



## Effect of Health Education about Care of Stroke Patients on the Burden of Care Providers and their Quality of Life

Eman Ahmed Abdullah Aziz<sup>(1)</sup>, Om Ibrahim Ali El Saey El Mliegy<sup>(2)</sup>,  
Amany Lotfy Abdelaziz Esmail<sup>(3)</sup>, Amany Kamal Mohammed<sup>(4)</sup>

1230

1. PhD. Researcher of Medical Surgical Nursing (Corresponding author), Faculty of Nursing, Tanta University.
2. Prof. of Medical Surgical Nursing (Main Supervisor), Faculty of Nursing, Tanta University.
3. Prof. of Medical Surgical Nursing, Faculty of Nursing, Tanta University.
4. Lecturer of Medical Surgical Nursing, Faculty of Nursing, Tanta University.

### Abstract

**Background:** It is estimated that the burden of care for stroke patients' care providers is increasing in the world due to the lack of support from the organizations and associations. This study aimed to evaluate the effect of health education about care of stroke patients on the burden of care providers and their quality of life. **Setting:** Neurology Department for nursing staff and stroke out patients' clinic for family care providers at Tanta University Hospitals. **Design:** A quasi-experimental. **Subject:** All nurses 50 from Neurology Department and convenience sample 70 of family care providers. **Tools:** 6 tools were used: **Tool (I)** Nursing Interview Questionnaire. **Tool (II)** Expanded Nursing Stress Scale. **Tool (III)** Family Care providers Interview. **Tool (IV)** Zarit Burden Questionnaire. **Tool (V)** Ways of Coping Questionnaire. **Tool (VI)** Quality of Life (SF-36) Questionnaire. **Results:** Immediately after implementation of the educational program; (62.0%) of the studied nurses had occasionally stress factors, and (72.0%) of them had increase in quality of life. As well as (67.1%) of the family care providers had mild to moderate burden and (54.3%) of them had increase in quality of life. **Conclusion:** Immediately after implementation of the educational program there was an enhancement in the studied nurses and family care providers' knowledge, using of coping ways, and quality of life and reduction in the care of burden. **Recommendation:** Further study is recommended on large sample and in different hospitals settings in order to generalize the result.

**Key words:** Health education, Burden, Care providers, Quality of life.

DOI Number: 10.48047/NQ.2022.20.20.NQ109128

NeuroQuantology 2022;20(20): 1230-1252

### Introduction

Stroke is a devastating disease and a medical emergency situation sometimes called a brain attack. It is the second leading cause of death and the major cause of long term, physical, psychological and social disability in the elderly around the world (Feigin et al., 2022). Stroke is an injury to the brain that has significant effects that extend far beyond the health of individual to family and community (Elbqry, 2019).

Unlike other chronic disability conditions, the onset of stroke disability is sudden (Suksatan, 2020) and caring for stroke patients is a very complex activity that needs special care and services not related to chronic disability only but also related to changes in quality of life for stroke survivors such as mental, psychological, physical, and socioeconomic disorders (Taha, 2020).

Care providers either nurses at hospital or family members at home (father, mother, sister, spouse, daughter, ...) are the backbone of services provided to surviving stroke patients, as they bestow survivors with treatment, feeding, hygiene, activities of daily

living (ADL) and emotional support (Pucciarelli et al., 2018).

Stroke caregiving often has a negative impact on care providers with a decreased quality of life (QOL) and high levels of burden, depression, anxiety, exhaustion, hopelessness, fatigue, decreased physical health, reduced productivity, social isolation, economic problems, and physical impairments including sleeping issues and (neck- shoulder-lower back) pain that might threaten the recovery of stroke survivors (Ugur, 2019).

**Burden of care** or in other words "care burden" is defined as physical, mental, emotional, and psychological hardship that care providers may experience when caring for their patients due to amount of time and assistance devoted to dealing with the consequences of disability, also constant high levels of stress and ineffective or inadequate coping methods. It also includes financial and social problems, and deterioration of family relationships (Vericilerinin, 2017).

The term **quality of life (QOL)** is a concept that reflects physical, emotional and social behaviors and attitudes of an individual, regarding their previous and current health



status(Tsai et al., 2018).The level of burden experienced by care providers is likely to be influenced by a variety of factors. Some characteristics of stroke patients and their care providers, as well as external support mechanisms, were found to be candidate determinants of care providers' burden(Efi et al., 2017).

**The needs of care providers** are dynamic over time, which requires individualized attention and adaptations to improve their life significantly. Care providers attempted to deal with the challenges they faced, using both effective and unsuccessful coping strategies. Care providers should be aware of the connection between caregiving and stress, as well as coping strategies. Care providers should try to shift attitudes toward positive coping mechanisms in this direction(Farahani et al., 2020).

Studies investigating the interaction between patients' characteristics, providers' attributes, and support mechanisms that eventually determine the burden of care and QOL experienced by the care providers are scarce.This information is important because strategies directed at care providers are likely to be more successful if they target modifiable determinants of the caregiving burden and address specific care providers' needs(Noori & Ebrahim, 2020).

Although health care professionals are advised to maximize the well-being of both patients and care providers, less attention is paid to care provider burden compared with patient outcomes(Tosun & Temel, 2017). Burden of care for stroke patients' care providers could be improved with implementation of an educational training program which is vital and fundamental component of rehabilitation that designed to acquisition of skills, attitudes and knowledge to meet needs of care providers, minimize level burden of care, improve quality of life for care providers, and enhance coping strategies among care providers of stroke survivors(Sharifian et al., 2021).

### **Significance of the study:**

It is estimated that the burden of care for stroke patients' care providers is increasing in the world due to lack of support from the organizations and associations.Studies have shown that caring for a stroke survivor, especially those with a disabling condition places an undue burden on care providers which may in turn reduce their QOL, also threaten both the sustainability of care and recovery of stroke patients(Caro, 2018).

Care providers are the key persons in the recovery and rehabilitation process of stroke survivors(Pucciarelli et al., 2018). Despite multiple researches recommended the

development of patient care education which based on the care providers ' needs and recommended conduction of instructions based on the integration of skill building, psycho education, and social support to relieve the care burden they feel and enhance quality of life for care providers, there are few studies conducted to evaluate the effect of patient care education on the care providers of stroke survivors in Egypt (Naga et al., 2021; Abd Elmegeid, 2020). So that, the present study conducted to evaluate the effect of health education about care of stroke patients on the burden of care providers and their quality of life.

### **The aim of the study is to:**

Evaluate the effect of health education about care of stroke patients on the burden of care providers and their quality of life.

### **Research hypothesis:**

The following research hypotheses are formulated in an attempt to achieve the aim of the study:

1. Burden of care level on care providers for stroke patients is expected to be minimized after implementing the health education.
2. Quality of life for care providers is expected to be improved after implementing the health education.

### **Subject and Methods**

#### **Research design:**

A quasi-experimental research design (one group pre-posttest) was used to conduct this study.

#### **Setting:**

This study was conducted at Neurology Department for nursing staff care providers and at stroke out patients' clinic for family care providers at Tanta University Hospitals.

#### **Subject:**

- All nurses (50) from Neurology Department who are providing direct care and rehabilitation for patients with stroke.
- Convenience sample of 70 family care providers (father, mother, sister & relatives) from the above mentioned setting was taken to conduct this study. The sample size was calculated based on Epidemiological Information Program, based on the total of patients per year in the previous mentioned settings according to review of Tanta University Hospital Statistical Records.

#### **Inclusion criteria:**

- **For nurses:**  
All nurses from Neurology Department who are providing direct care and rehabilitation for patients with stroke.
- **For family care providers:**



Care providers providing care for a stroke patient for at least 6 hours a day for at least 1 month.

#### **Tools for data collection:**

Six tools were used to evaluate the effect of health education about care of stroke patients on the burden of care providers and their quality of life, which include the following:

#### **Nursing Care providers Tools**

##### **Tool (I): Nursing Interview Questionnaire:**

This tool was developed by the researcher and written in a simple Arabic language after reviewing the relevant literatures and it was divided into the following 2 parts:

**Part (1): Socio- demographic data of nursing staff:** which included; age, sex, marital status, professional qualification, occupation, total period of service in the nursing profession, total experience of nursing staff of caring stroke patients, and training courses; it composed of (9) closed ended questions.

**Part (2): Nursing Staff Knowledge Assessment Sheet:** it was developed by the researcher based on the related literature (Abd El-Hay, 2018; Farrag et al., 2018; Catangui, 2015) to assess nursing staff knowledge. It included the following:

- Knowledge about stroke (15) closed ended questions which included; definition, types, risk factors, manifestations, complications and treatment.
- Knowledge about assessment of stroke patients (15) closed ended questions which included; emergency assessment, neurological assessment, voluntary and involuntary reflexes assessment, swallowing assessment, communication assessment.
- Knowledge about care and rehabilitation of stroke patients (30) closed ended questions which included; safety measures, positioning techniques, managing airway and swallowing problems, medications, mobilization, skin care, rehabilitation, exercise program, healthy diet, oral care, urinary catheter care, prevent (infection, contractures, and skin breakdown) and provide emotional support for patients.
- **Scoring system of knowledge:**
  - (1) Correct answer.
  - (0) Incorrect answer or don't know.
- The total scoring system of nurses' knowledge (60) and calculated and classified as the following:
  - **High level of knowledge**  
> 80% of the total score
  - **Moderate level of knowledge**  
≥ 65% - 80% of the total score

- **Low level of knowledge**

< 65% of the total score

##### **Tool (II): Expanded Nursing Stress Scale (French, 2000):**

It was the best known and most widely used scale to measure sources and frequency of stress and burden perceived by nurses. This scale consisted of (59) closed ended questions, which was scored by summing the responses of the care provider items in five point Likert scale as the following: (0) Does not apply, (1) Never stressful, (2) Occasionally stressful, (3) Frequently stressful, and (4) Extremely stressful.

