

Effect of nursing intervention on improving awareness of high-risk patients about stroke prevention



Original article

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Abstract: **Objective:** Stroke is perceived as a serious illness although it is preventable, and lifestyle alterations can be made to reduce its risk. Improvement of stroke care should be achieved through awareness of public, especially through high-risk group. Henceforth, the aim of this study was to evaluate the effect of nursing intervention on improving awareness of high-risk people about stroke prevention.

Methods: A quasi-experimental design was used to carry out this study, where a purposive sample of 80 adult patients at high risk for stroke were enrolled while they were attending the out-patient clinics of Zagazig University Hospitals for follow-up treatment; they were divided into two groups: case (40 patients) and control (40 patients). An interview questionnaire was used to assess patients' knowledge regarding warning signs, risk factors, and immediate treatment; attitude; and their practice for prevention for stroke at pretest and posttest.

Results: The study revealed the poor level of knowledge, bad level of preventive behavior, and negative attitude regarding stroke prevention at pre-intervention. However, after intervention, the high-risk people had fair level of knowledge with moderate practice for stroke prevention and positive attitude, with statistically significant difference between pre-post intervention and between the case and control groups.

Conclusions: The study revealed that the nursing intervention seemed to change the knowledge, practice, and attitude of subjects regarding stroke prevention. This, in turn, implies that awareness of prevention of stroke and high-risk factor control could be important to reduce the burden of stroke in Egypt. Thus, further research on a larger scale is required to improve population knowledge and behavior for stroke prevention and control.

Keywords: awareness • high-risk group • intervention • nursing • prevention • stroke

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1. Introduction

Stroke is becoming a challenging public health issue, and it has been shown to be a major cause of death and disability in all societies.¹ According to the World Health Organization, about 16 million new cases of stroke and 62 million stroke survivors were estimated in 2005, with deaths from stroke accounting for 9.7% of all global deaths, and this is expected to increase to over 23 million new stroke cases and 7.8 million stroke deaths by 2030 in the absence of significant global public health response.²

The burden of stroke is increasing in many low- and middle-income countries due to high fatality rates and overwhelming resource incurred by the health systems.³ Moreover, research has shown that the Middle East region faces a double burden of such disease due to growing rates of noncommunicable diseases. Stroke is now targeted public health priorities in these regions.⁴

In Egypt, there are a limited number of studies about epidemiology of stroke with no accurate national estimates of prevalence or incidence of stroke. A study done by Kandil et al.⁵ found that prevalence of stroke in Upper Egypt (Sohag) was 5.08/1000, and it was higher among suburban than rural and urban and higher among males than females. According to recent estimates, the overall prevalence rate of stroke is high with a crude prevalence rate of 963/100,000 inhabitants.⁴

Stroke is the most preventable neurological disease because of its risk factors. According to the inter-stroke studies, hypertension, high cholesterol, diabetes, smoking, obesity, physical activity, poor diet, and alcohol consumption are the most common risk factors for strokes worldwide, which can be prevented through healthier lifestyle choices and habit changes.⁶

Studies have shown that poor knowledge of stroke risk factors and warning signs is an important causal factor of delay in hospital reporting of stroke and a possible cause of poor outcome.⁷ Thus, increased people's knowledge of stroke risk factors and warning signs are important in the control of the disease that reduces morbidity and mortality of stroke. Therefore, one of the most important goals of nursing is to improve stroke awareness for high-risk people and to identify what this group knows about the consequence of their diseases in relation to stroke.⁸

Previous studies have demonstrated that individuals in the general population, including individuals who have risk factors for stroke, have low levels of knowledge in these areas.^{9,10} Consistent with these findings, health educational programs have been very useful for prevention and promotion in this regard.

1.1. Aim of the study

The aim of this study was to evaluate the effect of nursing intervention on improving the level of stroke awareness among high-risk patients through the following objectives:

- (1) Assess the patients' knowledge, practice, and attitude regarding stroke prevention.
- (2) Evaluate the effectiveness of the nursing intervention on awareness of high-risk people regarding stroke prevention.

