Effect of Tele-nursing Instructions on Adherence to Therapeutic Regimen and Improving Symptoms for Patients with Peptic Ulcer

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Abstract:

Back ground: Peptic ulcer is an excavation that forms in the mucosal wall of the stomach, pylorus, duodenum and in the esophagus. Tele-nursing has a great contribution to ensuring continuity of care for patients following hospitalization. **Aim:** To evaluate effect of tele-nursing instructions on adherence to therapeutic regimen and improving symptoms for patients with peptic ulcer.**Patients and Methods: Research design:** Aquasi experimental research design (study and control). **Setting:** Tropical Medicine and Gastroenterology department at El - Rajhi liver Hospital at Assuit University hospital .**Sample:**A purposive sample of 60 male and female patients diagnosed with peptic ulcer.**Tools: Tool (I):**Patient's assessment sheet.**Tool II:** Morisky Medication Adherence Scale (MMAS-8).**Results:** Statistically significant difference in adherence level of study group before and after telenursing instructions (2.03±1.67&6.93±0.91) respectively. While in control group there was no statistically significant difference in adherence level (2.13±1.38& 3.6±1.43).Also , there was improving in symptoms for patients with peptic ulcer among study group than control group after applying tele-nursing instructions.**Conclusion:**Telenursing instructions improved adherence level of patients to therapeutic regimen and improved symptoms for patients with peptic ulcer **Recommendations:** Further studies aimed at improving patient adherence using telenursing strategiesf or patients with peptic ulcer should be applied.

Keywords: Adherence, Peptic ulcer, symptoms ,Telenursinginstructions, andTherapeutic regimen.

Introduction:

Peptic ulcers are sores that develop in the lining of the stomach, lower esophagus, or small intestine (the duodenum), usually as a result of inflammation caused by the bacteria H. pylori, as well as related erosion from stomach acids, frequent use of aspirin, ibuprofen, and other anti-inflammatory drugs, smoking, drinking too much alcohol, radiation therapy, stomach cancer **(Kuna et al., 2019).**

Peptic-ulcer disease causes significant morbidity and mortality in the elderly. It frequently presents in an atypical manner and is associated with a high incidence of complications. The prevalence of Helicobacter pylori increases with age and can have an important role in the development of ulcers. Nonsteroidal anti-inflammatory drugs also contribute to the increased incidence of ulcers and the development of complications in the elderly **(Borum, 2018).**

Patients with PUD may be symptomatic or asymptomatic. Symptomatic patients generally present with dyspepsia, i.e., upper abdominal pain or discomfort. Most of the time, the pain is felt in the epigastric region. The pain is burning,gnawing, or dull aching in nature and generally non-radiating but rarely can radiate to the back in the case of posterior penetrating ulcer **(Robert et al., 2019).**

Patients with gastric ulcer may feel pain shortly after taking food, but in the case of

duodenal ulcer, pain is generally felt 2–3 h after taking meal, or sometimes patients wake up at night with epigastric pain. Duodenal ulcer pain is generally relieved after taking antacids orfood which has minimal effect on relieving gastric ulcer pain. Other symptoms include abdominal discomfort, weight loss, poor appetite,belching, nausea, and vomiting. Sometimes patients may feel gas and bloating sensation in the abdomen. Some may also experience blood in stool and vomit, and black stools that indicate gastrointestinal bleeding (**Kavitt, et al., 2019).**

According to the American Tele-Health Association (2018), tele-nursing is a tool for delivering nursing care remotely to improve efficiency and patient access to healthcare (**American Tele-Health Association, 2018).**

Tele-nursing includes all kinds of nursing care and services that can be provided from distance and includes awide range of communication technologies such as phone, fax, email, internet, and video call to overcome time and distance difficulties and provide better nursing care. Among these devices, phone calls are frequently used in telenursing as telephone is accessible for majority of people in our society. In calling system, patients receive calls from health care personnel on periodical basis and get advice on their treatment, receive educational information.Nurses can make use of technology to conduct telenursing sessions from their homes, in clinics and hospitals (**Patti and Denise., 2019).**

Tele-Nursing saves patients'time and provides the opportunity to educate them remotely espicially elderly patients who have limitations in seeking medical services and consultations.Thus, patients those living in rural areas,are no longer obliged to travel long distances and,consequently, both medical costs and self-referrals to the emergency department decrease. In general, telenursing is an efficient route for enhancing patient care and disease management. (**Balenton and Chiappelli, 2017).**