- **Classification of scores was as follows:**

- (1 – 59) **Never stressful**
- (60 – 118) **Occasionally stressful**
- (119 – 177) **Frequently stressful**
- (178 – 236) **Extremely stressful**

#### **Family Care providers Tools**

##### **Tool (III): Family Care providers Interview Questionnaire:**

It was developed by the researcher after reviewing the relevant literatures and it was divided into 3 parts:

**Part (1): Socio- demographic data of family care providers (TEXAS Department of Aging and Disability Services (DADS), 2017):** which included; age, sex, relation to the patient, marital status, number of children, educational level, economic status, occupation, history of illness, time of care, number of days of care, care provider needs, and care provider skills carried for stroke patients; it composed of (22) closed ended questions.

**Part (2): Socio- demographic data of stroke patients:** which included; age, sex, marital status, number of children, educational level, occupation, and history of illness; it composed of (9) closed ended questions.

**Part (3): Family Care Provider Knowledge Assessment Sheet:** it was developed by the researcher based on the related literature (Abdullah Aziz, 2019) to assess family care providers' knowledge. It included the following:

- Knowledge about stroke (15) closed ended questions which included; definition, types, risk factors, manifestations, complications and treatment.
- Knowledge about care of stroke patients (25) closed ended questions which included; assist patients with medications, feeding, self-care, activities of daily living, caring for skin, changing position, mobilization, follow up, maintaining safety, coping with life stressors and provide emotional support.
- **Scoring system of knowledge:**
  - (1) Correct answer.
  - (0) Incorrect answer or don't know.



- The total scoring system of relatives' knowledge (40) and calculated and classified as the following:

- **High level of knowledge**  
> 75% of the total score
- **Moderate level of knowledge**  
≥ 60% - 75% of the total score
- **Low level of knowledge**  
< 60% of the total score

#### **Tool (IV): Zarit Burden Interview Questionnaire (Bédard et al., 2001):**

This questionnaire examined the family care providers' burden of care associated with the physical, psychological, economic, and social life status. This questionnaire consisted of (22) closed ended questions, which was scored by summing the responses of the caregiver items in five point Likert scale.

- **Classification of scores was as the following:**

- (0 – 20) **No burden to little**
- (21 – 40) **Mild to moderate burden**
- (41 – 60) **Moderate to severe burden**
- (61 – 88) **Severe burden**

#### **Mixed (Nursing Staff and Family Care Providers) Tools**

#### **Tool (V): Ways of Coping (Revised) Questionnaire (Folkman & Lazarus, 1985):**

This questionnaire examined a wide range of thoughts and acts that the care provider had used to deal with the internal and/or external demands of specific stressful encounters. This questionnaire contained a (66) closed ended item and consisted of eight scales as the following: problem focused coping, wishful thinking, distancing, seeking social support, emphasizing the positive, self-blame, tension reduction, and self-isolation. It was scored by summing the responses of the care provider items in four point Likert scale as the following: (0) Not Used, (1) Used Somewhat, (2) Used Quite A Bit, and (3) Used A great deal.

- **Classification of scores was as the following:**

- (0 – 66) **Not used to somewhat**
- (67 – 132) **Used quite a bit**
- (133 – 198) **Used a great deal**

#### **Tool (VI): Quality of Life Short Form-36 (SF-36) Questionnaire (McHorney et al., 1994):**

This questionnaire had (36) closed ended questions and consisted of eight scales as the following: physical functioning, physical health problems, emotional well-being, emotional health problems, social functioning, limitations of activities, pain, and general health. It was scored by summing the responses of the care provider in each section.

- **Scores range from 0 – 100 which classified as follows:**

Lower scores (0 – 60) = **more disability.**

Higher scores (61 – 100) = **less disability.**

**Ethical and legal consideration:** informed consent was obtained from every nurse & family care provider included in the study. Privacy of the subjects' data was maintained, and confidentiality and anonymity were maintained by the use of code number instead of names.

**Validity of content:** All tools were tested for content validity by a jury of (6) experts in Medical Surgical Nursing specialist at the faculty of Nursing at Tanta University. Their opinions elicited regarding the format, layout, consistency, accuracy, clarity, relevancy of the tools and accordingly needed modifications were done.

#### **Reliability of tools:**

- **Cronbach's Alpha for Tool I is 0.816** "good" for 60 items applied on 5 nurses.
- **Cronbach's Alpha for Tool II is 0.890** "good" for 59 items applied on 5 nurses.
- **Cronbach's Alpha for Tool III is 0.826** "good" for 40 items applied on 7 family care providers.
- **Cronbach's Alpha for Tool IV is 0.924** "excellent" for 22 items applied on 7 family care providers.
- **Cronbach's Alpha for Tool V is 0.907** "excellent" for 66 items applied on both 5 nurses and 7 family care providers.
- **Cronbach's Alpha for Tool VI is 0.899** "good" for 36 items applied on both 5 nurses and 7 family care providers.

**Pilot study:** A pilot study was conducted on 10% of care providers those represent (5) of nurses and (7) relatives in order to test the feasibility, applicability and clarity of the constructed tools, and needed modification were done.

**Fieldwork:** The present study was conducted in about one year started from January 2021 to the end of December 2021 through four phases (Assessment, planning, implementation and evaluation) as the following:

#### **I. Assessment Phase (Pretest):**

##### **➤ For the studied nurses:**

The researcher explained the aim of the study and the components of the tools to the studied nurses. The researcher distributed a questionnaire to the studied nurses for assessing their knowledge, stress, coping ways and quality of life by using (Tool I, Tool II, Tool V, and Tool VI) at morning shift to assess who meet the inclusion criteria and was included in the study.





➤ **For the studied family care providers:**

The researcher explained the aim of the study and the components of the tools to the studied family care providers. The researcher distributed a questionnaire to the studied family care providers for assessing their knowledge, burden of care, coping ways and quality of life by using (Tool III, Tool IV, Tool V, and Tool VI) by the researcher at morning shift to assess who meet the inclusion criteria and was included in the study.

**II. Planning Phase:**

- The researcher was developed the educational program based on the baseline information gathered in the assessment phase and extensive reviews of related literature (Watkins, 2017; Rosewilliam, 2016; Feigin et al., 2016), in addition to managerial arrangement to carry out the study.
- Preparing the content of the educational program by the researcher to meet the care providers' needs according to pretest. An illustrative structured colored booklet based on literature review was prepared and written in simple Arabic and practical language supported by illustrative pictures as a guide to help the care providers understanding the contents.

**Expected outcomes:**

1. Improving of care providers' knowledge about stroke and rehabilitation of stroke patients.
2. Minimizing level burden of care on care providers of stroke patients.
3. Enhancing needs of care providers and coping strategies among care providers of stroke patients.
4. Improving quality of life for care providers of stroke patients.

**III. Implementation Phase:**

- ❖ The implementation of the educational program was carried out at the above mentioned settings. The educational program was administered in three sessions; the duration of each session ranged from 20-40 minutes. The sample was divided into small groups; each group was contained at least eight care providers.
- ❖ The educational program was presented in a clear and concise form, following the principles of adult learning, focusing on interactive learning and active participation. It

was implemented using different teaching methods and media.

❖ **Teaching methods and media:**

- Such as short lectures, group discussion, in addition to different audiovisual materials was used as pamphlets, pictures, posters and video to facilitate the teaching of each topic.
- ❖ The educational program was carried out by the researcher for the studied care providers throughout 3 basic sessions.
- ❖ The studied care providers either (nurses or family members) had taken the same simple content of each session but according to their level of understanding and occupation.

**The content of each session was divided as the following:**

❖ **First session:**

**The aim** of this session was to orient the studied care providers about importance of the program, its sessions & expectations of each session.

**Objectives:** the studied care providers should be able to identify program orientation and title expectations; anatomy and function of the brain; provide information regarding stroke (definition, types, risk factors, manifestations, prevention of recurrent stroke, treatment, complications).

**Contents:**

- Program orientation and title expectations.
- An over view of simple anatomy and function of the brain.
- Definition of stroke & its types.
- Risk factors & manifestations of stroke.
- Prevention of recurrent stroke.
- Treatment & complications of stroke.

❖ **Second session:**

**The aim** of this session was to orient the studied care providers about caring and rehabilitation for stroke patients and provide emotional support for stroke patients.

**Objectives:** the studied care providers should be able to demonstration and re-demonstration regarding caring and rehabilitation for stroke patients; providing emotional support for stroke patients.

**Contents:**

- Caring and rehabilitation for stroke patients.
- Demonstration and re-demonstration was done by the studied care providers on the patient under supervision of the researcher regarding care of stroke patients such as (assist with medications, feeding, self-care, activities of daily living; caring for skin; changing position;



mobilization ; maintaining safety; coping with life stressors ; providing emotional support) and rehabilitation with exercises.

❖ **Third session:**

**The aim** of this session was to help the studied care providers to identify care burden factors and focused on coping strategies.

**Objectives:** the studied care providers should be able to identify care burden factors; coping strategies to minimize are burden and improving quality of life.

**Contents:**

- Factors of care burden and how dealing with it.
- Ways of coping.
- Improving quality of life.
- Providing support to the patients and families.
- Revision & summarizes the training program; kept open discussion between the researcher and care providers and ask questions to provide feedback.

**IV. Evaluation Phase:**

➤ **For the studied nurses:**

- ❖ **First time:** before implementing of the educational program by using (Tool I, Tool II, Tool V, and Tool VI).
- ❖ **Second time:** immediately after implementing of the educational program by using (Tool I part 2, Tool II, Tool V, and Tool VI).
- ❖ **Third time:** after two months from implementing of the educational program by using (Tool I part 2, Tool II, Tool V, and Tool VI) for the previously mentioned purposes. The researcher interviewed with nurses at time of work at neurology department.

➤ **For studied family care providers:**

- ❖ **First time:** before implementing of the educational program by using (Tool III, Tool IV, Tool V, and Tool VI).
- ❖ **Second time:** immediately after implementing of the educational program by using (Tool III part 3, Tool IV, Tool V, and Tool VI).
- ❖ **Third time:** after two months from implementing of the educational program by using (Tool III part 3, Tool IV, Tool V, and Tool VI) for the previously mentioned purposes. The researcher was informed care providers to come to evaluate effectiveness of the program not to evaluate them and interviewed with family care providers at time of clinical visit follow up for their

stroke survivors or throughout previously registered mobile call under the researcher cost.

**Limitations of the study:**

Period for data collection was during COVID 19 pandemic where gathering was limited at outpatient clinics and working by half nursing staff capacity at neurology department so the researcher divided groups into “sub group” and time of sessions reduced to only 30 mins.

