Individualized Nursing Intervention: Its Effect on Enhancing Patients' Adherence to Hypertensive Treatment Plan

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Abstract

Background: Hypertension is one of the leading causes of death or disability. Treatment plan of hypertension is a combination of antihypertensive medications, and adoption of healthy life style. Non-adherence to treatment plan is a growing concern to healthcare systems. Therefore, several researches were conducted to investigate factors that might lead to non-adherence to treatment plan as well effect of individualized nursing intervention to improve patients' adherence to such treatment plan. **Aim of the study**: This study aimed to evaluate effect of individualized nursing intervention on enhancing patients' adherence to hypertensive treatment plan**. Method**: A quasi experimental study design was used to conduct this study in medical wards in one of the governmental hospitals. A purposeful sampling technique was used according to inclusion and exclusion criteria. Eighty four patients participated in this study. Three tools were used for data collection as follows: First tool; patient's demographic data assessment tool. Second tool; self-administered questionnaire tool, to assess factors affecting patients' adherence toward hypertensive treatment plan. Third tool; Hill-Bone Compliance to High Blood Pressure Therapy Scale, this tool was used twice before and after delivering individualized nursing intervention**. Results:** Revealed that, 57% of the studied sample their adherence were affected by some factors related to the medications, and nearly two third of them their adherence were affected by personal and financial factors. Also, the more increasing in age the more increasing non-adherence to treatment plan; this indicates that the factors affecting young age are different from those of the old age. Patient's adherence toward hypertensive treatment plan significantly improved after delivering the individualized nursing intervention that copes with age related factors and all other individualized ones. **Conclusion:** The current study proved that individualized nursing intervention is significantly effective on enhancing patients' adherence to hypertensive treatment plan through identifying and managing factors that hinder each patient to be adherent to the described treatment plan. **Recommendation**: In the light of the study results, the researchers recommended to conduct further studies that assess every age group separately as the factors and problems which hinder their adherence to hypertensive treatment plan among young age were completely different than those of the old age, as well to increase the number of the study sample to generalize the results, and to encourage nurses to follow the individualized care planning approach with their patients.

Keywords: Adherence - Treatment plan – Hypertension – Nursing intervention – individualized

Introduction:

Hypertension is a worldwide health problem. It contributes to the burden of cardiovascular diseases, stroke, and renal failure and might lead to early mortality or disability. Uncontrolled hypertension is still a crucial medical and psychosocial problem in developed as well as developing countries. However, risk factors, prevention, and controlling mechanisms for hypertension disease are well familiar, the negative outcomes resulting from hypertension disease will possibly continue for many years. This makes hypertension is the most terrible social and health related challenges. The maximal beneficial effect of an appropriate treatment plan can be achieved only if patients strictly are being adhered to the recommended treatment plan *(Yue et al; 2015; Mekonnen et al; 2017).*

Medication adherence and persistence is recognized as a worldwide public health problem, particularly important in the management of chronic disease. Non-adherence to medical treatment plans affects every level of the population *(Costa et al; 2015).* Adherence to hypertensive treatment plan is defined as the extent to which patients take prescribed medications as well as adopting and being committed into prescribed healthy life style as diet, exercises, and medical follow up visits. Adherence to prescribed hypertensive treatment plan is a complex and multidimensional challenge. A proper investigation for the factors that lead to patient's poor adherence could guide the health care providers specially nurses for developing individualized nursing interventions to improve adherence to treatment plan among patients who have different diseases *(Yue et al; 2015; Kalogianni, 2019).*

Chronic conditions such as hypertension could affect negatively on physical, mental, and social well-being of individuals. Therefore, adherence to treatment plan is crucial; as patient's adherence to such plan will maximize the benefits of treatment, reduce the risk of complications, and improve the quality of the patient's life. Meanwhile, poor adherence to such plan is roadblock to better quality of life. Non-adherence with treatment plan continues to be one of the main causes of poor control of any disease especially chronic one and might lead to multiple organ failure, as well increase in morbidity and mortality *(Shameena,et al; 2017; Shah et al; 2018; Heydari et al; 2019).*

