients), they found that more than one half (55%& 58.3%) were primary level of education for both groups

The current study revealed that no statistically significant differences found among TN and traditional groups regarding their socio-demographic characteristics (P > 0.05). This finding agreed with **Talebi et al., (2023)**, who found that there weren't statistically significant differences found among intervention and control groups regarding their socio-demographic characteristics (P > 0.05).

Regarding presence of chronic disease, the result of this study revealed that more than half of tele-nursing group and two thirds of traditional group didn't have any other chronic disease. This finding agreed with **Mahdi &Al-Humairi, (2022)**, who mentioned that near three fifths (58.7%) hadn't any other chronic disease. However, disagreed with **Modey Amoah et al., (2020**), who studied " The role of lifestyle factors in controlling blood pressure among hypertensive patients in two health facilities in Urban Ghana" (n =360 patients), and found that more than two thirds (68%) had history of associated diseases.

Regarding family history, the result of this study revealed that near three quarters of both group had family history of hypertension from first degree. This finding agreed with **Modey Amoah et al., (2022)**, who reported that near two thirds (61.4%) of studied group had family history of hypertension. However, disagreed with **Sadeghi-Gandomani et al., (2021)**, who studied "Impact of tele-nursing on blood pressure and body mass index of people with pre-hypertension: A randomized controlled clinical trial" in Iran (n = 81 patients), and mentioned that more than three fifths of both groups (61% & 62.5%) hadn't family history of hypertension.

As regards duration of disease, the present study revealed that majority of tele-nursing group and most of traditional group had hypertension from less than 5 years. This finding agreed with **Ayanaw et al., (2022)**, who studied "Sleep quality and associated factors among adult hypertensive patients attending a chronic follow up care clinic in northwest Amhara regional state referral hospitals, Northwest Ethiopia" (n= 563patients), and found that more than three fifths (61.9%) of studied group had hypertension from less than or equal 5 years. However, disagreed with **Modey Amoah et al., (2020)**, who found 43.9% had hypertension from more than 5 years.

Concerning the way of discovering disease the present study revealed that more than half of both groups discovered disease by measuring blood pressure. This finding disagreed with **Ralapanawa et al., (2020),** who studied " Hypertension knowledge, attitude, and practice in adult hypertensive patients at a tertiary care hospital in Sri Lanka" (n =371 patients), and found that one half

(50%) of studied group first diagnosed and discovered disease at tertiary care hospital.

The current study revealed that less than tenth of tele-nursing and traditional groups had good total knowledge about HTN pre-program, however post program increased to majority and more than two thirds respectively. This finding agreed with **Olfah et al., (2023)**, who studied "Education about HTN management by tele-nursing during the COVID-19 pandemic" at Indonesian, (n= 44 patients), and found that less than one third of experiment group had good knowledge pre-program and increased to more than two thirds post-program, while disagreed with **Firdaus et al., (2022)**, and found that less than tenth (7.7%) of studied group had good total knowledge about HTN pre-program, however post-program increased to less than quarter (23.1%).

The current study revealed that less than tenth of tele-nursing had good knowledge about TN pre-program, however became near three quarter of them post-program, while most of TN group had poor knowledge about TN pre-program and decreased to less than one tenth post-program. This finding might be due to TN is a new health educational methods and many hypertensive patients didn't knew about it.

The current study revealed that, there were statistically significant difference between tele-nursing and traditional groups regarding their all items of total lifestyle practices post-program ($p < 0.05$) except lifestyle practice of rest and sleep there was highly statistically significant difference ($p \leq 0.001$). This finding might be due to TN was more effective in influencing patient behaviors than traditional method, this might be due to TN provided frequent and convenient communication, enabling continuous monitoring, encouragement, and tailored advice. Patients in the TN group might had benefited from more regular follow-up, leading to better adherence to life style modification.

The current study revealed that, more than one fifth of tele-nursing and traditional groups had satisfactory total lifestyle practices pre-program and increased to majority and near two thirds of them respectively post-program. This finding was in the same line with **Magbool et al., (2021),** who studied "Effect of tele-nursing (phone- based follow up) and educational package on life style and clinical status for diabetic patients " in Egypt (n= 100 patients, and revealed that improvement of lifestyle after application of educational package, with highly significant difference of lifestyle for patients, before and after educational package and disagreed with **Geremew et al., (2023),** who found that only third (30%) of the participants had adhered to the recommended lifestyle modifications. This finding might be due to patients felt continuous attention and monitoring from the researcher through uploading videos, photos, and comments entered via cellphone messages.

According to research hypotheses, the current study revealed that TN program modified lifestyle among hypertensive patients more than traditional program, so the current study accepted null hypothesis which stated " TN program will modify lifestyle among hypertensive patients more than traditional program" and rejected alternative hypothesis which stated "Traditional program will modify lifestyle among hypertensive patients more than TN program". This finding agreed with **Elbialy, et al., (2022),** who studied " Effect of implementing tele-nursing versus traditional nursing program on knowledge, lifestyle modification and blood pressure control for hypertensive patients" in Egypt (n=200 patients), and found that TN method was effective in enhancing patients' knowledge, adherence to antihypertensive medications and lifestyle modification for better control of

blood pressure and also agreed with **Weheida et al., (2022**), who found that TN is an effective health care strategy as it has been proven to give a positive result for improving health outcomes among patients with rheumatic heart disease. This result might be due to the continuous support system adopted by the researcher through tele-nursing which increased the patient's adherence to a healthy lifestyle practices.