**Statistical Analysis:**

The collected data were organized, tabulated, graphically and statistically analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Quantitative data were presented using descriptive statistics in the form of frequency, percentages, range, mean and standard deviation. Chi-square test ( $\chi^2$ ) was used for comparisons between qualitative variables. Spearman correlation measures the strength and direction of association between four ranked variables. Fisher's exact test (FE) is a statistical test used to determine if there are nonrandom associations between two categorical variables. For comparisons between means for variables during three periods of intervention (F) value of analysis of variance (ANOVA) was calculated. Pearson's correlation coefficient (r) is the test statistics that measures the statistical relationship, or association, between two continuous variables.

**Significance of the results:**

- Highly significant at P value < 0.01\*\*.
- Statistically significant was considered at P value < 0.05\*.
- Non-significant at P value  $\geq$  0.05.

**Results**

**Table (1): Illustrates the distribution of the studied nurses regarding their socio demographic characteristics.**

It represented that more than half of the studied nurses (56.0%) their age ranged from (30 to < 40) years, while less than two thirds (62.0%) were female. Regarding marital status, majority of studied nurses (82.0%) were married, as well as majority (84.0%) were village residents.

Regarding the qualifications, Bachelor of Nursing qualification represented nearly two third of the studied nurses (66.0%) followed by Nursing Institute (26.0%). Bedside Nurses represented the highest occupation nearly more than two third of the studied nurses (68.0%) followed by the charge nurses (20.0%).

Regarding the experience years in profession, more than three quarters of the studied nurses (76.0%) had more than five to ten years of experience. Nearly two third of the studied nurses (66.0%) had experience years in



neurology ranging from 5 years to ten years' experience.

**Figure (1): Illustrates the training courses received by the studied nurses.**

It showed that more than half of the studied nurses (52.0%) haven't received any previous training courses. While the studied nurse had received training courses as ICU & emergency (34.0%) followed by first aid (30.0%), basic life support (26.0%) and infection control (24.0%).

**Table (2): Illustrates the distribution of the studied nurses regarding their total level of knowledge throughout periods of intervention.**

It was found that there was statistically significant difference has occurred related to **knowledge** among the studied nurses during implementation of the educational program as  $P = (0.000)$ . Finally, the total level of knowledge among the studied nurses was improved immediately more than after two months of implementation of the educational program.

**Table (3): Illustrates the distribution of the studied nurses regarding their stress level throughout periods of intervention.**

It was found that there was statistically significant difference has occurred related to **stress scale** among the studied nurses during implementation of the educational program as  $P = (0.000)$ . Finally, the total level of stress among the studied nurses was reduced immediately and after two months of implementation of the educational program.

**Table (4): Illustrates the distribution of the studied nurses regarding their using of coping ways throughout periods of intervention.**

It was found that there was statistically significant difference has occurred related to **coping ways** among the studied nurses during implementation of the educational program as  $P = (0.000)$ . Finally, the using of coping ways among the studied nurses was improved immediately and after two months of implementation of the educational program.

**Table (5): Illustrates the distribution of the studied nurses regarding their quality of life level throughout periods of intervention.**

It was found that there was statistically significant difference has occurred related to **disability level** among the studied nurses during implementation of the educational program as  $P = (0.001)$ . Finally, low disability among the studied nurses was improved immediately and after two months of implementation of the educational program.

**Table (6): Illustrates the correlation between levels of knowledge, stress, coping ways, and quality of life of the studied nurses throughout periods of intervention.**

It showed that there is statistically significant difference between coping ways level and quality of life among the studied nurses only pre intervention of the educational program  $P = (0.045)$  and positive correlation between coping ways level and quality of life immediately and after two months of the implementation of the educational program  $r = (0.318)$ ,  $P = (0.024)$ .

While, there is no statistically significant positive correlations between levels of knowledge, stress, and quality of life among the studied nurses throughout periods of intervention of the educational program.

**Table (7): Illustrates the distribution of the studied family care providers regarding their socio demographic characteristics.**

Regarding age, it represented that both age groups; from (20 to < 30) and (40 to ≤ 50) years represented one quarter of the studied family care providers (25.7%). Moreover, more than half of the studied family care providers (57.1%) were female, and more than one quarter (28.6%) were life partner. Regarding marital status, more than two thirds (72.9%) of the studied family care providers were married, as well as less than two thirds (61.4%) were village residents.

Regarding education, average qualification represented more than one third of the studied family care providers (40.0%) followed by high qualification (24.3%). Working care providers represented nearly two third of the studied family care providers (65.7%). Regarding monthly income, it was not enough among more than half of the studied family care providers (58.6%).

Nearly more than half of the studied family care providers (54.3%) not being the only care providers for patients and (55.7%) of them reported 1 week to 3 months duration of care, as well as less than two third of them (64.3%) provided daily care.

**Figure (2): Illustrates the aspects where the studied family care providers may need help.**

It showed that majority of the studied family care providers (95.7%) need more information regarding the disease, (87.1%) needed insurance, (85.7%) needed support groups, and (82.9%) needed for home safety.

**Table (8): Illustrates the distribution of the studied family care providers regarding their total level of knowledge throughout periods of intervention.**

It was found that there was statistically significant difference has occurred related to **knowledge** among the studied family care providers during implementation of the



educational program as  $P = (0.000)$ . Finally, the total level of knowledge among the studied family care providers was improved immediately more than after two months of implementation of the educational program.

**Table (9): Illustrates the distribution of the studied family care providers regarding their burden level throughout periods of intervention.**

It was found that there was statistically significance difference has occurred related to **burden of care** among the studied family care providers during implementation of the educational program as  $P = (0.000)$ . Finally, the total level of burden among the studied family care providers was reduced immediately and after two months of implementation of the educational program.

**Table (10): Illustrates the distribution of the studied family care providers regarding their using of coping ways throughout periods of intervention.**

It was found that there was statistically significance difference has occurred related to **coping ways** among the studied family care providers during implementation of the educational program as  $P = (0.000)$ . Finally, the using of coping ways among the studied family care providers was improved immediately and after two months of implementation of the educational program.

**Table (11): Illustrates the distribution of the studied family care providers regarding their quality of life level throughout periods of intervention.**

It was found that there was statistically significance difference has occurred related to

**disability level** among the studied family care providers during implementation of the educational program as  $P = (0.001)$ . Finally, low disability among the studied family care providers was improved immediately and after two months of implementation of the educational program.

**Table (12): Illustrates the correlation between levels of knowledge, burden of care, coping ways, and quality of life of the studied family care providers throughout periods of intervention.**

It showed that there is statistically significance difference between knowledge and quality of life only post intervention of the educational program  $P = (0.016)$ ; and between burden of care and quality of life during the implementation of the educational program  $P = (0.000 - 0.008 - 0.008)$  respectively.

There is high statistically significance and positive correlations between knowledge and quality of life  $r = (0.346 - 0.394 - 0.496)$  respectively,  $P = (0.003 - 0.001 - 0.000)$  \*\* respectively; as well as coping ways and quality of life  $r = (0.319 - 0.330 - 0.330)$  respectively,  $P = (0.007 - 0.005 - 0.005)$  \*\* respectively throughout periods of intervention of the educational program.

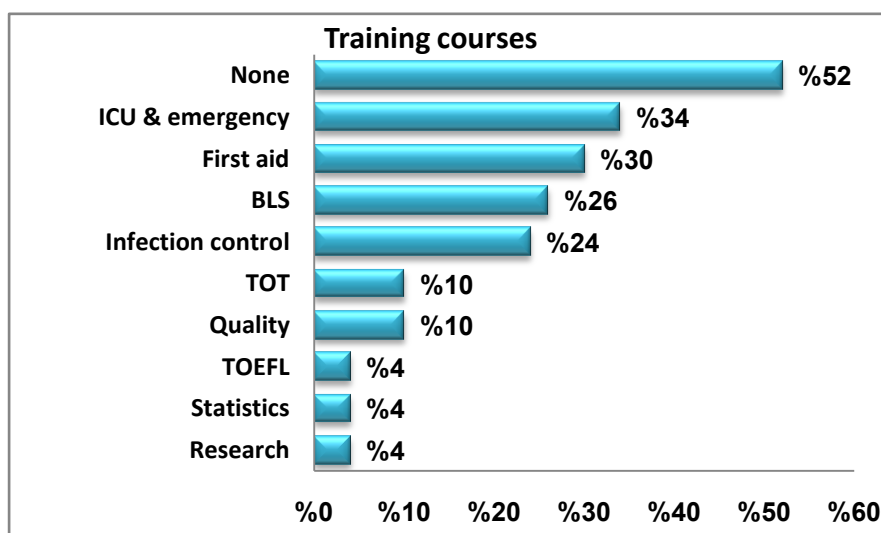
While there is high statistically significance and negative correlations between burden of care and quality of life  $r = (-0.520, -0.518, -0.518)$  respectively,  $P = (0.000 - 0.000 - 0.000)$  \*\* respectively throughout periods of intervention of the educational program.





**Table (1):** Percentage distribution of the studied nurses regarding their socio-demographic characteristics(n. =50).

Socio-demographic characteristics	The studied nurses (n=50)	
	N	%
<b>Age (years)</b>		
▪ (20 - < 30)	21	42.0
▪ (30 - < 40)	<b>28</b>	<b>56.0</b>
▪ (40 - 50)	1	2.0
<b>Gender</b>		
▪ Male	19	38.0
▪ Female	<b>31</b>	<b>62.0</b>
<b>Marital status</b>		
▪ Married	<b>41</b>	<b>82.0</b>
▪ Not Married	9	18.0
<b>Residence</b>		
▪ Town	8	16.0
▪ Village	<b>42</b>	<b>84.0</b>
<b>Educational level</b>		
▪ Nursing diploma	1	2.0
▪ Nursing Institute	13	26.0
▪ Bachelor of Nursing	<b>33</b>	<b>66.0</b>
▪ Postgraduate	3	6.0
<b>Occupation</b>		
▪ Bedside nurse	<b>34</b>	<b>68.0</b>
▪ Charge nurse	10	20.0
▪ Supervisor	5	10.0
▪ Head nurse	1	2.0
<b>Experience in profession</b>		
▪ Less than 5 years	5	10.0
▪ > 5 years to 10 years	<b>38</b>	<b>76.0</b>
▪ > 10 years to 15 years	6	12.0
▪ More than 15 years	1	2.0
<b>Experience in neurology</b>		
▪ Less than 5 years	14	28.0
▪ > 5 years to 10 years	<b>33</b>	<b>66.0</b>
▪ > 10 years to 15 years	3	6.0



**Figure (1):** Training courses received by studied nurses (n. =50).



**Table (2):** Percentage distribution of the studied nurses regarding their knowledge level throughout periods of intervention(n=50).