The treatment of PUD varies depending on the etiology of the ulcer, whether the ulcer is initial or recurrent, and whether complications have occurred. Overall treatments aimed at relief of symptoms, the healing of the ulcer and the prevention of symptomatic recurrence and complications. Drug regimens containing antimicrobials such as clarithromycin, metronidazole, amoxicillin, and bismuth salts and anti-secretory drugs such as the H2-receptor antagonist and proton pump inhibitor are used to relieve ulcer symptoms, heal the ulcer, and eradicate HP infection dietary modifications may be important for some patients, especially those who are unable to tolerate certain foods and beverages, reducing stress and decreasing or stopping cigarette smoking is often encouraged (**Kumar et al., 2019).**

Adherence to treatment regimens is generally defined as the extent to which a patient properly follows medical advice (eg, treatment regimen, lifestyle tips, advice concerning disease management (**Saag et al., 2018).** The concept of therapeutic adherence therefore refers to a great diversity of behaviors that include taking part of the treatment, not stopping a medication before the course of treatment is completed, not taking more or less medication than prescribed, not taking a dose at wrong time, furthermore developing health behaviors, avoiding risk behaviors and attending appointments arranged by health professionals (**Gómez Padilla et al., (2021)**

Patient compliance is an important factor for the successful outcome of the treatment regimen. Patient counselling and follow-up helps in the successful management of peptic ulcer. Patients with peptic ulcer disease should be notified about the possible complications (**Francis et al., 2020).**

Gastroenterology nurses should monitor patients, keep the team updated on the patient's condition and should educate the patient on disease process itself, drugs, possible changes in lifestyle (alcohol intake, smoking), dietary instructions, regular follow-up care and medication compliance to obtain symptom relief and a cure (**Malik et al., 2020).**

Significance of the study:

Peptic ulcer disease is a global problem**,** relevant data has shown that incidence of peptic ulcers has now reached 5%-10% of the

worldwide population, increasing in recent years **(Xie et al., 2022).** According to the newest WHO data published in 2020 Peptic Ulcer Disease Deaths in Egypt reached 1,339 or 0.25% of total deaths. The age adjusted Death Rate is 1.89 per 100,000 of population ranks Egypt 119 in the world **(WHO , 2020).** Due to the widespread benefits of Tele-nursing and potential of this technology in improving patient education regardless of the time and space limitation and also due to limitation on patients admission on hospital nowadays so this study was carried out to investigate the effect of applying tele-nursing on adherence and improving symptoms for patients with peptic ulcer.

Operational definition:

Tele-nursing: is operationally defined in this study as the use of telecommunications technology to provide nursing instructions for peptic ulcer patients at a distance through phone calling.

Adherence: is defined as the degree of correctly following instructions provided by the health care personnel's by patients.

Therapeutic regimen: Peptic ulcer disease can be controlled by pharmacologic therapy, lifestyle modifications (cessation of alcohol intake and smoking), dietary modifications and regular follow-up care.

Aims of the study were to:

General aim; evaluate effect of tele-nursing instructions on adherence to therapeutic regimen and improving symptoms for patients with peptic ulcer.

Specific objectives;

1.Assess patients adherence to therapeutic regimen.
2.Assess symptoms of petic ulcer among patients.
3.Design, implement and evaluate effect of tele-nursing instructions on adherence to therapeutic regimen and improving symptoms.

Research hypotheses: The following research hypothesis was formulated to achieve the aims of this study:

1.The tele-nursing instructions will have a role in improving adherence to therapeutic regimenamong the study group than the control group.

2.Symptoms will be improved as a results from improving adherence to therapeutic regimenamong the study group than the control group.

Patients and Methods

Research design:

A quasi-experimental research design (study / control) was utilized in this study, which is a type of evaluation aims to determine if a program or intervention has an intentional effect on a study's participants **(Miller et al ., 2020).**

Study variables:

The independent variable was the telenursing instructions while the dependant variables were adherence to therapeutic regimen and improving symptoms for patients with peptic ulcer.

Setting of the study:

The study was conducted in the Tropical Medicine and Gastroenterology department at El - Rajhi liver Hospital, Assuit University.It is a teriary- level university hospital which dedicated to hebatobiliary and gastroenterologyical disorders and liver transplantation in the south of Egypt so, we selected this setting because this hospital more specialized in Tropical Medicine and Gastroenterology and patients whom diagnosed with peptic ulcer only admitted at this hospital.

Sample:

A Purposive sample of (60) male and female patients,they equally divided randomly into study and control groups (30 for

each).Random sample (one for study group and one for control group).

» Study group were the patients who received tele-nursing instructions.

» Control group were the patients who received routine hospital instructions.

Inclusion criteria: Patients diagnosed with peptic ulcer their age more than 18 years, recurrent exposed to peptic ulcer, willing to participate in the study and free from cognitive impairment or psychiatric disorders.