It is worth mentioned that, to improve patient's adherence to hypertensive treatment plan, scientific researchers believe that there might be some factors that could affect patients' adherence, which are classified into; patient-level factors for instance; age, gender, lack of social support, and psychological, cognitive or medical vulnerability can also play a part, race/ethnicity, education, and income or socioeconomic status and organizational factors such as; health care providers' level as the patient-physician or nurse relationship and communication, health care providers' attitudes toward disease and its treatment plan, and their knowledge and skills related to hypertensive treatment plan that might have potential to influence patients' adherence behavior, in addition to medication-related factors such as; effect of medication on controlling hypertension, and its side effects *(Hsu et al; 2014; Conn et al; 2016; Al-Ganmi et al; 2018; Uchmanowicz et al; 2018; Al-Ganmi et al; 2019).*

Adherence is defined and characterized by the level of agreement between what the physician prescribes and the individual's behavior in terms of medication, nutrition and changes in lifestyle (*Almedia et al; 2016).* Adherence to hypertensive treatment plan plays a key role in maintaining and improving patient's outcomes. In the contrary, neglecting medication adherence causes severe adverse health outcomes *(Ni et al; 2018).* Therefore, it has been suggested several nursing interventions that aim to enhance patient's adherence toward such plan. These nursing interventions can be divided into interventions that are centered on the patients' education that may improve patients' knowledge about their disease, and interventions that focus on raising awareness about importance of being adhered to hypertensive treatment plan as well the consequences from not being adhered (*Costa et al; 2015)*.

Health care providers especially nurses are considered as the most important ones in assisting to enhance patients' adherence toward their treatment plan. For example, nurses often have a personal connection with the patients before they receive any treatment plan. This connection helps patients to better accept nurses' education about the risks and benefits of following treatment plan for any disease as prescribed *(Shah et al; 2015; Uchmanowicz et al; 2018*).

Adherence to hypertension treatment is understood as the degree of agreement between the behavior of the patients and the recommendations of the healthcare

providers in view of the treatment plan. Although various strategies exist to evaluate the adherence to hypertension treatment plan, there is no agreement on a gold standard. To assess patient's adherence to treatment plans, several methods and tools are used by several researchers, as many authors developed different questionnaires to assess patient's adherence to different treatment plans in chronic diseases such as hypertension *(Boratas & Kilic, 2018).*

There are many validated instruments used for this purpose as that of Hill-Bone Compliance to High Blood Pressure Therapy Scale used to assess patient behaviors for three important behavioral domains of high blood pressure treatment; reduced sodium intake; appointment keeping; and medication taking. Use of this scale is beneficial in planning and implementing effective individualized nursing intervention as a part of hypertensive treatment plan. Nurses may find this scale useful as a teaching tool to guide behavior modification of hypertensive patients that will lead to control their hypertension (*Kim et al; 2000*).

Significance of the Study

The World Health Organization has reported that about 62% of cerebrovascular diseases and 49% of ischemic heart diseases burden worldwide are attributed to uncontrolled high level of blood pressure. Patient's non-adherence with hypertensive treatment plan is a predominant reason for failing to control hypertension. Health care providers especially nurses should be aware of various factors affecting patients' adherence to treatment plan in order to be able to provide them with the needed instructions and guide them to control it for better health condition *(Shah et al; 2018).*

Aim of the Study

This study aimed to evaluate the effect of safety measure educational guideline on knowledge, practice and adverse health outcome among pesticide workers through**:**
Evaluate the effect of individualized nursing intervention on enhancing patients' adherence to hypertensive treatment plan through:

1) Assessing levels of patients' adherence toward their hypertensive treatment plan before delivering the individualized nursing intervention.
2) Identifying patients related factors that have an effect on their adherence toward hypertensive treatment plan.
3) Developing individualized nursing intervention based on identified patients related factors.
4) Assessing level of patients' adherence toward hypertensive treatment plan after delivering individualized nursing intervention.

Research Hypothesis:
Delivering individualized nursing intervention has effect on enhancing patient's adherence to hypertensive treatment plan.

Methods

The study was conducted in the different Medical Wards of one of the governmental hospitals in Egypt. The study started from May to October 2019. A quasi experimental study design was used. As well, a purposeful sampling technique was applied according to the specified inclusion and exclusion criteria. The subjects in the initial assessment were 105, but 21 of them were dropped throughout the study due to inability to approach the patients for follow up regularly. Accordingly, only 84 patients completed the study.