Total knowledge level	The studied nurses (n=50)						$\chi^2$ P
	Pre intervention		Immediate		Post intervention		
	N	%	N	%	N	%	
▪ Low	8	16.0	0	0.0	0	0.0	<b>20.886</b> <b>0.000*</b>
▪ Moderate	7	14.0	2	4.0	5	10.0	
▪ High	35	70.0	48	96.0	45	90.0	
<b>Range</b>	<b>(31-60)</b>		<b>(43-60)</b>		<b>(39-60)</b>		<b>F=11.104</b> <b>P=0.000*</b>
<b>Mean ± SD</b>	<b>51.76±9.490</b>		<b>58.04±3.763</b>		<b>56.40±6.253</b>		

(<65%) Low (65-80)% Moderate (>80 %) High

(\*) Statistically significant at level P<0.05 .

**Table (3):** Percentage distribution of the studied nurses regarding their stress level throughout periods of intervention(n=50).

Total Stress level	The studied nurses (n=50)						$\chi^2$ P
	Pre intervention		Immediate		Post intervention		
	N	%	N	%	N	%	
▪ Never stressful	5	10.0	9	18.0	9	18.0	<b>30.031</b> <b>0.000*</b>
▪ Occasionally	13	26.0	31	62.0	31	62.0	
▪ Frequently	30	60.0	10	20.0	10	20.0	
▪ Extremely	2	4.0	0	0.0	0	0.0	
<b>Range</b>	<b>(1-195)</b>		<b>(1-158)</b>		<b>(1-158)</b>		<b>F=10.454</b> <b>P=0.000*</b>
<b>Mean ± SD</b>	<b>121.46±42.021</b>		<b>92.20±34.125</b>		<b>92.20±34.125</b>		

(1-59) Never stressful (60-118) Occasionally  
 (119-177) Frequently (178-236) Extremely

(\*) Statistically significant at level P<0.05 .

**Table (4):** Percentage distribution of the studied nurses regarding their level of coping ways throughout periods of intervention (n=50).

Level of coping ways	The studied nurses (n=50)						$\chi^2$ P
	Pre intervention		Immediate		Post intervention		
	N	%	N	%	N	%	
▪ Not used to somewhat	7	14.0	2	4.0	2	4.0	<b>24.168</b> <b>0.000*</b>
▪ Used quite a bit	40	80.0	26	52.0	26	52.0	
▪ Used a great deal	3	6.0	22	44.0	22	44.0	
<b>Range</b>	<b>(47-152)</b>		<b>(60-152)</b>		<b>(60-152)</b>		<b>F=9.909</b> <b>P=0.000*</b>
<b>Mean ± SD</b>	<b>95.56±25.323</b>		<b>115.00±25.156</b>		<b>115.00±25.156</b>		

(0-66) Not used to somewhat (67-132) Used quite a bit  
 (133-198) Used a great deal

(\*) Statistically significant at level P<0.05 .

**Table (5):** Percentage distribution of the studied nurses regarding their quality of life level throughout periods of intervention (n=50).

Quality of life level	The studied nurses (n=50)						$\chi^2$ P
	Pre intervention		Immediate		Post intervention		
	N	%	N	%	N	%	
▪ High disability	33	66.0	14	28.0	14	28.0	<b>19.948</b> <b>0.001*</b>
▪ Low disability	17	34.0	36	72.0	36	72.0	

(0-60) High disability (61-100) Low disability

(\*) Statistically significant at level P<0.05 .

**Table (6):** Correlation between levels of knowledge, stress, coping ways, and quality of life of the studied nurses throughout periods of intervention (n=50).



(Knowledge, Stress, Coping ways) levels	The studied nurses (n=50)				$\chi^2$ P
	Quality of life level				
	High disability		Low disability		
	N	%	N	%	
<b>Knowledge level</b>					
<b>Pre intervention</b>					
▪ Low	4	8.0	4	8.0	1.108 0.575
▪ Moderate	5	10.0	2	4.0	
▪ High	24	48.0	11	22.0	
<b>r , P</b>		0.027 , 0.853			
<b>Immediate</b>					
▪ Moderate	0	0.0	2	4.0	FE 1.00
▪ High	14	28.0	34	68.0	
<b>Post intervention</b>					
▪ Moderate	1	2.0	4	8.0	0.176 0.675
▪ High	13	26.0	32	64.0	
<b>r , P</b>		0.102 , 0.483			
<b>Stress level</b>					
<b>Pre intervention</b>					
▪ Never stressful	4	8.0	1	2.0	3.666 0.300
▪ Occasionally	6	12.0	7	14.0	
▪ Frequently	22	44.0	8	16.0	
▪ Extremely	1	2.0	1	2.0	
<b>r , P</b>		-0.173 , 0.230			
<b>Immediate/Post intervention</b>					
▪ Never stressful	2	4.0	7	14.0	0.745 0.689
▪ Occasionally	10	20.0	21	42.0	
▪ Frequently	2	4.0	8	16.0	
<b>r , P</b>		-0.030 , 0.834			
<b>Coping ways level</b>					
<b>Pre intervention</b>					
▪ Not used to somewhat	5	10.0	2	4.0	<b>6.201</b> <b>0.045*</b>
▪ Used quite a bit	28	56.0	12	24.0	
▪ Used a great deal	0	0.0	3	6.0	
<b>r , P</b>		0.269 , 0.059			
<b>Immediate/Post intervention</b>					
▪ Not used to somewhat	1	2.0	1	2.0	2.097 0.351
▪ Used quite a bit	9	18.0	17	34.0	
▪ Used a great deal	4	8.0	18	36.0	
<b>r , P</b>		<b>0.318 , 0.024*</b>			

r: Pearson's correlation coefficient

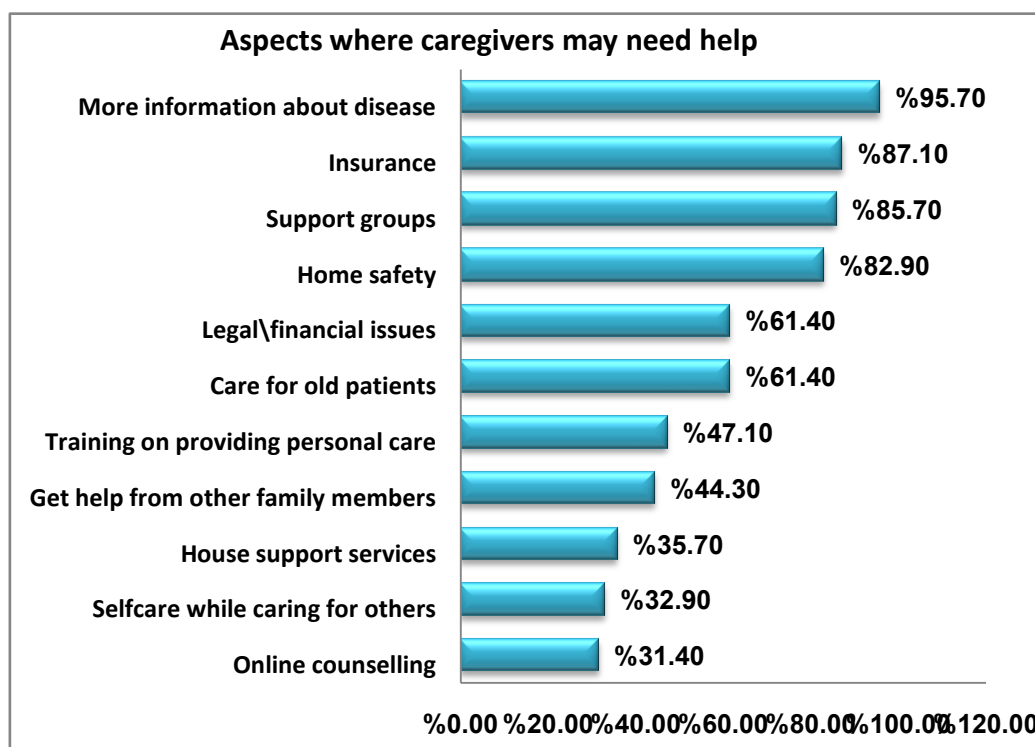
(\*) Statistically significant at level  $P < 0.05$ .

**Table (7):** Percentage distribution of the studied family care providers regarding their socio-demographic characteristics(n=70).

Socio-demographic characteristics	The studied care providers (n=70)	
	N	%
<b>Age (years)</b>		
▪ From 20 to < 30	<b>18</b>	<b>25.7</b>
▪ From 30 to < 40	17	24.3
▪ From 40 to ≤ 50	<b>18</b>	<b>25.7</b>
▪ More than 50	17	24.3
<b>Gender</b>		
▪ Male	30	42.9
▪ Female	<b>40</b>	<b>57.1</b>
<b>Marital status</b>		
▪ Married	<b>51</b>	<b>72.9</b>
▪ Not married	19	27.1
<b>Level of education</b>		



▪ Illiterate	9	12.9
▪ Read and write	13	18.6
▪ Average qualification	<b>28</b>	<b>40.0</b>
▪ High qualification	17	24.3
▪ Postgraduate	3	4.3
<b>Residence</b>		
▪ Town	27	38.6
▪ Village	<b>43</b>	<b>61.4</b>
<b>Occupation</b>		
▪ Working	<b>46</b>	<b>65.7</b>
▪ Not working	24	34.3
<b>Monthly income</b>		
▪ Not enough	<b>41</b>	<b>58.6</b>
▪ Enough	23	32.9
▪ Enough to saved	6	8.6
<b>Only care provider</b>		
▪ Yes	32	45.7
▪ No	<b>38</b>	<b>54.3</b>
<b>Duration of care</b>		
▪ 1 week to 3 months	<b>39</b>	<b>55.7</b>
▪ 3 months to > 1 year	13	18.6
▪ 1 year to > 2 years	9	12.9
▪ 2 years or more	9	12.9
<b>Frequency of care</b>		
▪ Daily	<b>45</b>	<b>64.3</b>
▪ Weekly	18	25.7
▪ Monthly	4	5.7
▪ < Once per month	3	4.3



**Figure (2):** Aspects where care providers need help (n. =70).

**Table (8):** Percentage distribution of the studied family care providers regarding their knowledge level throughout periods of intervention (n=70).