Sample size

Sample size was calculated by using the EP-INFO intervention with a confidence level 95% and the flow rate of patient's cases in 6 months so the sample was calculated to be 83 patients 23 patients drop out during the data collection, only 60 patients agreed to participate and completed the study period.

Tools: two tools were used to collect data:

Tool I: Patient assessment sheet, this tool was developed by researchers to assess demographic data, and symptoms. It used prior applying of tele-nursing instructions and after four weeks from applying of tele-nursing instructions. It included two parts:

1. Demographic data: Patient name, age, gender, marital status, residence, educational level, occupation,phone number, and smoking.

2. Symptoms assessment sheet: This tool was developed by the researchers after reviewing the relevant literature to assess symptoms of peptic ulcers as (Epigastric abdominal pain, bloating, abdominal fullness, nausea and vomiting, appetite changes, weight loss/ Wight gain, Jaundice, hematemesis, and melena). This part answered either with yes or no responses.

Tool II: Morisky Medication Adherence Scale (MMAS-8)

The MMAS evaluates items addressing the circumstances surrounding adherence behavior , it was developed by **Morisky et al. (2008).** It was adopted by the researchers for assessing patients' adherence level to therapeutic regimen. MMAS-8 is one of the most widely used tools to assess patient's adherence. It includes 8 items with Yes/no responses and is thus quick and simple to use.

Contents of (MMAS-8)
Item 1: asks about forgetness of taking pills.

Item 2: asks about reasons other than forgetting to take medications.

Item 3: asks about cutting back or stopping to take medication without telling doctor, because felling worse when took it.

Item 4: asks about forgeting to bring along medication when travelling or leaving home.

Item 5: asks about taking medications yesterday.

Item 6: asks about stopping taking medication at any time.

Item 7: asks about feeling hassled about sticking to treatment plan.

Item 8: asks about having difficulty in remembering to take all medications.

Scoring system*:*

» A score of zero was given for a positive response while a score of one was given for a negative response for questions 1, 2, 3, 4, 6 and 7 (Yes = 0; No = 1). Contrariwise, for item 5, a score of zero was given for a negative response while a score of one was given for a positive response (Yes = 1; No = 0).

» For item 8 is on a five-point Likert scale , a score of one was given for 'Never/Rarely' while a score of zero was given for 'Once in while/Sometimes/Usually/All the time'.

» The total score was eight. Patients who had a score below 6 were considered having low adherence. Patients who had a score between 6 < 8 were considered having medium adherence. While patients who had a score equal 8 were considered having high adherence.

Tele-Nursing instructions: It was developed by the researchers after reviewing related literature and was written in simple Arabic language that was consistent with the related literature to meet patients'' needs and their level of understanding. Experts in the field of nursing and gastroenterology medicine checked the contents for comprehensiveness, clarity and applicapility and related corrections were done.It included diagrams, pictures with colors which were primarily intended for attracting and guiding patients to comply with their therapeutic regimens. It included brief informations on theoretical background of peptic ulcers disease as (definition , symptoms and methods of treatments). The instructions covered dietary instructions, healthy life style modifications as cessation of smoking and compliance with treatments.The nursing instructions was presented to patients in the form of handouts and printed material.

Ethical Consideration:

Permission to carry out the study was obtained from the ethical committee of the Faculty of Nursing (11-2020) and from the hospital authorities of AlRajhy Liver Hospital.There was no risk for studied patients during application of the research. The study was followed common ethical principles in clinical research. Prior to the initial interview, the researchers introduced themselves to patients. Oral consent was obtained from patients who participated in the study, after explaining the nature and purpose of the study. Confidentiality and anonymity were assured. Study patients had the right to refuse to participate and or withdraw from the study without any rational at any time. Study spatients privacy was considered during collection of data.

Content validity and reliability: It was established by a panel of five experts (three experts from Medical Surgical Nursing

staff and two from Tropical Medicine and Gastroenterology staff) who reviewed the tool for clarity, relevance, comprehensiveness, understanding, and applicability. Minor modifications were required. Test reliability of tool II was ascertained with Cronbach's alpha = 0.90

Pilot Study:

It was implemented on 10% of the sample (six patients), to find out the feasibility and clarity of the tools, and identify any difficulties needed to be handled. No alterations were done to the tools, so the sample of the pilot study was involved in the actual study sample.

Operational Design:

1) Assessment phase:

- The researchers met the selected patients (study and control group), each patient was completely informed with the purpose and nature of this study and the patients' agreement was obtained. demographic data were collected and assessment of symptoms done using (tool I) then, assessment of adherence to therapeutic regimen done using (tool II).