1.2 Hypotheses

1. The high-risk people who exposed to stroke prevention program will have a high total score of knowledge scale than those who did not follow the program.
2. The high-risk people who exposed to stroke prevention program will have a high total score of preventive behaviors scale than those who did not follow the program.
3. The high-risk people who exposed to stroke prevention program will have a high total score of the positive attitude than those who did not follow the program.

2. Methods

2.1. Research design

A quasi-experimental design was used in this study.

2.2. Setting

This study was conducted in the outpatient clinics of Zagazig University Hospitals, and these clinics were diabetes, obesity, internal medicine, and endocrinology clinic.

2.3. Subjects and sampling

This study enrolled purposive sample of 80 adult patients at high risk for stroke during their follow-up visits to the outpatient clinics at Zagazig University Hospitals. They were diagnosed with one disease or comorbidity such as hypertension, diabetes mellitus, obesity, and heart diseases. They were subdivided randomly into two equal groups (40 for case and 40 for control groups).

2.3.1. Inclusion criteria

The inclusion criteria were being adult male and female patients, who were diagnosed with one disease or comorbidity such as hypertension, diabetes

mellitus, obesity, and heart diseases, and who voluntarily accepted to participate in the study.

2.3.2. Exclusion criteria

High-risk patients with cognitive impairments and gestational diabetes, and those who need to be admitted as they were medically unstable were also excluded from the study.

2.4. Tool of data collection

Based on the literature review and previous studies, the researchers developed data collection instruments; it was written in Arabic language; and the interviewing questionnaire included the following parts:

- **Part I:** Sociodemographic data, medical and family history such as sex, age, occupation, and level of education, past medical history, weight, height, body mass index (BMI), past stroke history, clotting medications taken, smoking, and physical exercises.
- **Part II: Patient knowledge regarding stroke:** The questions assessed the areas of definition of stroke, causes, warning signs, and immediate intervention.

Scoring: For each knowledge question, a correct response was scored one and the incorrect scored zero. For each area of knowledge, the scores of the items were summed up, and the total was divided by the number of the items, giving a mean score for the part. These scores were converted into percentage scores. Total knowledge was poor if <50%, fair if 50%–75%, and good if >75%.

- **Part III: Patient attitude toward stroke:** For each question, the response answers were either “agreed” which scored one or “disagree” which scored zero. The score was reversed for negative questions.

Scoring: The scores of the items were summed up, and the total was divided by the number of the items, giving a mean score for the part. These scores were converted into percentage scores. Total attitude was considered negative if <60% and positive if ≥60%.

- **Part IV: Patients’ practice of preventive behavior:** All questions referred to positive practices. For each question, the response answers were either “yes” which scored one or “no” which scored zero.

Scoring: The scores of the items were summed up, and the total was divided by the number of the items, giving a mean score for the part. These scores were converted into percentage scores. Preventive behavior

was considered bad if <50%, moderate if 50%–75% and good if >75%.

For testing the validity of the tools, 3 experts in community health nursing and medical surgical nursing revised it, and some modifications were done according to their opinion. The content and face validity of the study tools were measured to evaluate the individual items as well as the entire tools used for the study as being relevant and appropriate to test what they wanted to measure.

2.5. Pilot study

The pilot study was applied on 10% of the total study sample, to test the applicability of tool, arrangement of items, and to estimate the time needed for each sheet. They were not excluded from the sample as there were not any changes applied.

2.6. Description of program

The execution of the study ran over 4 phases, and there were assessment, planning, implementation, and evaluation phase. The whole cycle was completed in around 5 months, starting from the beginning of January 2016 to the mid of May 2016.