Knowledge level	The studied care providers (n=70)						$\chi^2$ P
	Pre intervention		Immediate		Post intervention		
	N	%	N	%	N	%	





▪ Low	44	62.9	0	0.0	0	0.0	<b>136.724</b> <b>0.000*</b>
▪ Moderate	18	25.7	6	8.6	15	21.4	
▪ High	8	11.4	64	91.4	55	78.6	
<b>Range</b>	<b>(14-40)</b>		<b>(31-40)</b>		<b>(28-40)</b>		<b>F=179.07</b>
<b>Mean ± SD</b>	<b>24.24±6.092</b>		<b>36.09±2.118</b>		<b>34.91±2.888</b>		<b>P=0.000*</b>
	(<65%) Low		(65-80)% Moderate		(>80 %) High		

(\*) Statistically significant at level P<0.05 .

**Table (9):** Percentage distribution of the studied family care providers regarding their burden of care level throughout periods of intervention (n=70).

Burden of care level	The studied care providers (n=70)						$\chi^2$ P
	Pre intervention		Immediate		Post intervention		
	N	%	N	%	N	%	
▪ No to mild	6	8.6	6	8.6	6	8.6	<b>34.247</b> <b>0.000*</b>
▪ Mild to moderate	24	34.3	47	67.1	47	67.1	
▪ Moderate to severe	30	42.9	17	24.3	17	24.3	
▪ Severe	10	14.3	0	0.0	0	0.0	
<b>Range</b>	<b>(14-83)</b>		<b>(15-60)</b>		<b>(15-60)</b>		<b>F=11.85</b>
<b>Mean ± SD</b>	<b>44.73±16.441</b>		<b>35.59±10.564</b>		<b>35.59±10.564</b>		<b>P=0.000*</b>
	(0-20) No to mild		(21-40) Mild to moderate				
	(41-60) Moderate to severe		(61-88) Severe				

(\*) Statistically significant at level P<0.05 .

**Table (10):** Percentage distribution of the studied family care providers regarding their ways of coping level throughout periods of intervention (n=70).

Ways of coping level	The studied care providers (n=70)						$\chi^2$ P
	Pre intervention		Immediate		Post intervention		
	N	%	N	%	N	%	
▪ Not used to somewhat	12	17.1	2	2.9	2	2.9	<b>21.711</b> <b>0.000*</b>
▪ Used quite a bit	49	70.0	43	61.4	43	61.4	
▪ Used a great deal	9	12.9	25	35.7	25	35.7	
<b>Range</b>	<b>(39-150)</b>		<b>(59-153)</b>		<b>(59-153)</b>		<b>F=15.422</b>
<b>Mean ± SD</b>	<b>95.79±26.03</b>		<b>115.19±22.69</b>		<b>115.19±22.69</b>		<b>P=0.000*</b>
	(0-66) Not used to somewhat		(67-132) Used quite a bit				
			(133-198) Used a great deal				

(\*) Statistically significant at level P<0.05 .

**Table (11):** Percentage distribution of the studied family care providers regarding their quality of life level throughout periods of intervention (n=70).

Quality of life level	The studied care providers (n=70)						$\chi^2$ P
	Pre intervention		Immediate		Post intervention		
	N	%	N	%	N	%	
▪ High disability	43	61.4	32	45.7	32	45.7	4.611 0.102
▪ Low disability	27	38.6	38	54.3	38	54.3	
<b>Range</b>	<b>(38-73)</b>		<b>(42-80)</b>		<b>(42-80)</b>		<b>F=6.812</b>
<b>Mean ± SD</b>	<b>56.83±9.47</b>		<b>62.06±9.78</b>		<b>62.06±9.78</b>		<b>P=0.001*</b>
	(0-60) High disability		(61-100) Low disability				

(\*) Statistically significant at level P<0.05 .

**Table (12):** Correlation between levels of knowledge, burden of care, coping ways, and quality of life of the studied family care providers throughout periods of intervention (n=70).

(Knowledge - Burden – Copying ways) levels	The studied care providers(n=70)				$\chi^2$ P
	Quality of life level				
	High disability		Low disability		
	N	%	N	%	



<b>Knowledge level</b>					
<b>Pre intervention</b>					
▪ Low	30	42.9	14	20.0	3.042
▪ Moderate	10	14.3	8	11.4	0.218
▪ High	3	4.3	5	7.1	
<b>r , P</b>					
<b>0.346, 0.003**</b>					
<b>Immediate intervention</b>					
▪ Moderate	5	7.1	1	1.4	FE
▪ High	27	38.6	37	52.9	0.065
<b>r , P</b>					
<b>0.394 , 0.001**</b>					
<b>Post intervention</b>					
▪ Moderate	11	15.7	4	5.7	<b>FE</b>
▪ High	21	30.0	34	48.6	<b>0.016*</b>
<b>r , P</b>					
<b>0.496, 0.000**</b>					
<b>Burden of care level</b>					
<b>Pre intervention</b>					
▪ No to mild	1	1.4	5	7.1	
▪ Mild to moderate	8	11.4	16	22.9	<b>23.715</b>
▪ Moderate to severe	24	34.3	6	8.6	<b>0.000*</b>
▪ Severe	10	14.3	0	0.0	
<b>r , P</b>					
<b>-0.520, 0.000**</b>					
<b>Immediate intervention</b>					
▪ No to mild	1	1.4	5	7.1	
▪ Mild to moderate	18	25.7	29	41.4	<b>9.562</b>
▪ Moderate to severe	13	18.6	4	5.7	<b>0.008*</b>
<b>r , P</b>					
<b>-0.518, 0.000**</b>					
<b>Post intervention</b>					
▪ No to mild	1	1.4	5	7.1	
▪ Mild to moderate	18	25.7	29	41.4	<b>9.562</b>
▪ Moderate to severe	13	18.6	4	5.7	<b>0.008*</b>
<b>r , P</b>					
<b>-0.518, 0.000**</b>					
<b>Coping ways level</b>					
<b>Pre intervention</b>					
▪ Not used to somewhat	10	14.3	2	2.9	5.429
▪ Used quite a bit	30	42.9	19	27.1	0.066
▪ Used a great deal	3	4.3	6	8.6	
<b>r , P</b>					
<b>0.319, 0.007**</b>					
<b>Immediate intervention</b>					
▪ Not used to somewhat	1	1.4	1	1.4	4.943
▪ Used quite a bit	24	34.3	19	27.1	0.084
▪ Used a great deal	7	10.0	18	25.7	
<b>r , P</b>					
<b>0.330, 0.005**</b>					
<b>Post intervention</b>					
▪ Not used to somewhat	1	1.4	1	1.4	4.943
▪ Used quite a bit	24	34.3	19	27.1	0.084
▪ Used a great deal	7	10.0	18	25.7	
<b>r , P</b>					
<b>0.330, 0.005**</b>					

FE: Fisher' Exact test

r: Pearson's correlation coefficient

(\*) Statistically significant at level  $P < 0.05$  .

(\*\*) Statistically highly significant at level  $P < 0.01$  .

## Discussion

The finding of the present study revealed that more than half of the studied nurses (56.0%) their age ranged from (30 < 40) years, from the researcher point of view this result may be due to nearly two third of the studied nurses (66.0%) had bachelor of nursing.

Supporting these findings by (Sitanggang et al., 2020) who conducted study about professional quality of nurses in palliative nursing services, and reported that two third of studied nurses (60.0%) their age from (> 28 – 42 years).



Regarding to gender, the current study illustrated that less than two thirds of the studied nurses (62.0%) were female, from the researcher point of view this result may suggest that there is a gender bias toward nursing profession in Egypt. This finding was in agreement with study by **(Santos et al., 2020)** who conducted study about "Development and validation a nursing care protocol with educational interventions for family caregivers of elderly people after stroke" and reported that more than two thirds of them were females.

Regarding to marital status, the present study showed that majority of the studied nurses (82.0%) were married, from the researcher point of view this result may be due to culture in our society that people married at young age so majority studied nurses are married. This result agreed with **(Vahedian-Azimi et al., 2019)** who carried out study regarding effects of stress on critical care nurses: a national cross-sectional study, and found that most of the studied nurses (89.0%) were married.

The result of the present study revealed that majority of the studied nurses (84.0%) were village resident, from the researcher point of view this result may be due to agricultural nature of the sample setting (El Gharbia governorate). This result contraindicated with **(Mohamed Morsy, 2020)** who carried out study about effect of educational interventions for nurses about pre and post-operative care on clinical outcomes of patients undergoing ureteral stent surgery, and found that (71.0%) of the studied nurses living in urban area.

Regarding to qualification, the present study represented that nearly two third of the studied nurses have bachelor of nursing (66.0%), from the researcher point of view this result may be due to newly assigned nurses with bachelor of nursing who distributed in critical care departments in the hospital rather than general departments. This result supported with **(Sok, 2020)** who represented that less than three quarters of participants (73.0%) graduated university in their study about burn out and related factors of nurses caring for DRN patients in intensive care units, South Korea.

Regarding to occupation, the present study revealed that nearly two third of the studied nurses (68.0%) were bedside nurses, from the researcher point of view this result may be due to job description distribution in the hospital as bedside nurses responsible for providing care to patients in all hospital departments. This result goes in the same line with **(Hisaka et al., 2021)** in their study about nurses'

awareness and actual nursing practice situation of stroke care in acute stroke units: a Japanese cross-sectional web-based questionnaire survey, who found that majority of all participants (90.5%) were staff nurses.

Regarding to the experience years in profession, the present study showed that more than three quarters of the studied nurses (76.0%) had more than 5 to 10 years of experience, from the researcher point of view this result may be due to more than half of the studied nurses (56.0%) their age ranged from (30 < 40) years. This result accepted with **(Saramago, 2020)** who carried out study regarding stress in nurses' caring for stroke patients and families: a mixed – method study, and found that (75.0%) of respondents had a minimum 3 years' experience.