2) Implementation phase:

- Through this phase the researchers met the study group and clarified the content of nursing instructions for them, each patient was met for one session, the session took about 30-40 min. Researchers interviewed the patients one time then telephone number which included Whats App was taken from each patient for follow up through tele-nursing (weekly).

- Nursing instructions were applied on an individual basis. One of the family members attended the session to confirm patient support and increasing their sense of responsibility.

- Patients were given an educational (booklet) in clear Arabic language,which aimed to equip the patients with basic knowledge about PUD and emphasizing importance of adhring to therapeutic regimen which aids in management of symptoms and early recovery.

- **The nursing instructions (booklet) contents covers the following:**

▪ Brief explanation on basic information about PUD as (definition, signs and symptoms, diagnosis, complications and treatment regimen).

▪ Instructions which should be followed by patients for management of PUD as; right administration of medication; following a healthy life style as cessation of smoking and avoidance of alcohol; avoidance of stress; healthy eating habits as beverage restrictions, reducing coffee, tea, cola beverages, beer, and spices which causes dyspepsia, encouraging bland diets eating and regular follow up.

- After session there was 5-10 minutes for discussion and feedback. Reinforcement was performed according to patients' needs to ensure understanding.

- The researchers used pictures and diagram to help them retain the learned material. The study was carried out in the morning shift.

- Tele-nursing instructions were carried out throughout a period of one month for the study group only while the control group received the routine hospital instructions.

- The researchers arranged with the patients the time for follow up through tele-nursing (phone, E mail and whats App) weekly for one month.

- On tele-nursing the researchers phoned the patients (weekly) with a duration of approximately15-20 minutes for each patient and reminding them of importance of adherence to therapeutic regimen and other instructions which explained before.

- At the end of the call, the patients were allowed to ask questions. The researchers provided explanations, necessary consultations, and information according to their needs.

- This study was carried out through the period from May 2021 to Septmber 2021 at morning shift.

3) Evaluation phase:

In this phase, both study and control group were reassessed after one month using the same tools through tele-nursing (phone, Email, and whats up).

Statistical Design

All the data was tallied and examined. For statistical analysis, SPSS software version 19 was used. Frequency and percent were used to express categorical data. The mean and standard deviation (SD) were used to express numerical data. The T-test was used to compare the three sets of numerical data that were analyzed. The Chi square test was developed to compare numerical data groups. If the P-value was less than 0.05, it was regarded significant, if it was less than 0.001 it considered highly significant, and if it was more than 0.05, it considered non-significant.

Results:

Table (1): shows that the highest percentage of both study and control group their age were more than fifty five years, mean age was (49.10±17.48) years for the study group and (52.43±18.31) years for the control group. married and non-smokers. As regards to gender the highest percentage of control group were male (63.3%) while male to female ratio were equal (50%) in study group. As regarding marital status majority of patients in study and control group were married (90% & 86.7%) respectively. Regarding residence the highest percentages of study group (73.3%) were from rural areas while in control group, most of them (60%) were from urban areas. Concerning educational level about one third (33.3%) of the study group were illiterate and (33.3%) were university educated while half of patients (50%) in control group were secondary educated. In relation to patients'occupation, one third of the study group(33.3%) were housewives and in control group more than half (53.3%) were not working. The highest percentage of patients were not smoking in study and control group (76.7% & 0%) respectively.

Table (2): illustrates that there was statistically significant difference in adherence level of study group before and after telenursing instructions (2.03±1.67&6.93±0.91) respectively. While in control group there was no statistically significant difference in adherence level (2.13±1.38& 3.6±1.43).

Figure (1): reflects that highest percentages of patients in both study and control group suffering from symptoms of peptic ulcer pre telenursing instructions with epigastric abdominal pain is the predominant symptom in

majority of patients in control group (93.3%) and (100%) in study group.

Figure (2): reveals that most symptoms were improved in study group in contrast to control group after applying telenursing instructions.

Table (3): clarifies that there was statistical significant relation between

adherence to therapeutic regimen for study group with their demographic data before and after telenursing instructions in those items (age, residence, and smoking).

Table (4): presents negative correlation between study and control group regarding adherence to therapeutic regimen and symptoms.

Table (1): Distribution of studied sample as regarding to their demographic characteristics.