Inclusion/Exclusion Criteria:

Adult patients can read and write with different educational levels, and are of different age groups, under hypertensive treatment plan at least for a year, free from any other chronic/acute diseases, or any cognitive limitations that may affect direct interaction with the researchers, as the study is based on successful interaction between researchers and patients.

Data Collection Tools:

Data were collected by using three tools; **First Tool was; Patients' Demographic Data Assessment Tool** that was used to assess patient's demographic characteristics as gender, age, educational level**,** type of job, availability of health insurance, period of being diagnosed as hypertensive patient.

Second Tool was: Self-administered questionnaire that was used to assess factors that affect patients' adherence toward their own hypertensive treatment plan, which was adopted from ***Bonnie et al; (1999)*** and it included the participant's perception and health beliefs, economic and social factors that might affect her/his adherence to hypertensive treatment plan. This tool was used once to build up on it the individualized nursing intervention for each participant.

Third Tool was: Hill-Bone Compliance to High Blood Pressure Therapy Scale that was adopted from ***Kim et al; (2000),*** and used twice before and after delivering the individualized nursing intervention to evaluate the level of patients' adherence for her/his own treatment plan. This tool contained 14 assessment points that covering all aspects of hypertensive treatment plan including the behavioral domains relevant to the effective treatment. The tool has 4 possible responses; the lower score indicated more adherence to hypertensive treatment plan, and the higher score indicated non-adherence to hypertensive treatment plan.

Scoring system of this tool as follows; each item is a 4 point levels. The response options consist of "none of the time =1", "some of the time =2", "most of the time =3", and "all the time = 4", and the responses will identify the gab that need to be covered in the individualized nursing intervention. Therefore, the findings of second and third tools used in the development of the individualized nursing intervention.

Validity and Reliability of Data Collection Tools:

They are the main components to assess the quality of data collection tools. Validity was done to assess to which degree the tools will measure what is proposed to be measured. Meanwhile, the reliability was done to identify the accuracy of the obtained data in research study, it was assessed by using Cronbach's alpha test, and its values were as follows; factors affecting adherence = 0.90 and Hill-Bone Compliance High Blood Pressure Therapy Scale questionnaire = 0.97.

With regard to this study, validity of the tools was tested by 3 Professors from Medical Surgical Nursing from different universities. In addition, they ensured that the tools assessing all components of the study that respond to the study hypothesis and achieve its aim. Moreover, the assessors ensured that the translated version accurately reflecting the meaning before conducting the pilot study which was done by using 10% of the study sample to ensure that the implementation of the study plan and the tools were accurately working. The results of pilot study revealed that, the data collection tools needed some wording modifications and reordering of their contents to be understood. The tools were modified accordingly and patients who participated in the pilot study were excluded from the main study sample.

Ethical Consideration

Approval of the Research Committee in the University was obtained to conduct this study, as well as from the Hospital Director after explaining its aim, implementation plan, and the policy of maintaining the participants' rights throughout the study

Based on the hospital administration request the hospital name is kept. The researchers informed the patients that, they had the right to withdraw from the study at any time. In addition, the researchers informed them that, the data collection tools were anonymously designed. After all these clarifications, the researchers obtained a written consent form

from each patient that proves that she/he was willing to participate in the study.

Data Collection Phase:

Data collection was done in 2 phases as follows; first phase; was called pre - delivering individualized nursing intervention; after assessing patients' demographic data, the researchers conducted baseline assessment for the patients to assess their adherence toward hypertensive treatment plan. The researchers asked each patient to fill in data collection tools and first and second tools took from 25-30 minutes to be filled in.

According to the findings that resulted from the baseline assessment in the current study, the researchers developed individualized nursing intervention for each patient to cover each patient's needs through instructions/guidance to enhance her/his adherence to hypertensive treatment plan. The researchers prepared the content by using flyers and brief written instructions about antihypertensive medications, actions, side effects, precautions that should be followed as well as treatment plan and health instructions related to healthy life style that should be followed by the patients.