The result of the present study revealed that nearly two third of the studied nurses (66.0%) had experience years in neurology from 5 to 10 years' experience, from the researcher point of view this result may be due to more than three quarters of the studied nurses (76.0%) had more than 5 to 10 years of experience in nursing profession. This result in disagreement with **(Ram, 2019)** who carried out study about effectiveness of supplementary training on knowledge and attitude regarding comprehensive care of acute ischemic patients among nursing staff, and represented that almost half of nursing staff (42.5%) were having less than 1 year experience in caring stroke patients.

Regarding to the training courses, the present study showed that more than half of the studied nurses (52.0%) haven't received any previous training courses; while, more than one third of them had received training courses as ICU & emergency (34.0%) followed by first aid (30.0%). From the researcher point of view this result may be due to lack of in service training programs that may be determined by cost or number of staff in every shift because staff shortage made it difficult to undertake training, also; duration of training, skills deficit and knowledge acquisition required by medical and nursing staff factors that contribute to lack of training courses that reflect on quality of patient care, job performance, care burden and care providers' quality of life.

This finding matched with **(Nagep, 2021)** who conducted study about "Assessment of Nurses' Performance Regarding Care for Elderly Stroke Patients" and showed that less than half of the studied nurses haven't received any previous training courses.

Concerning on total knowledge level among the studied nurses, the result of current



study displayed that there was a statistically significant difference has occurred in knowledge during implementation of the educational program as  $P = (0.000)$  and the total level of knowledge was improved immediately and after two months of implementation of the educational program as majority of the studied nurses had high knowledge (96% –90.0%) respectively and the remaining had moderate knowledge (4% – 10.0%) respectively.

This improvement of nurses' knowledge immediately post implementation of designed educational program may be due to their exposure to stroke competency program where they are provided with an Arabic educational booklet, motivated and reinforced and also; it is the first time for the studied nurses to attend educational sessions about cerebrovascular stroke.

This finding consistent with study by **(Rababah, 2021)** who conducted study about "Effectiveness of an educational program on improving healthcare providers' knowledge of acute stroke" and showed that there was statistically significant mean differences among the study nurses on level of knowledge about stroke as  $P$  value  $<0.05^*$ .

Related to total stress level among the studied nurses throughout periods of intervention, the present study illustrated that there was a statistically significant reduction has occurred in stress scale during implementation of the educational program as  $P = (0.000)$  and immediately and after two months of implementation of the educational program frequently stressed percentage changed from (60.0% to 20.0%) and extremely stressed percentage decreased to (0.0%).

From the researcher point of view this result may be due to the effectiveness of the educational program in significantly reducing studied nurses' stress by applying positive coping mechanisms to be able to face challenges and obstacles during their work, services and life.

This result supported with study by **(Jiang, 2020)** who conducted study about "Psychological impact and coping strategies of frontline medical staff in Hunan between January and March 2020 during the outbreak of Coronavirus Disease 2019 (COVID 19) in Hubei", and showed that more than half of studied nurses had moderate level of total nursing stress scale. Also, more than one quarter of them had severe level. Mean SD score of studied nurses regarding to total nursing stress scale was  $99.47 \pm 10.671$ , so that; recommended perform program to reduce stress among studied nurses.

Regarding total level of using coping ways among the studied nurses throughout periods of intervention, the current study showed that there was a statistically significant difference has occurred related to using of coping ways during implementation of the educational program as  $P = (0.000)$ , and increase using of coping ways immediately and after two months of implementation in a great deal (44.0%). From the researcher point of view this result may be due to improvement of the studied nurses' knowledge & skills and consequently improved their using of coping ways as they become more aware of their role in reducing burden of care and improving quality of their life.

This result matched with study by **(Madian, 2019)** who conducted study about "Level of stress and coping strategies among nursing students at Damanhour University, Egypt" and showed that more than half of the studied nurses had fair of coping ways and recommended that stress management programs and the provision of suitable support.

As regards to nurses regarding their quality of life level throughout periods of intervention, the present study illustrated that a statistically significant reduction has occurred in disability level as  $P = (0.001)$  and increase quality of life immediately and after two months of implementation of the educational program among the studied nurses as low disability represented (72.0%). From the researcher point of view this result may be due to the effectiveness of the educational program that reflect on improvement in studied nurses' knowledge and the effectiveness of coping strategies training in reducing burden of care and reducing disability then hence improving their quality of life post program.

This result matched with study by **(Babapour et al., 2022)** who conducted study about "Nurses' job stress and its impact on quality of life and caring behaviors" and concluded that provision of educational programs to the studied nurses improve their quality of life.

Regarding the correlation between levels of knowledge, stress, coping ways, and quality of life of the studied nurses throughout periods of intervention. It showed that there is statistically significance difference between coping ways and quality of life only pre intervention  $P = (0.045)$  and positive correlation between coping ways and quality of life immediately after the implementation of the educational program  $r = (0.318)$ ,  $P = (0.024)$ .

This finding was in contrast with **(Al-Ruzieh&Ayaad, 2021)** who conducted a





study entitled "Work Stress, Coping Strategies, and Health-Related Quality of Life among Nurses at an International Specialized Cancer Center" and found that there is no significant correlation between the total mean value of the coping strategy scale and the health-related quality of life scale  $r = (0.121)$ ,  $P = (>0.05)$ .

Regards to socio-demographic characteristics among the studied family care providers, the present study illustrated that about one quarter of them (25.7%) their age; from (20 to < 30) and (40 to  $\leq$  50) years. Moreover, more than half of them (57.1%) were females, and more than one quarter of them (28.6%) were life partner, less than three quarters of them (72.9%) were married, as well as less than two thirds (61.4%) were village residents. These findings was in agreement with study by (Achilike et al., 2020) who conducted study about "Caregiver burden and associated factors among informal caregivers of stroke survivors" and revealed that most of the studied caregivers female, married and provide care for their partner.

From the researcher point of view, this result may be due to women are the primary care providers in family setting as they seem to see it as amoral obligation. As well as spousal care providers emphasized that marital responsibility and a sense of obligation promoted them to become the main care providers and this obligation can has negative influence on family care providers because they wish to provide the best possible for their parents or spouses which can lead to increase burden of care.

The result of the present study revealed that more than one third of the studied family care providers (40.0%) were average qualification. From the researcher point of view, this result may be due to the fact that education in Egypt is free for all and obligatory by law until the end of middle school period. This result in agreement with (Ahmed, 2021) who conducted study about "burden and coping mechanisms among caregivers for old adult with advanced illness", and found that the high proportion of participants was nearly half of the caregivers had a secondary education, about one third had a primary education and more than one fifth had a higher education.

The result of the present study showed that more than half of the studied family care providers (58.6%) were having monthly income not enough. From the researcher point of view, this result may be due to low socioeconomic status of people in our society, increase cost of living and requirements of individuals and family, as well as expensive

costs of therapy. This result in supported with (Costa et al., 2020) who carried out study about "burden on caregivers of patients with sequelae of cerebrovascular accident", and represented that more than half of the studied caregivers had insufficient income.

Regarding the role of family care providers in care, the result of the present study revealed that more than half of the studied family care providers (54.3%) not being the only care providers for patients due to culture in our society that connected people with family and relatives from birth to death, more than half of them (55.7%) reported 1 week to 3 months duration of care as more than half of the studied patients (55.7%) had stroke duration ranging from 1 week to 3 months, as well as less than two third of the studied family care providers (64.3%) provided daily care.

This result in accepted with (Nalini,2016) who conducted study about " assess the role burden and attitude of caregivers towards post stroke rehabilitation in selected hospitals, Chennai " , and found that majority of participant (58.3%) being caregivers for duration of 10 – 4 weeks and majority of them (80.0%) spent < 5 hours on patient care every day.

According to aspects where care providers need help,the result of the present study showed that majority of the studied family care providers need more information regarding the disease, insurance, support groups, and home safety. From the researcher point of view, this result might be due to lack of information and training to care providers and adequate educational media and personnel in hospital. As well as lack of attention from health professionals resulting in facing infinite number of unmet needs which commonly affects all aspects of care providers' life.

This result harmony with study by (Riffin, 2021) who conducted study about "Assessing and addressing family caregivers' needs and risks in primary care" and stated that most of the studied caregivers need more information regarding the disease, insurance, and support.

Concerning on total knowledge level among the studiedfamily care providers, the present study showed that there was a statistically significant difference has occurred in knowledge during implementation of the educational program as  $P = (0.000)$  and the total level of knowledge was improved immediately and after two months of implementation of the educational program as majority of the studied family care providers had high knowledge (91.4% –78.6%)



respectively and the remaining had moderate knowledge (8.6% –21.4%) respectively.

From the researcher point of view, this result may be due to improvement of family care providers' knowledge immediately after implementation of designed educational program as the family care provider's desire to know more information about stroke as they previously rely on their personal and non-scientific information about stroke patients' caring and some chronic complications in patients are caused by non-scientific care.

This finding accordance with study by **(Gurjar, 2019)** who conducted study about "Effectiveness of educational program on knowledge and competence of home care of stroke patients among care givers" and displayed that in pretest about three quarters of caregivers had an inadequate knowledge, about one fifth of them had moderate knowledge and very few of them had adequate knowledge regarding home care of stroke patients. Whereas in posttest, more than half of them had an adequate knowledge, two fifths had moderate knowledge and very few of them had inadequate knowledge regarding home care of stroke patients. So that there was a statistically significant difference has occurred in knowledge  $P = (0.000)$ .

Regarding to total burden level among the studied family care providers throughout periods of intervention, the present study revealed that there was a statistically significance reduction has occurred in burden of care during implementation of the educational program as  $P = (0.000)$  and immediately and after two months of implementation of the educational program moderate to severe burden percentage changed from (42.9% to 24.3%) and severe burden percentage decreased from (14.3% to 0.0%).

From the researcher point of view, high percentage of burden among the studied family care providers might be due to variety factors including: family care providers are responsible for caring of patients when they return to the community, impact of caring for elderly patients and overlapping or conflicting roles in family, lack of coping mechanisms among care providers that help them cope effectively with stresses of advanced disease with little support from community health services. While, reduction in the burden of family care providers occurred after the nursing interventions that provided a break for care providers in the provision of care activities.