Demographic characteristics.	Study(n=30)		Control(n=30)		P. value
	No	**%**	**No**	**%**	
Age					
18<30 years	5	16.7	6	20.0	
30<40 years	4	13.3	0	0.0	0.190
40<55 years	10	33.3	9	30.0	
> 55 years	11	36.7	15	50.0	
Mean±SD	49.10±17.48		52.43±18.31		0.474
Gender					
Male	15	50.0	19	63.3	0.297
Female	15	50.0	11	36.7	
Marital status					
Single	3	10.0	4	13.3	0.688
Married	27	90.0	26	86.7	
Residence					
Urban	8	26.7	18	60.0	0.009**
Rural	22	73.3	12	40.0	
Education					
University	10	33.3	1	3.3	
Secondary School	4	13.3	15	50.0	<0.001**
Preparatory School	2	6.7	10	33.3	
Read and write	4	13.3	1	3.3	
Illiterate	10	33.3	3	10.0	
Occupation					
Employer	6	20.0	7	23.3	
House wife	10	33.3	7	23.3	
Not work	8	26.7	16	53.3	0.055
Retired	2	6.7	0	0.0	
Free work	4	13.3	0	0.0	
Smoking					
Yes	7	23.3	12	40.0	0.165
No	23	76.7	18	60.0	

*- Chi square **Significant level at P value < 0.01*

Table (2): Distribution of studied sample as regarding to their adherence to therapeutic regimen before and after telenursing instructions.

Adherenceto therapeutic regimen	Study (n=30) before telenursing instructions		after telenursing instructions		P. value	Control (n=30) before telenursing instructions		after telenursing instructions		P. value
	No	%	No	%		No	%	No	%	
Low adherence	30	100.0	1	3.3	<0.001**	30	100.0	28	93.3	0.150
Medium adherence	0	0.0	19	63.3		0	0.0	2	6.7	
High adherence	0	0.0	10	33.3		0	0.0	0	0.0	
Mean±SD(range)	2.03±1.67(0-5)		6.93±0.91(5-8)		<0.001**	2.13±1.38(0-5)		3.6±1.43(1-6)		<0.001**

*Independent T-test   Chi square test **Significant level at P value < 0.01*

Figure(1): Distribution of studied sample as regarding to symptoms of peptic ulcer before telenursing instructions (n=60 study and control).
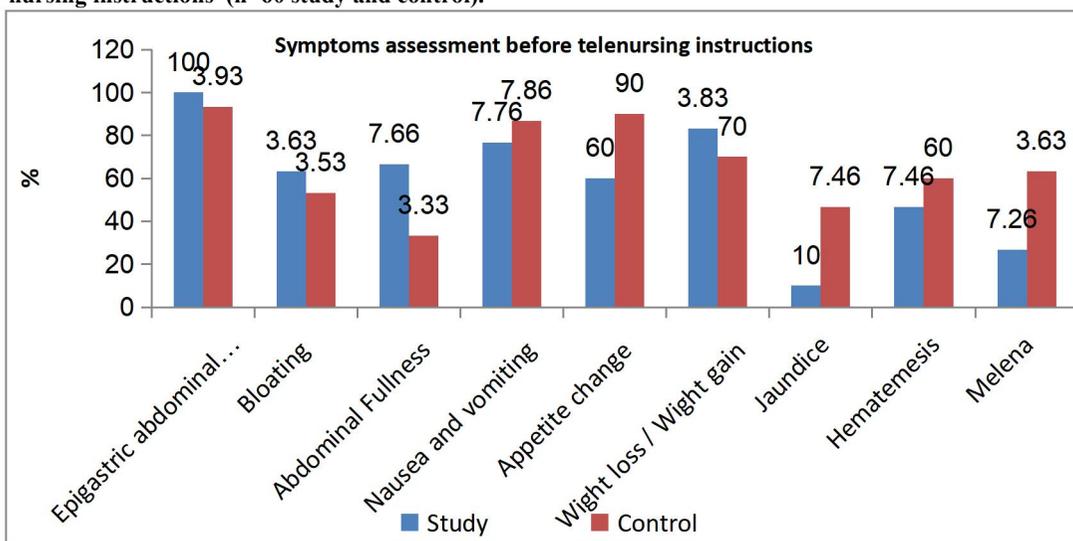
Figure(2): Distribution of studied sample as regarding to symptoms of peptic ulcer after telenursing instructions (n=60 study and control).
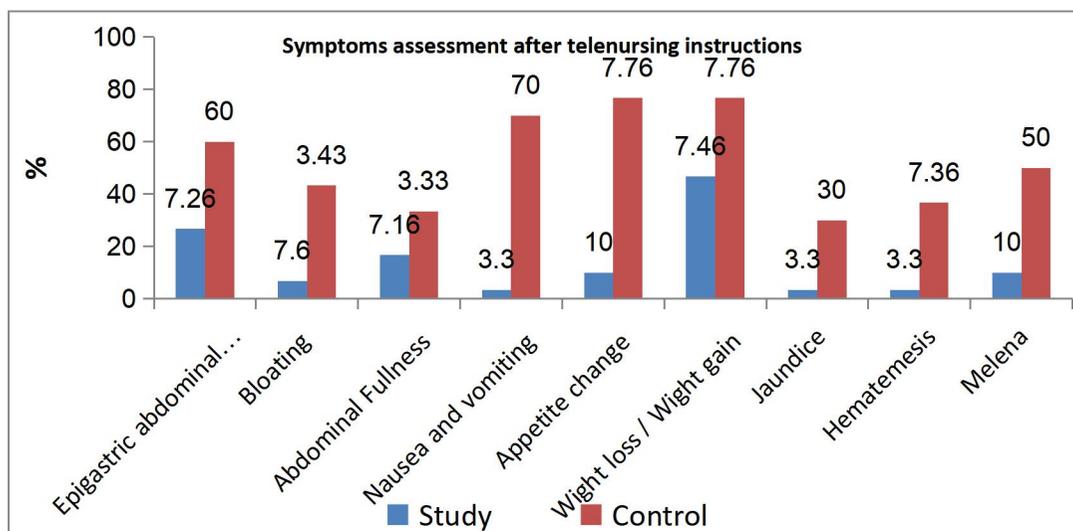
Table (3):- Relation between adherence to therapeutic regimen for study group with their demographic data before and after telenursing instructions (n=30).