2.6.1. Assessment phase

To gain entry to outpatient clinics, an official permission was gained through the appropriate channels. Then, the researchers started to enroll participants who fulfill the criteria to further divide them into case and control groups (randomly) after appropriate matching. To do so, the researchers introduced themselves, and the purpose of the study was explained briefly. After that, the baseline data (pretest) were collected from each participant individually using an interview questionnaire sheet, and the time spent with each client was about 30 min. Finally, the collected data were subjected to statistical analysis to give a solid base for designing the nursing intervention.

2.6.2. Planning phase

Taking ground from the results of the assessment phase, the researchers identified the needs for target group and set priorities of needs to plan their nursing intervention. From the available related literature, sessions and booklet were formulated. The sessions were designed to cover the 3 main scopes: first, the theoretical background about stroke (covered definition of stroke, risk factors, warning signs, first aid of stroke, and immediate management). Second, the preventive behaviors (covered diet, exercise, smoking quitting, stress management, rest and sleep, and follow up). Third, attitude

(covered the arrangement for favorable attitude about the patient ability to prevent stroke).

2.6.3. Implementation phase

In this phase, the researchers sketched the program into 9 sessions. The sessions took place either in the waiting hall (when it was not crowded with patients) or in any empty room in the clinics. The researchers usually started with the objective of the session and ended with the date and time and the objectives of the next session. The researchers used open discussions during sessions; videos were presented; also, promotional materials (brochures) were given to participants after each session. The sessions usually took place between 9:00 AM and 1:00 PM when the researcher and patients were available at clinics. Each session took approximately 30 min. Each group had 4–5 patients, but in some instances, sessions were conducted individually because of the different timetable of patients' follow up in the clinics or due to personal issues for some patients. The sessions were executed as follows:

Session 1: Introductory session, to give general account about the intervention and rules followed; also, it served as an ice breaker to promote familiarity between researchers and participants.

Objective: to explain the purpose of the program.

Session 2: The focus of this session was to provide knowledge about definition and risk factors. Group discussion was used as a teaching method, and hand outs were used as a teaching material.

Objective: to define stroke and list risk factors of stroke.

Session 3: The focus of this session was to equip patients with knowledge about warning signs and immediate management of stroke. Both lecture and group discussions were used as teaching methods, and hand outs were used as teaching materials.

Objective: to explore warning signs of stroke and identify immediate management of stroke.

Session 4: This session was designed to equip patients with knowledge about the importance of first aid and the measures taken to alleviate its consequences, highlighting the importance of golden hours for treatment. Lectures were used as a teaching method, and hand outs were used as a teaching material.

Objective: to identify first aid measures for stroke.

Session 5: The focus of this session was to spotlight on patient practice of preventive behaviors of stroke as exercise and smoking, focusing on its impact on stroke. Both lecture and group discussions were used as teaching methods, and hand outs and videos were used as a teaching material.

Objective: to value positive effects of exercise and quitting smoking on stroke.

Session 6: This session was designed to equip patients with knowledge about the importance of stress management and easily used techniques to manage stress. Both lecture and group discussions were used as teaching methods, and hand outs were used as a teaching material.

Objective: to apply stress management technique (as deep breathing exercise).

Session 7: The focus of this session was to equip patients with knowledge about rest and sleep and follow up as preventive behaviors of stroke. Both lecture and group discussions were used as teaching methods, and hand outs were used as a teaching material.

Objective: to value positive effects of rest and sleep and follow up as preventive behaviors of stroke.

Sessions 8 and 9: These sessions were designed specifically to help patients attain positive attitude toward stroke management; henceforth, peer educators (had similar health problem and managed to face it) was the choice where the ex-stroke patients talked about their experience and how it is possible to manage and even avoid the occurrence of stroke through healthy behaviors and follow up.

Objective: to have favorable (positive) attitude toward stroke.

2.6.4. Evaluation phase

To evaluate the effect of the intervention, the posttest performed (using the same tools of the pretest) immediate after the intervention. For the control group, nothing was done except the pretest and the posttest.