This finding in same line with study by **(Kazemi et al., 2021)** who conducted study about "Caregiver burden and coping strategies

in caregivers of older patients with stroke" and showed that more than half of the studied caregivers had mild burden of care. Moreover, this outcome matched with **(Deyhoul et al., 2020)** who conducted study about "The effect of family-centered empowerment program on the family caregiver burden and the activities of daily living of Iranian patients with stroke" and founded that there was a statistically significant difference has occurred in burden of care at  $p < 0.001^{**}$ .

Regarding total level of using coping ways among the studied family care providers' throughout periods of intervention, the current study demonstrated that there was a statistically significant difference has occurred in using of coping ways during implementation of the educational program as  $P = (0.000)$ , and increase using of coping ways immediately and after two months of implementation of the educational program in a great deal (35.7%).

This result congruent with the study was done by **(Cheng, 2018)** who conducted study about "Effectiveness of a strength-oriented psychoeducation on caregiving competence, problem-solving abilities, psychosocial outcomes and physical health among family caregiver of stroke survivors" and illustrated that most of the studied caregivers used quite a bit preprogram, while, after psycho education program about half of them used a great deal and there was a statistically significance difference has occurred related to ways of coping among the studied family caregivers after implementation of the educational program regarding coping ways as  $P < 0.001^{**}$ .

Concerning on quality of life level among the studied family care providers throughout periods of intervention, the present study illustrated that a statistically significant reduction has occurred in disability level as  $P = (0.001)$  and increase quality of life immediately and after two months of implementation of the educational program among the studied family care providers as low disability represented (54.30%). From the researcher point of view this result may be due to the effectiveness of the educational program that reflect on improvement in family care providers' knowledge and the effectiveness of coping strategies training in reducing burden of care and reducing disability then hence improving their quality of life post program.

This result in agreement with study by **(Baykal & Tulek , 2022)** who conducted study about "The effect of discharge training on quality of life, self-efficacy and reintegration to normal living in stroke patients and their informal caregivers" and showed that the program improved total quality of life in



caregivers and there was a statistically significance as  $P$  value  $<0.05^*$ .

Regarding the correlation between levels of knowledge, burden of care, coping ways, and quality of life of the studied family care providers throughout periods of intervention. It showed that there is statistically significance difference between knowledge and quality of life only post intervention  $P = (0.016)$  and between burden of care and quality of life during the implementation of the educational program  $P = (0.000 - 0.008 - 0.008)$  respectively.

There is high statistically significance and positive correlations between knowledge and quality of life  $r = (0.346 - 0.394 - 0.496)$  respectively,  $P = (0.003 - 0.001 - 0.000)$  \*\* respectively; as well as coping ways and quality of life  $r = (0.319 - 0.330 - 0.330)$  respectively,  $P = (0.007 - 0.005 - 0.005)$  \*\* respectively throughout periods of intervention of the educational program. While negative correlations between burden of care and quality of life  $r = (-0.520, -0.518, -0.518)$  respectively,  $P = (0.000 - 0.000 - 0.000)$  \*\* respectively throughout periods of intervention of the educational program.

These findings matched with study by (Chan et al., 2022) entitled "A review on family caregiving challenges in Malaysia" and concluded that there is statistically significance difference pre and post intervention between levels of knowledge, burden of care, coping ways and quality of life among the family caregivers pre and post intervention at  $P < 0.05^*$ .

### **Conclusion**

Based up on the results of current study, it concluded that:

There was an enhancement in the studied nurses' results as immediately after implementation of the educational program majority of them had high knowledge, as well as reduced total level of stress from frequently stressed to occasionally stressed, less than half of them used coping ways in a great deal, and less than three quarters of them had reduction in disability score and increase in quality of life. Moreover, there was a positive correlation between their coping ways level and quality of life immediately after the implementation of the educational program  $r = (0.318)$ ,  $P = (0.024)$ .

In addition, the educational program improved the studied family care providers' results as immediately after implementation of the educational program majority of them had high knowledge, as well as reduced total level of burden from moderate to severe into mild to moderate burden, more than one third of them

used coping ways in a great deal, and more than one half of them had reduction in disability score and increase in quality of life. Moreover, there was a positive correlation between their knowledge, coping ways and quality of life as well as negative correlation between their burden of care and quality of life throughout periods of intervention of the educational program at  $P < 0.01^{**}$ .

### **Recommendations**

The results of this study projected the following recommendations:

#### **For the studied nurses:**

- Replication of the study on nurses only to evaluate the reflection of the educational training programs on only one or two dimensions either (knowledge or care burden or coping ways or quality of life) to achieve best results.
- Further study is recommended on large sample and in different hospitals settings in order to generalize the result.
- Encourage nurses to read text books and periodical attending scientific meeting & conferences related to caring for stroke patients, using of coping ways to deal with care burden, and quality of life.
- Neurology nurses must receive continuous and periodic in services educational programs to update their knowledge and clinical skills regarding caring for stroke patients.
- Encourage continuous, assessment, supervision, guidance and evaluation of nursing performance and care burden factors to maintain and achieve the best professional nursing care to patient.

#### **For the studied family care providers:**

- Replication of the study on family care providers only to evaluate the reflection of the educational training programs on only one or two dimensions either (knowledge or care burden or coping ways or quality of life) to achieve best results.
- Further study is recommended on large sample and in different hospitals settings in order to generalize the result.
- Discharge instruction booklet is great beneficial to be given to patients and their family care providers at discharge time about caring and rehabilitation of stroke patients at home.

#### **For administration:**

- Establishing stroke counseling professional team to provide knowledge about stroke, its life style modifications, caring and rehabilitation of stroke patients at hospital and home.



- Establishing health education programs in the hospital concerned with teaching nurses, patients and family, caring and rehabilitation of patients at hospital and home, how to break down factors affecting care burden and using of coping ways as possible as well as knowing how to improve quality of life for both care providers and patients.
- Submission of educational handouts, posters, booklets and brochures about caring and rehabilitation of stroke patients at hospital and home.

## **Declarations**

### **Ethics approval and consent to participate:**

Ethical approval was taken from committee of ethics at faculty of nursing, Tanta University, Egypt to fulfill this study. All methods were carried out in accordance with relevant guidelines and regulations (eg. Tanta University, declaration). Oral informed consent to participate in the study was obtained from every nurse and family care provider included in the study after clarifying the aim of study according to level of understanding. This procedure for obtaining oral informed consent was approved by the committee of ethics at faculty of nursing, Tanta University

### **Consent for publication:**

- 'Not applicable' for that section.

### **Availability of data and materials:**

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

### **Competing interests:**

- 'Not applicable' for that section.

### **Funding:**

- 'Not applicable' for that section.

### **Authors' contributions:**

- EA: (corresponding author) wrote the main manuscript text, collect data, analysis result, prepared figures & tables, and discussion result.
- Om.IA, AL, AK: reviewed the study and approved the final manuscript for submission.

### **Acknowledgements:**

- 'Not applicable' for that section.

### **Authors' information (optional):**

- 'Not applicable' for that section.

## **References**

**Abd El-Hay SA, Abed Allah A, Tag El Din E.** Effect of implementing designed educational training program for neurological nurses on clinical outcomes

of stroke patients. *Clinical Nursing Studies.* 2018; 6(4):121-37.

**Abd Elmegeid M, Hussein Z, Salah H.** Emergency Nurses' Knowledge and Practice regarding Care of Acute Ischemic Stroke Patients undergoing Recombinant Tissue Plasminogen Activator. *IOSR Journal of Nursing and Health Science.* 2020; 9(5): 28-35.

**Abdullah Aziz EA, El Sayed Mahdy N, Mahmoud SF.** Factors Affecting Compliance with Lifestyle Modifications among Patients Suffering from Recurrence of Cerebrovascular Stroke. *Egyptian Journal of Health Care.* 2019 Sep 1; 10 (3):1-21.

**Achilike S, Beauchamp JE, Cron SG, Okpala M, Payen SS, Baldrige L, Sharrief A.** Caregiver burden and associated factors among informal caregivers of stroke survivors. *Journal of Neuroscience Nursing.* 2020; 52(6): 277-283.

**Ahmed NF, SAIF MY, Hamedy S.** Burden and Coping Mechanisms among Caregiver for Old Adult with advanced illness. *NILES journal for Geriatric and Gerontology.* 2021; 4(2): 318-345.

**Al-Ruzzieh, MA, Ayaad O.** Work Stress, Coping Strategies, and Health-Related Quality of Life among Nurses at an International Specialized Cancer Center. *Asian Pacific Journal of Cancer Prevention: APJCP.* 2021; 22 (9): 2995.

**Babapour AR, Gahassab-Mozaffari N, Fathnezhad-Kazemi A.** Nurses' job stress and its impact on quality of life and caring behaviors: a cross-sectional study. *BMC nursing.* 2022; 21(1): 1-10.

**Baykal D, Tulek Z.** The effect of discharge training on quality of life, self-efficacy and reintegration to normal living in stroke patients and their informal caregivers: A randomized controlled trial. *Neurology Asia.* 2022; 27 (1).

**Bédard M, Molloy DW, Squire L, Dubois S, Lever JA, O'Donnell M.** The Zarit Burden Interview: a new short version and screening version. *The gerontologist.* 2001 Oct 1; 41(5):652-7.

**Caro CC, Costa JD, Da Cruz DM.** Burden and quality of life of family caregivers of stroke patients. *Occupational therapy in health care.* 2018 Apr 3; 32(2):154-71.

**Catangui E.** Specialized stroke nursing program using an inter-professional approach: A nurse-driven education initiative of one stroke hospital in Saudi Arabia. *Journal of Nursing Education and Practice.* 2015 Nov 1; 5(11):81.