Demographic characteristics	N	Medication Adherence Scale	
		Before telenursing instructions Mean ±SD	After telenursing instructions Mean ±SD
Age			
18<30 years	5	3±1.87	7.6±0.55
30<40 years	4	1±0	7±0
40<55 years	10	1.4±1.07	6.7±0.82
>55 years	11	2.54±2.01	6.81±1.16
P. value		**0.124**	**0.325**
Gender			
Male	15	2.2±1.78	7±0.93
Female	15	1.87±1.6	6.87±0.92
P. value		**0.594**	**0.695**
Marital status			
Single	3	2.33±2.31	8±0
Married	27	2±1.64	6.81±0.88
P. value		**0.749**	**0.029***
Residence			
Urban	8	3.5±1.77	7.25±0.89
Rural	22	1.5±1.3	6.82±0.91
P. value		**0.002****	**0.256**
Education			
Univeristy	10	3.4±1.84	7.6±0.7
Secondary School	4	2.5±1.73	6.5±0.58
Preparatory School	2	1±0	6±0
Read and write	4	1±0	7±0
Illiterate	10	1.1±0.88	6.6±1.07
P. value		**0.006****	**0.030***
Occupation			
Employer	6	3±1.79	7.17±0.75
House wife	10	1.5±1.51	6.5±0.85
Not work	8	1.5±1.41	6.75±1.04
Retired	2	5±0	8±0
Free work	4	1.5±0.58	7.5±0.58
P. value		**0.019***	**0.109**
Smoking			
Yes	7	1.29±0.49	7±0.82
No	23	2.26±1.84	6.91±0.95
P. value		**0.181**	**0.829**

Independent T-test -   - One-way Anova T-test
*Significant level at P value < 0.05, **Significant level at P value < 0.01

Table (4):- Correlation between adherence to therapeutic regimen for study and control group with symptoms before and after telenursing instructions(n=60).

Peptic ulcer symptoms	Morisky Medication Adherence Scale							
	Study				Control			
	Before telenursing instructions		After telenursing instructions		Before telenursing instructions		After telenursing instructions	
	r	P	r	P	R	P	R	P
Epigastric abdominal pain	-	-	-.363-*	0.049	-.239	0.203	-.233	0.215
Bloating	.445*	0.014	-.382-*	0.037	-.195	0.301	-.457-*	0.011
Abdominal Fullness	.498**	0.005	-.550-**	0.002	-.312	0.093	-.200	0.288
Nausea and vomiting	-.232	0.218	.226	0.229	-.170	0.370	-.009	0.964
Appetite change	-.233	0.215	-.108	0.569	-.093	0.626	.312	0.094
Wight loss / Wight gain	.170	0.370	-.098	0.608	-.391-*	0.033	.195	0.301
Jaundice	-.204	0.280	-.403*	0.021	.187	0.321	.021	0.910
Hematemesis	-.209	0.269	.226	0.229	0.000	1.000	.249	0.184
Melena	.120	0.528	-.440-*	0.015	-.252	0.180	.311	0.094

statistically Significant Correlations at P. value <0.05
**statistically Significant Correlations at P. value <0.01*

Discussion:

Peptic ulcer (PU), characterized by a long course of the disease and higher relapse, is a common disease in gastroenterology, among which gastric ulcer and duodenal ulcer are the most predominant ones **Lanas and Chan (2017).** Insufficient disease-related knowledge and self-care ability, poor compliance after discharge, poor medication adherence, and the recurrence of the disease may hinder the quality of life of patients **Lee et al., (2017).**

Telenursing is anovel field that uses innovative technologies to offer safe ,effective and ethical care in atimmely manner. Telenursing recently became an essential component in the delivery of primary care to patients during the COVID 19 pandemic. It is an excellent career option for nurses during 21 st century **Das et al ., (2022).** So, this study conducted using Quasi experimental research design in an attempt to evaluate the effect of of tele-nursing instructions on adherence to therapeutic regimen and improving symptoms and to compare with patients whom had no tele-nursing instructions.

This study showed that mean age was 49.10±17.48 years for the study group and 52.43±18.31years for the control group. These study results concur with those of **Liu et al. (2021),** who conducted research on PU patients. Their findings showed that the observation group mean age was 50.06 ± 5.31 years while the control group mean age was 49.28 ± 5.49 years and this may be explained by age-related changes in gastric mucosal defense.

As regards to gender nearly two thirds of patients were male in control group while male to female ratio were equal in study group. Concerning marital status; majority of patients were married. As regards to residence the present study showed that nearly three quarters of patients resident in rural areas while nearly two thirds of them were from urban areas in control group.This finding was in agreement with a study conducted in Faculty of Nursing, Zagazig University by**Abd Allah et al., (2021)** who revealed that nearly two thirds of the elderly patients were males, slightly more than two thirds of patients belonged to rural areas and they added that nearly three quarters were married. On the other way, it was not agreed with **Elsayad et al., (2017), Lipatova et al. (2020) at Saratov, and Albaqawi et al. (2017)**

in a research in Saudi Arabia, as they found in their study about PUD, that the disease was common among women more than among men. From the researcher's point of view, it could be due to varied precipitating factor for peptic ulcer disease.

In terms of educational attainment, the current study showed that half of the patients in the control group had only completed secondary school, compared to one third of study group participants who were illiterate and one third who had completed a university degree. As regarding occupation , the highest percentages of the study group were housewives and in control group were not working. These findings was in accordance with **Elsayad et al., (2017)** who claimed that nearly half of patients were illiterate and nearly two thirds were not working. Also this agrees with **Hussein AL-Bahadli, (2013)** who reported that more than one third of patients were colleage graduates and nearly one third secondary educated and **Khan et al., (2020)** agrees with the previous findings as they stated that highest percentages of patients had completed secondary education.

The present study showed that the highest percentages among both groups were non smokers. This finding was in line with **Alsinnari et al., (2022)** who underwent a study on Two hundred twenty-three patients with peptic ulcers to assess recurrence and reported that the majority of included patients were non smokers.

Althubaiti et al., (2018) agreed with the above finding and clarified that there was no significant association of PUD with BMI, taking aspirin, doing exercise and smoking. Also they reported that nonsmokers patients suffered from peptic ulcer more often than smoker patients. Also in agreement with this previous finding **Alrayah, 2019** clarified that majority (73.8%) of patients had no smoking habit. On the other hand, these findings were contradicting with **Shamseya et al., (2015)** and the study proved that, peptic ulcers are more common in smokers than in non-smokers. Cigarette smoking is positively associated with peptic ulcer pathogenesis and delayed ulcer healing.

Interestingly; this study revealed that there was statistically significant difference in adherence to therapeutic regimen of study group before and after tele-nursing instructions while there was no statistically significant difference in control group adherence level. From the researchers point of views the possible explanation can be attributed that the reminding from the researchers and telehealth follow-up emphasized to patients the importance of taking medication on time; These efforts also gave patients the chance to learn more about PU, which made them more aware of the necessity of taking the right medication at the right time for recovery. Patients were more committed to their therapy as a result, and medication adherence increased dramatically.

These results are consistent with Liu et al (2021) findings which showed that there was a significantly higher compliance rate among the observation group than the control group following the intervention with ($p < 0.05$). Also **Fahimi et al., (2021)** agreed with the previous findings as they reported that a significant increase was observed among the observation group in the mean scores related to medication adherence compared with the control group after the educational intervention and added that messenger-based education enhanced peptic ulcer patient-related outcomes more effectively in the form of QoL and medication adherence.

In line with the previous finding **Hu, (2020)** reported that his study results indicated that before the intervention, the compliance scores of the observation and control groups were not significantly different while after the intervention, the compliance behavior scores of the observation group were significantly higher than the control group. Additionlly he added that patients with chronic gastric ulcer can improve their compliance behavior through application of targeted nursing based on basic life care which can significantly raise patients' levels of disease cognition and medication adherence.