All these content were written by simple, clear, and understandable Arabic language and offered to each patient separately. Then, the researchers met each patient 20-25 minutes to explain to her/him an overview about hypertension disease, asking questions by the patients and answers of the researchers. In each session the researchers explained to the patient what should be done to improve her/his adherence toward hypertensive treatment plan.

After delivering individualized nursing intervention the researchers informed each patient that for the period of 3 months, first month the researchers followed up the patient to what extent the she/he was adhered to treatment plan, and this was done either through a visit that will be done by the researchers to the patient who participated in the study during her/his follow up visit in outpatient clinic to reassess to what extent she/he was adhered toward taking medications and instructions that have been given to them in individualized nursing intervention, and after two months the researchers repeated the assessment again by the same way, and based on their responses the researchers recorded the results as a post delivering individualized nursing intervention..

Statistical Analysis:

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 18, through using frequencies, percentages and Chi Square test. The results of the study were reported by using descriptive statistics (frequencies, percentages, and means).

Result:

Table (1): Frequency & Percentage Distribution of Demographic Characteristics of the Hypertensive Patients Included in the Study (n= 105)

Items	No.	%
Gender		
Male	53	50.4
Female	52	49.5
Age (in years)		
20 - 30	6	5.7
31- 40	15	14.2
41- 50	35	33.3
51- 60	39	37.1
61-70	10	9.5
$\bar{x} \pm SD$	50.6 ± 9.6	
Education		
Can read and write	30	28.5
Intermediate	33	31.4
Above intermediate	35	33.3
University	7	6.6
Type of job		
Governmental	40	38
Private	31	29.5
Without job/retired	34	32.3
Years of having hypertension		
1 - < 5	46	43.8
5 - < 10	34	32.3
10 - < 15	20	19
15- < 20 years	5	4.7
$\bar{x} \pm SD$	7.29 ± 4.3	
Health insurance		
Yes	47	44.7
No	58	55.2

Table (1) showed that more than two third of the studied sample's age varied between 40 and 60 years, with a mean age of 50.6 ± 9.6. It also revealed that the highly educated participants were limited to 6.6%. Meanwhile, those with (no job or retired) represented 32.3%. Adding to that 55.2% of the studied sample had no health insurance. With regard to years of suffering or being under treatment for hypertension, (43.8%) of the patients under this study had five years or less having hypertension. It is worth to mention that the mean years of suffering from hypertension among the studied sample was 7.29 ± 4.3.

Table (2): Frequency & Percentage Distribution of the Patients related Factors Affecting their Adherence toward Hypertensive Treatment Plan (n= 84)

#	Factors that affect patients' adherence to treatment plan	Yes	
		No.	%
1	**Different medication related factors:** (as hindering side effects, Frequency of medications, duration of taking medications, unpleasant medication taste)	48	57
2	**Different personal related factors:** (as patient needed someone to support in implementing all the treatment plan/patients was not fully understanding the instructions or the plan/written instructions were not readable or so concise or not given/lack of communication between patient and physician/patient was not given enough time to interact and express all needs and limitations to follow the plan, etc.).	50	59.5
3	**Different financial related factors:** (as limited /no health insurance /expensive medications and lack of accessibility to medication/having many other family obligations) .	49	58.3

Table (2) clearly represented that, 57%, 59.5%, and 58.3% of the studied sample had medication, personal and financial related factors, that might have negative effect on their adherence toward hypertensive treatment plan respectively.

Table (3): Percentage Distribution of Initial Assessment to Patient's Adherence to Hypertensive Treatment Plan (n=84) (According to the Hill Bone Compliance Scale, 2016).