2.7. Statistical analysis

The collected data were organized, tabulated, and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 16, SPSS Inc., Chicago, IL, USA). For quantitative data, the range, mean, and standard deviation (SD) were calculated. For qualitative data, which describe a categorical set of data by frequency, percentage, or proportion of each category, comparison between two groups and more was done using the chi-squared test (χ^2). For comparison between means of two groups of nonparametric data of independent samples, Z value of the Mann–Whitney test was used. For comparison between means of two related groups (pre and post program) of nonparametric data, Z value of the Wilcoxon signed-rank test was used. The correlation between variables was evaluated using the Pearson's correlation coefficient (r). The significance was adopted at $P < 0.05$ for interpretation of results of tests of significance.

2.8. Ethical consideration

This study was approved by the ethics committee of the Faculty of Nursing College, Zagazig University (no reference number), and therefore, the official permission to hold out the study was obtained from the General Director of Zagazig University Hospitals and the head of the Out-patient clinics after clarifying the aim of the study. The researchers followed the ethical rules in all stages of the study. The written consent was taken from every subject who participated in the study after explaining the purpose and nature of the study. The researchers emphasized that the study was voluntary and anonymous. They had the full right to refuse to participate in the study or to withdraw at any time without giving any reason.

3. Results

Table 1 displays the sociodemographic characteristics of the study and control group. Eighty participants (case and control) were interviewed before and after the nursing intervention. The mean age of the sample was around 53 years. Considering participants' sex, 67.5% of the study and 62.5% of the control groups were females. Regarding residence, 55% of the study group compared to 72.5% of the control group belonged to rural areas. As for the educational level, around one quarter of both groups were illiterate. Moreover, the mean and SD of BMI were 33.08 ± 6.31 among the study group compared to 34.05 ± 4.96 among the control group.

Variables	Study group (n = 40)		Control group (n = 40)		χ^2	P
	n	%	n	%		
Age (years)						t-test = 0.056, P = 0.955
Range	25–90		32–74			
Mean $\pm$ SD	53.15 $\pm$ 16.28		52.98 $\pm$ 10.92			
Sex						
Females	27	67.5	25	62.5	0.22	0.639
Males	13	32.5	15	37.5		
Residence						
Rural	22	55	29	72.5	2.650	0.104
Urban	18	45	11	27.5		
Educational level						
Illiterate	9	22.5	11	27.5	20.189	0.0001*
Read and write	16	40	3	7.5		
Elementary	3	7.5	13	32.5		
Secondary	4	10	10	25		
University	8	20	3	7.5		
Marital status						
Single	8	20	1	2.5	6.193	0.045*
Married	23	57.5	27	67.5		
Widow/Divorced	9	22.5	12	30		
Work						
Not working	28	70	30	75	2.355	0.308
Retired	6	15	2	5		
Working	6	15	8	20		
Live with						
Alone	6	15	3	7.5	1.127	0.288
With family	34	85	37	92.5		
Income						
Not enough	24	60	25	62.5	3.163	0.076
Enough	13	32.5	15	37.5		
Enough and spare	3	7.5	0	0		
BMI						t-test = 0.764, P = 0.447
Range	21.6–48.4		25.0–46.6			
Mean $\pm$ SD	33.08 $\pm$ 6.31		34.05 $\pm$ 4.96			

Note: *Significant ($P < 0.05$); BMI, body mass index; SD, standard deviation.

Table 1. Sociodemographic data and BMI of the studied stroke high-risk patients (study and control groups) (N = 80).

Regarding the medical history and family history of the participants (study and control groups), Table 2 reveals that 37.5% of the study group had hypertension; whereas, 37.5% of the control group had hypertension accompanied with diabetes. Considering family history of stroke, 10% of the study group compared to 12.5% of the control group had positive family history of stroke. As to the study participants' personal history of stroke, the majority of both groups did not have personal history of stroke. Moreover, only 25% of the study group compared to 12.5% of the control group took blood clotting drugs.