- Chan SL, Matsah NS, Yusuf AA, Khaidir AS, Hamdan NH, Kamizi ZN.** A review on family caregiving challenges in Malaysia. *ProGCouns: Journal of Professionals in Guidance and Counseling.* 2022; 3(1).
- Cheng HY, Chair SY, Chau JP.** Effectiveness of a strength-oriented psychoeducation on caregiving competence, problem-solving abilities, psychosocial outcomes and physical health among family caregiver of stroke survivors: A randomised controlled trial. *International Journal of Nursing Studies.* 2018; 87: 84-93.
- Costa TF, Pimenta CJ, Nóbrega MM, Fernandes MD, França IS, Pontes MD, Costa KN.** Burden on caregivers of patients with sequelae of cerebrovascular accident. *Revista Brasileira de Enfermagem.* 2020; 73.
- Deyhoul N, Vasli P, Rohani C, Shakeri N, Hosseini M.** The effect of family-centered empowerment program on the family caregiver burden and the activities of daily living of Iranian patients with stroke: a randomized controlled trial study. *Aging clinical and experimental research.* 2020; 32(7): 1343-1352.
- Efi P, Fani K, Eleni T, Stylianos K, Vassilios K, Konstantinos B, Chrysoula L, Kyriaki M.** Quality of life and psychological distress of caregivers' of stroke people. *Journal of Acta Neurol Taiwan.* 2017 Dec 15; 26(4):154-66.
- Elbqry MG, Sherif WI, Mahdy NE, Gaballah SH, Altantawy AM.** Effect of educational program on knowledge, adherence and self-efficacy among patients with recurrent cerebrovascular stroke. *Journal of Nursing and Health Science.* 2019; 8(4): 42-51.
- Farahani MA, Bahloli S, JamshidiOrak R, Ghaffari F.** Investigating the needs of family caregivers of older stroke patients: a longitudinal study in Iran. *BMC geriatrics.* 2020; 20(1): 1-12.
- Farrag MA, Oraby MI, Ghali AA, Ragab OA, Nasreldein A, Shehata GA, Elfar E, Abd-Allah F.** Public stroke knowledge, awareness, and response to acute stroke: Multi-center study from 4 Egyptian governorates. *Journal of the Neurological Sciences.* 2018 Jan 15; 384:46-9.
- Feigin VL, Brainin M, Norrving B, Martins S, Sacco R L, Hacke W, Lindsay P.** World Stroke Organization (WSO): global stroke fact sheet 2022. *International Journal of Stroke.* 2022; 17(1): 18-29.
- Feigin VL, Roth GA, Naghavi M, Parmar P, Krishnamurthi R, Chugh S, Mensah GA, Norrving B, Shiue I, Ng M, Estep K.** Global burden of stroke and risk factors in 188 countries, during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet Neurology.* 2016 Aug 1; 15(9):913-24.
- Folkman S, Lazarus RS.** If it changes it must be a process: study of emotion and coping during three stages of a college examination. *Journal of personality and social psychology.* 1985 Jan; 48(1):150. Available at: <https://prevention.ucsf.edu/sites/prevention.ucsf.edu/files/uploads/tools/surveys/pdf/Ways%20of%20coping.pdf>. Accessed on 10/8/2020.
- French SE, Lenton R, Walters V, Eyles J.** An empirical evaluation of an expanded nursing stress scale. *Journal of Nursing Measurement.* 2000 Sep 1; 8(2):161-78.
- Gurjar N.** Effectiveness of educational program on knowledge and competence of home care of stroke patients among care givers. *International Journal of Health Sciences & Research.* 2019; 9(5): 260-265.
- Hisaka Y, Ito H, Yasuhara Y, Takase K, Tanioka T, Locsin R.** Nurses' Awareness and Actual Nursing Practice Situation of Stroke Care in Acute Stroke Units: A Japanese Cross-Sectional Web-Based Questionnaire Survey. *International Journal of Environmental Research and Public Health.* 2021; 18(23): 12800.
- Jiang Y.** Psychological impact and coping strategies of frontline medical staff in Hunan between January and March 2020 during the outbreak of Coronavirus Disease 2019 (COVID 19) in Hubei. China. *Med Sci Monit.* 2020; 26: e924171.
- Kazemi A, Azimian J, Mafi M, Allen K A, Motalebi S A.** Caregiver burden and coping strategies in caregivers of older patients with stroke. *BMC psychology.* 2021; 9(1): 1-9.
- Madian A, Abdelaziz M, Ahmed HA.** Level of stress and coping strategies among nursing students at Damanhour University, Egypt. *Am J Nurs Res.* 2019; 7(5): 684-96.
- McHorney CA, Ware Jr JE, Lu JR, Sherbourne CD.** The MOS 36-item Short Form Health Survey (SF-36): III. Tests of data quality, scaling assumptions, and reliability across diverse patient groups. *Medical care.* 1994 Jan 1:40-66.



- Mohamed Morsy MS, Ali El-Meligy OI, Ahmed Hassan A, A Salem F.** Effect of Educational Intervention for Nurses about Pre and Post-Operative Care on Clinical Outcomes of Patients Undergoing Ureteral Stent Surgery. *Egyptian Journal of Health Care.* 2020; 11(3): 1012-1031.
- Naga MS, Bedier NA, Salem MA, Ahmed HA, Elhfnawy AM.** Effect of Competency Based Program on Nurses' Knowledge, Skills and Attitude toward the Care of Patients with Stroke. *Alexandria Scientific Nursing Journal.* 2021; 23(2): 10-21.
- Nagep NM, Mohammed SA, Amr EF.** Assessment of Nurses' Performance Regarding Care for Elderly Stroke Patients. *NILES journal for Geriatric and Gerontology.* 2021; 4(2): 301-317.
- Nalini G.** Assess the role burden and attitude of care givers towards post stroke rehabilitation in selected hospitals, Chennai (Doctoral dissertation, MA Chidambaram College of Nursing, Chennai). 2016.
- Noori LK, Ebrahim SA.** Family Caregivers Burden and Coping strategies for Patient With Schizophrenia in Mosul City. *Mosul Journal of Nursing.* 2020; 8(2): 215-224.
- Pucciarelli G, Ausili D, Galbusera AA, Rebora P, Savini S, Simeone S, Alvaro R, Vellone E.** Quality of life, anxiety, depression and burden among stroke caregivers: a longitudinal, observational multicentre study. *Journal of Advanced Nursing.* 2018 Aug; 74(8):1875-87.
- Rababah JA, Al-Hammouri MM, AlNsour EA.** Effectiveness of an educational program on improving healthcare providers' knowledge of acute stroke: a randomized block design study. *World Journal of Emergency Medicine.* 2021; 12(2): 93.
- Ram GN.** Effectiveness of Supplementary Training on Knowledge and Attitude Regarding Comprehensive Care of Acute Ischemic Patient among Nursing Staff. 2019.
- Riffin C, Wolff JL, Pillemer KA.** Assessing and addressing family caregivers' needs and risks in primary care. *Journal of the American Geriatrics Society.* 2021; 69(2): 432-440.
- Rosewilliam S, Sintler C, Pandyan AD, Skelton J, Roskell CA.** Is the practice of goal-setting for patients in acute stroke care patient-centred and what factors influence this? A qualitative study. *Clinical rehabilitation.* 2016 May; 30(5):508-19.
- Santos NO, Predebon ML, Bierhals CC, Day CB, Machado DD, Paskulin LM.** Development and validation a nursing care protocol with educational interventions for family caregivers of elderly people after stroke. *Revista Brasileira de Enfermagem.* 2020; 73.
- Saramago I, Timmons S, Gallagher P, Fox S.** Stress in nurses' caring for stroke patients and families: a mixed-method study. *HRB Open Research.* 2020; 3:51.
- Sharifian P, Mohammadi F, Ranjbaran F, Kamyari N, Shamsizadeh M.** The effects of care-oriented group discussion on burnout among the caregivers of patients with stroke. *Journal of Multidisciplinary Care.* 2021; 10(3): 121-125.
- Sitanggang YF, Manurung DU, Puspita EY, Natalia L, Hutasoit EO.** Professional Quality of Life of Nurses in Palliative Nursing Services. 2020.
- Sok S, Sim H, Han B, Park SJ.** Burnout and related factors of nurses caring for DNR patients in intensive care units, South Korea. *International Journal of Environmental Research and Public Health.* 2020; 17(23): 8899.
- Suksatan W, Posai V.** An integrative review of discharge planning interventions with Thai stroke patients. *Systematic Reviews in Pharmacy.* 2020; 11(11): 1692-1700.
- Taha AS, Ibrahim RA.** Effect of a design discharge planning program for stroke patients on their quality of life and activity of daily living. *International Journal of Studies in Nursing.* 2020; 5(1): 64–86.
- TEXAS Department of Aging and Disability Services (DADS).** Caregiver Interview Questionnaire. Available at: [https://hhs.texas.gov/sites/default/files/documents/laws\\_regulations/reports\\_presentation/2017/profile\\_informal\\_caregiving\\_texas-Feb-2017.pdf](https://hhs.texas.gov/sites/default/files/documents/laws_regulations/reports_presentation/2017/profile_informal_caregiving_texas-Feb-2017.pdf). Accessed on 10/ 8/2020. 21.
- Tosun ZK, Temel M.** Burden of caregiving for stroke patients and the role of social support among family members: an assessment through home visits. *International Journal of Caring Sciences.* 2017 Sep 1; 10(3):1696.
- Tsai YH, Lou MF, Feng TH, Chu TL, Chen YJ, Liu HE.** Mediating effects of burden on quality of life for caregivers of first-time stroke patients discharged from the hospital within one year. *BMC neurology.* 2018; 18(1):1-9.
- Ugur GH, Erci B.** The Effect of Home Care for Stroke Patients and Education of Caregivers on the Caregiver Burden and



Quality of Life. *Acta Clinica Croatica*. 2019 Jun 1; 58(2.):321-32.

**Vahedian-Azimi A, Hajiesmaeili M, Kangasniemi M, Fornés-Vives J, Hunsucker R L, Rahimibashar F, Miller AC.** Effects of stress on critical care nurses: a national cross-sectional study. *Journal of intensive care medicine*. 2019; 34(4): 311-322.

**Vericilerinin NH, İle BV.** Determining the Relation Between the Burden of Caregivers for Individuals With Neurological Disease and Caregivers'

Ways of Coping With Stress. *Journal of Psychiatric Nursing*. 2017; 8(3):145-149.

**Watkins J.** *Clinical Guidelines for Stroke Management 2017*. Melbourne Australia, National Manager Clinical Services, stroke foundation. 2017.