	Items	All of the time		Most of the time		Some of the time		None of the time	
		N	%	N	%	N	%	N	%
1	Patient forget to take hypertensive medication	-	-	71	84.5	13	15.5	-	-
2	Patient decides to not to take hypertensive medication	-	-	71	84.5	13	15.5	-	-
3	Patient eats salty food	-	-	71	84.5	13	15.5	-	-
4	Patient adds salt on food before eating it	-	-	71	84.5	13	15.5	-	-
5	Patient eats fast food	-	-	71	84.5	13	15.5	-	-
6	Patient rarely confirms the next appointment before leaving the physician's clinic	-	-	84	100	-	-	-	-
7	Patient misses scheduled appointments with the physician	-	-	84	100	-	-	-	-
8	Patient forgets to get prescriptions filled	-	-	71	84.5	13	15.5	-	-
9	Patient runs out of hypertensive medication	-	-	84	100			-	-
10	Patient skips hypertensive medication before going to the physician	71	84.5	13	15.5	-	-	-	-
11	Patient misses taking hypertensive medication when feel better	71	84.5	13	15.5	-	-	-	-
12	Patient misses taking hypertensive medication when feel sick	71	84.5	-	-	13	15.5	-	-
13	Patient takes someone else's hypertensive medications	71	84.5	-	-	13	15.5	-	-
14	Patient misses taking hypertensive medication as they are do not care	71	84.5	-	-	13	15.5	-	-

Table (3) showed that, before delivering individualized nursing intervention 84.5% of the studied sample were not adhere to hypertensive treatment plan all of the time in a feature of; skipping medication dose before going to the physician, not taking medication when feel sick, take some else's hypertensive medication, do not take medication correctly as they are do not care. In the same table, 84.5% of the studied sample most of the time were not adhered to hypertensive treatment plan in a feature of; forgetting to take medication, decided to not take their medication, eat salty foods, add salt to food before eating, eat fast foods, and forget to get prescription filled. Meanwhile, all the entire sample rarely confirm the next appointment before leaving the clinic, and runs out medication, the majority of the studied sample was not adhered to hypertensive treatment plan most of the time.

Table (4): Percentage Distribution of Patient's Adherence to Hypertensive Treatment Plan after Delivering of Individualized Nursing intervention (n=84) (According to the Hill Bone compliance Scale, 2016)

	Items	All of the time		Most of the time		Some of the time		None of the time	
		N	%	N	%	N	%	N	%
1	Patient forget to take hypertensive medication	-	-	51	60.7	-	-	33	39.3
2	Patient decides to not to take hypertensive medication	-	-	51	60.7	-	-	33	39.3
3	Patient eats salty food	-	-	51	60.7	-	-	33	39.3
4	Patient adds salt on food before eating it	-	-	-	-	51	60.7	33	39.3
5	Patient eats fast food	-	-	-	-	51	60.7	33	39.3
6	Patient confirms the next appointment before leaving the physician's clinic	-	-	-	-	64	76.2	20	23.8
7	Patient misses scheduled appointments with the physician	-	-	51	60.7	13	15.5	20	23.8
8	Patient forgets to get prescriptions filled	-	-	51	60.7	13	15.5	20	23.8
9	Patient runs out of hypertensive medication	-	-	51	60.7	20	23.8	13	15.5
10	Patient skips hypertensive medication before going to the physician	-	-	51	60.7	20	23.8	13	15.5
11	Patient misses taking hypertensive medication when feel better	-	-	-	-	84	100	-	-
12	Patient misses taking hypertensive medication when feel sick	-	-	-	-	84	100	-	-
13	Patient takes someone else's hypertensive medications	-	-	-	-	84	100	-	-
14	Patient misses taking hypertensive medication as they are carless	-	-	51	60.7	33	39.3	-	-

Table (4) showed that, after delivering individualized nursing intervention 60.7%, of the studied sample was adhered to hypertensive plan all of the times in a feature of; did not forget to take medication, decided to take their medication and did not eat salty foods. While, 60.7%, 60.7% and 76.2% of the studied sample did not add salt to food before eating, did not eat fast foods, and confirm the next appointment before leaving the clinic some of the time respectively. Meanwhile, 23.8%, 23.8%, 23.8%, 15.5% and 15.5% of the studied sample did not miss scheduled appointment with the physician, did not forget to get prescription filled, and did not runs out hypertensive medication, did not skip medication before go to the physician respectively. Moreover, all entire sample some of the time misses taking medication when feel better, misses taking medication when feel sick, and patient takes someone else's hypertensive medications, and 39.3% of them miss taking hypertensive medication as they do not care.

Table (5): Relations between Patients' Demographic Data and Adherence to Hypertensive Treatment Plan before and after Delivering Individualized Nursing Intervention.