Also in line with the previous finding **Wang et al., (2017)** in a study conducted in China and entitled as (Effect of evidence-based nursing care on treatment compliance and

quality of life in elderly patients with peptic ulcer), they clarified that the compliance with regard to behavior, exercise, diet, and medication in the observation group was better than that in the control group ($P < 0.05$).

The present study clarified epigastric abdominal pain predominates in most patients in both the control group and the entire study group. This result was consistent with **Elsayad, et al. (2017),** who found that the majority of patients experienced epigastric pain. **Alrayah (2019),** reported similar results, as they stated that the most prevalent symptom in the majority of patients was discomfort in the epigastria area.

The results of the current study showed that while there was no statistically significant difference between the two groups regarding peptic ulcer disease signs and symptoms prior to receiving telenursing instructions, there was a statistically significant difference between the two groups regarding signs and symptoms following telenursing instructions. From the researchers point of view this improvement of signs and symptoms could be attributed to the fact that tele-nursing increased patients' health-related awareness for better outcomes. It can also be linked to earlier findings of this study, as there was a significant improvement in adherence level in the study group compared to the control group, which had a positive impact on improvements of complaints.

This findings agreed with **Dong and Lan., (2020)** who conducted a study titled as "Effects of comprehensive nursing care on patients with duodenal ulcer" and clarified that in term of gastrointestinal symptoms scores(GIS) and gastrointestinal rating scores (GSRS) the significant differences were not found between the two groups (control and observation) at admission while at discharge GIS and GSRS were significantly lower among the observation group than among the control group with p value (P<0.001).

Also this result was consistent with findings of the study by **Liu et al., (2021)** who assessed the effect of application value of information-based health education and continuity of care in patients with PU and

evaluated clinical efficacy in term of disappearance of symptoms and cure of ulcer; their study findings showed that higher total effective rate of the observation group stood out by comparing with the control group (p < 0.05).

Concerning the relation between the adherence of the study group and their demographic characteristics the present study clarified that pre telenursing instructions there is a statistically significant difference in some variables as retired, university educated patients and who resident in urban areas had a higher compliance rate than others. From the researchers' point of view, this could attributed to their formal education background and availability of social media and teaching aids in urban environment which helped them to be aware of impotance of adherence to therapeutic regimen and could be because their life style amending the patients' attitudes toward the therapeutic regimens and enhancing their knowledge while after following patients via telenursing by researchers adherence level of mostly patients increased regardless of these variables.

This significance was contradicted by **Gómez Padilla et al., (2021)** who underwent a study titled as "Factors that influence adherence to treatment in patients with peptic ulcer in Bayamo" and reported that lack of adherence was found to be greater among male patients, workers, and those who lived in urban areas from the researchers point of views this could be due to different nature and sample of the study.

As regarding to the correlation between adherence to therapeutic regimen and improvements of symptoms the current study explained there is a negative correlation between adherence to therapeutic regimen and symptoms. From the researchers point of views this result could be attributed to patient compliance which is an important factor for the successful outcome of the treatment regimen and this was accomplished through patient education via telenursing which is inexpensive, safe, and convenient method.

This finding coincides with literature which reported that the most important factors that influence ulcer management and recurrence are Helicobacter pylori infection and NSAID use. Other factors include gastric acid hyper-secretion, cigarette smoking, alcohol use, a long duration of PUD, ulcer-related complications, and patient non-compliance **Kumar et al., (2019).**

Also the results obtained by **Gómez Padilla et al., (2021)** support this research result as they pointed out that the patients with greater therapeutic adherence are those who have a better perception of the effect of medication with an earlier recovery than those patients who do not comply with the prescribed treatment.

In this context, our findings reported that telenursing instructions improved the adherence level among patients, and thus constitute promising complements to clinical treatment regimens and so on improving signs and symptoms.

Conclusion

Up on the results of the current study it could be concluded that tele-nursing instructions had apositive effect on improving adherence of patients with peptic ulcer to therapeutic regimen and improving symptoms.These findings justified the research hypotheses.

Recommendations

▪ Patients with peptic ulcer disease need advice, support and information from health professionals in order to be able to understand the importance of adherence to therapeutic regimen.
▪ Educational booklet for peptic ulcer patients to improve adherence to therapeutic rigemen should be available in Tropical Medicine and Gastroenterology department at El - Rajhi liver Hospital in Assuit University Hospitals.
▪ Tele- nursing should be an integral part of care of peptic ulcer patients.

▪ Further studies aimed at improving patient adherence using telenursing strategies for patients with peptic ulcer should be applied.

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