The current study revealed that there were highly statistically significant correlation between total knowledge about HTN and socio-demographic characteristics (sex and income) among tele-nursing and traditional groups post-program **(p ≤ 0.001).**

This finding was at the same line with **Elbialy, et al., (2022),** who found that there were highly statistically significant relation was found between total knowledge score and sex, marital status for both groups pre-intervention, while between total knowledge score and educational level for both groups post intervention, while there was statistically significant relation between total knowledge score and family monthly income pre and post intervention for the TN group only (p <0.001**) , (0.023*) respectively. This might be due to studied patients with at least moderate education were often more proactive in seeking out and engaging with health information, they might also be more comfortable using digital tools in the TN group allowed them to better retain and apply health knowledge.

The current study revealed that there were positive statistically significant correlation between total lifestyle practices and all items of socio-demographic characteristics among TN group except sex and residence among traditional group post-program **(p < 0.005)**. This finding agreed with **Smachew et al., (2022),** who found that there were statistically significant correlation between total lifestyle practices and socio-demographic characteristics among studied group **(p < 0.005)**. This might be due to educated adult of hypertensive patients had greater awareness of the risks associated with poor lifestyle habits, and with high motivation to apply and acquire knowledge to improve and modify their lifestyle habits.

The current study revealed that there were positive highly statistically significant correlation between total knowledge and lifestyle among TN group post program **(p ≤ 0.001)** and there were positive statistically significant correlation between total knowledge and lifestyle among traditional group post program **(p < 0.005)**. This finding agreed with **Elbialy, et al., (2022**), who found that there was significant positive correlation between total score of healthy lifestyle practices and their total knowledge score for both groups (p=0.032*& 0.003*) **(p <0.005)**. This finding might be due to regular and structured interactions through WhatsApp group that lead to consistent reinforcement of knowledge and translating into positive lifestyle changes.

Conclusion:

Tele-nursing method was more effective in enhancing patients' knowledge and lifestyle modification than traditional method. Less than one tenth of tele-nursing and traditional groups had good total knowledge about hypertension pre-program, however post- program increased to majority and more than two thirds of them respectively. More than fifth of tele-nursing and traditional groups had satisfactory total lifestyle practices pre-program and increased to majority and more than three fifths of them respectively post-program, however there were positive highly statistically significant correlation between total knowledge and lifestyle practices among TN group post- program **(p ≤ 0.001),** and there were positive statistically

significant correlation between total knowledge and lifestyle practices among traditional group post- program **(p < 0.005)**.

Recommendations: Enhance applying tele-nursing via follow up to improve hypertensive patient's adherence to a healthy lifestyle practices. Regularly conduct educational programs to improve patients' knowledge and practices to be able to modify their lifestyle practices. Conduct additional studies to explore the impact of tele-nursing on improving other chronic disease management. Further studies needed to focus on improving quality of life of hypertensive patients.

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دراسة مقارنة :تأثير برنامج التمريض عن بُعد والبرنامج التقليدي تجاه تعديل نمط الحياة بين مرضى ارتفاع ضغط الدم

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يساعد تعديل نمط الحياة على خفض مستوي ضغط الدم المرتفع .وهدفت هذه الدراسة إلى مقارنة تأثير برنامج التمريض عن بُعد وبرنامج التمريض التقليدي فيما يتعلق بتعديل نمط الحياة لدى مرضى ارتفاع ضغط الدم. وقد أجريت هذة الدراسة على ٢٨٠ عينة عشوائية من مرضى ارتفاع ضغط الدم المترددين على العيادات الخارجية بمستشفيات جامعة بنها, تم تقسيمهم إلى مجموعتين متساويتين؛ حيث تلقى 140 مريضًا برنامجًا تعليميًا تقليديًا، بينما تلقى 140 مريضًا آخر برنامج التمريض عن بُعد. حيث كشفت النتائج عن٦,٤% و 7.1%من مجموعتي التمريض عن بُعد والتمريض التقليدي على التوالي يمتلكون معرفة جيدة حول ارتفاع ضغط الدم قبل البرنامج، وارتفعت النسبة إلى 82.9% و 67.9%على التوالي بعد البرنامج .كذلك، كان 22.9% و 20.7%من مجموعتي التمريض عن بُعد والتمريض التقليدي على التوالي لديهم ممارسات نمط حياة مرضية قبل البرنامج، وارتفعت إلى 80.0% و 63.6%على التوالي بعد البرنامج .كما وُجدت علاقة ارتباط إيجابية ذات دلالة إحصائية عالية بين المعرفة ونمط الحياة في كلا المجموعتين بعد البرنامج وأوصت الدراسة بتعزيز تطبيق التمريض عن بُعد من خلال المتابعة لتحسين التزام مرضى ارتفاع ضغط الدم بنمط حياة صحي .