Item		Pre				Post			
		Adherence		Non –adherence		Adherence		Non –adherence	
Gender		N	%	N	%	N	%	N	%
Male		3	7	40	93	25	58	18	42
Female		5	12	36	88	30	73	11	27
Significance test	X²	0.663				2.098			
	P- value	0.415				0.148			
Age (in years)									
20 - ≤ 30		0	0	4	100	4	100	0	0
31 - ≤ 40		2	25	6	75	8	100	0	0
41 - ≤ 50		2	7	25	93	17	63	10	37
51- ≤ 60		3	9	31	91	17	50	17	50
61 +		1	11	8	89	9	100	0	0
Significance test	X²	47.33				23.248			
	P -value	<u>0.05</u>				0.89			
Qualifications									
Can read and write		1	3	34	97	10	67	5	33
Intermediate		3	18	14	52	8	47	9	53
Above intermediate		2	8	22	92	18	75	6	25
University		1	14	6	86	4	57	3	43
Significance test	X²	2.220				4.068			
	P -value	0.695				0.397			
Health insurance									
Yes		4	11	32	89	26	72	10	28
No		4	8	44	92	29	60	19	40
Significance test	X²	0.184				1.268			
	P -value	0.668				0.260			
Years of having hypertension									
1- ≤ 5									
6 ≤ 10		4	11	33	89	24	65	13	35
11 ≤ 15		2	7	27	93	19	66	10	34
16+		1	6	16	94	11	65	6	35
		1	100	0	0	1	100	0	0
Significance test	X²	18.983				15.093			
	P -value	0.215				0.445			
Type of job									
Governmental		3	10	27	90	20	67	10	33
Private		4	16	21	84	15	60	10	40
Without job/retired		1	3	28	97	20	69	9	31
Significance test	X²	2.467				0.776			
	P -value	0.291				0.507			

Table (5) clarified there is a significant relation between the age of the studied sample and non-adherence to hypertensive treatment plan as before delivering individualized nursing intervention non-adherence increased with age increase (P = 0.05). However, this condition subsided completely after delivering the individualized nursing intervention.

Discussion:

Control of high blood pressure for hypertensive patient is considered a great challenge. Adherence to medications is a matter of concern, identification of health beliefs toward taking medications has great effect on adherence to hypertensive treatment plan.

According to the findings of this study, the mean age of the studied sample was 50.6±9.6 years; with regard to gender, almost fifty percent of them were males. In relation to educational level, less than one third of the studied sample can read and write, while nearly one third of them had either intermediate or above intermediate education, in addition to less than one tenth of them had university education.

In relation to having health insurance, the present study results stated that, more than half of the studied sample had no health insurance. As regards duration of having hypertension, finding of the present study showed that, more two fifths of the studied sample had hypertension less than one to five years. With regard to type of job, the current study finding revealed that, more than one third of the studied sample had governmental job. All of the above mentioned characteristics may have a direct or indirect effect on patient's adherence to the hypertensive treatment plan.

As indicated in the current study, some factors were affecting patients' adherence toward hypertensive treatment plan as follows; more than half of the studied sample had medications related factors that affect negatively on their adherence to hypertensive treatment plan, and these factors were; presence of side effects, frequency and duration of taking medications, and unpleasant medication taste. This might happen due to medication related factors which may cause some restrictions that could affect patients' daily life style, as the patients could not be able to commit to take their medications regularly and follow treatment plan appropriately. In the same line with these findings, *Wang et al; (2014),* who stated that, a recent diagnosis of hypertension and a longer duration of antihypertensive medication usage and life style modifications together with comorbidities such as depression have been reported to be associated with poor medication adherence.

As revealed from this study results nearly three fifths of the studied sample had personal related factors that negatively effect on their adherence to hypertensive treatment plan such as; the patients had no one family member to remind them by the medication time, time of taking medication was not convenient for them, patients were not sure how to take the medication, as they were not fully understanding the instructions. This is due to patients might lack of knowledge about importance and benefits of being adherent to medication as constant control of signs and symptoms of disease, side effects and precautions. These results are supported by those of *Al-Ganmi et al. (2019),* who reported that, poor patients' knowledge about hypertensive treatment plan, and lack of social support, or educational level of the patients might affect their beliefs about importance of being adherent to hypertension treatment plan. In addition, these results are also supported by those of *Devkota et al. (2016),* who stated that, patients intentionally avoided treatment plan because of long term need for medications, and fear of side effects and once they feel better they stopped their medications and stopped to follow treatment plan.

In the current study, the results showed that, less than three fifth of the studied sample had financial related factors that affected negatively on patients' adherence such as; medication was expensive and not accessible all the time for them. These happened as a result of the expensive price and having many other family obligations, so the patients did not take the medications regularly, to have it most of the time during

each month. In addition, the place for getting the medications was far from patients' homes. In agreement with these findings, ***Al-Ganmi et al. (2018) and Ling et al; (2020)*** who clarified that, lower economic status of the patients has effect on their adherence to hypertensive treatment plan. In addition, it is very important to give enough time and being patience to assess and fulfill the individualized patient's needs in order to help and to assist them financially, when needed, for successful adherence to the treatment plan.

Regarding to comparison between baseline assessment patients' adherence to hypertensive treatment plan before and after delivering individualized nursing intervention, the present study result revealed that, slightly less than three fifth of the studied sample most of the time was not adhering before delivering individualized nursing intervention, and tenth of the studied sample some of the time was adhering to hypertensive treatment plan. Meanwhile, nearly one third of the studied sample became most of the time adherent to hypertensive treatment plan after delivering nursing intervention.

In addition, more than two fifth of them became some of the time adherent to treatment plan after delivering individualized nursing intervention. This finding could be explained by the patients who might have poor knowledge about hypertension disease, they were not aware by its significance and serious effect on them, but after delivering the individualized nursing intervention, they acquired too much knowledge about the important items in hypertensive treatment plan which let them became more committed into treatment plan.

This study finding was supported by that of ***Shah et al. (2018),*** who mentioned that, intervention and educating patients about their diseases enhance them to have better adherence in relation to their treatment plan. As well, this finding is supported ***by Ampofo et al.* (2020),*** who mentioned that educational intervention can improve health literacy and consequent adherence to medications among individuals with hypertension. As well, this might indicate that there is some shifting from violating the

treatment plan for some limited time. However, the current study result was in disagreement with the previous findings ***Conn etal. (2016)*** who indicated that, intervention and educating patients that included providing health education to manage medications' side effects were not effective methods to increase medications' adherence. As well, ***Crawshaw et al. (2017), and Sieben et al. (2019),*** who mentioned that, health care provider led intervention revealed small effect on medications' adherence, there is no effect of developed intervention on adherence.

The current study stated that, there was a statistically significant relation between non adherence and age of the studied sample. This might be due to that the older the age the poorer adherence to treatment plan as the older patients might not be fully aware by the importance of taking medications on time and being committed to treatment plan. In addition, older patients might live alone which could be one of the most important factors to let them not adherent to their treatment plan as they might forget required instructions. Moreover, this could happen as a result of some actions from different individualize that reflected negatively upon patients' adherence to hypertensive treatment plan.

This study finding was supported by that of Uchmanowicz ***et al. (2018), and Shah et al. (2018),*** who reported that, older age, and living alone are determinants of the lower adherence to medication and treatment plan, as well as whenever the age increases, adherence to treatment decreases. Meanwhile, the above mentioned study results was in disagreement with those of ***Mohammad et al. (2015),*** who reported that, younger patients were found to be less adherent than older ones.

Conclusion:

The study concluded that, the individualized nursing intervention had highly statistically significant effect on enhancing patients' adherence to

hypertensive treatment plan through identifying and dissolving the factors that hinder each individual hypertensive patient included in the study to follow the treatment plan, as support and guidance were developed based on their actual needs, abilities and availability of resources.

Recommendations:

This study recommended that:

1- Conducting further studies that assess every age group separately as the factors and problems which hinder the adherence to hypertension treatment plan among young age were completely different than those of the old age. To increase the number of the study sample for generalization of the results. To encourage nurses to follow the individualized care intervention approach with their patients. To offer patients with all supportive resources that facilitates their understanding to the treatment plan.

2- As the level of adherence in the study was measured using a direct method based on a self-reported questionnaire, which is considered as subjective method it is recommended to use an objective tool to assess patients' adherence.

Limitations:

The most significant limitation is that the study sample was small and recruited from one hospital, so results cannot be generalized.

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