Table 3 illustrates the level of total knowledge, attitude, and practice (KAP) regarding stroke among study and control groups pre and post the intervention. Table 3 indicates that, although nearly all (97.5%) of the study group had poor knowledge pre-intervention, 80% of them had fair knowledge post-intervention with a statistically significant difference ($P = 0.0001$). However, the knowledge level of the entire control group remained poor pre and post the intervention. Concerning the participants' attitude toward prevention of stroke, 95% of the study group had negative attitude pre-intervention, which changed to positive post-intervention as reported by 77.5% of them

Variables	Study group (<i>n</i> = 40)		Control group (<i>n</i> = 40)		χ^2	<i>P</i>
	<i>n</i>	%	<i>n</i>	%		
<i>Patients' medical history</i>						
Hypertension	15	37.5	11	27.5	15.215	0.009*
Diabetes	4	10	0	0		
Cardiac disease	8	20	2	5		
Hypertension and diabetes	6	15	15	37.5		
Hypertension and heart disease	4	10	3	7.5		
Multiple diseases	3	7.5	9	22.5		
<i>Family medical history</i>						
No	2	5	1	2.5	13.511	0.061
Hypertension	8	20	7	17.5		
Diabetes	4	10	4	10		
Heart diseases	7	17.5	2	5		
Obesity	7	17.5	2	5		
Hypercholesterolemia	4	10	2	5		
Hypertension and diabetes	4	10	14	35		
Multiple diseases	4	10	8	20		
<i>Family history of stroke</i>						
No	36	90	35	87.5	0.125	0.723
Yes (one of parents)	4	10	5	12.5		
<i>Patient history of stroke</i>						
No	35	87.5	39	97.5	2.883	0.090
Yes	5	12.5	1	2.5		
<i>Using blood clotting drugs</i>						
No	30	75	35	87.5	2.051	0.152
Yes	10	25	5	12.5		

Note: *Significant ($P < 0.05$).

Table 2. Medical history and family history of the studied stroke high-risk patients (study and control groups) ($N = 80$).

Variables	Study group (n = 40)				Control group (n = 40)				χ^2/P	
	Pre-program		Post- program		Pre-program		Post- program		Pre- program	Post- program
	n	%	n	%	n	%	n	%		
Levels of total knowledge										
Poor	39	97.5	7	17.5	40	100	40	100		
Fair	1	2.5	32	80	0	0	0	0		
Good	0	0	1	2.5	0	0	0	0		
χ^2	52.382				-				1.013	53.333
P	0.0001*				-				0.314	0.0001*
Levels of total attitude										
Negative	38	95	9	22.5	39	97.5	35	87.5		
Positive	2	5	31	77.5	1	2.5	5	12.5		
χ^2	43.378				2.883				0.346	34.141
P	0.0001*				0.09				0.556	0.0001*
Levels of total practice for prevention										
Bad	39	97.5	9	22.5	40	100	40	100		
Moderate	1	2.5	24	60	0	0	0	0		
Good	0	0	7	17.5	0	0	0	0		
χ^2	46.910				-				1.013	50.612
P	0.0001*				-				0.314	0.0001*

Note: *Significant ($P < 0.05$); KAP, knowledge, attitude, and practice.

Table 3. Levels of total KAP regarding stroke among the studied stroke high-risk patients (study and control groups) pre- and post-program (N = 80).

with a statistically significant difference for both groups ($P = 0.0001$). While 97.5% of the control group had negative attitude pre-intervention, 12.5% of them had positive attitude post-intervention, with a statistically significant difference between them ($P = 0.0001$).

Table 3 also shows that 95.5% of the study group had the bad level of practice pre-intervention, which became moderate post-intervention as reported by 60% of them with a statistically significant difference ($P = 0.0001$). However, the practice level of the entire control group remained bad pre and post the intervention.

Table 4 portrays that the study group had a significant favorable change of the physical activity from pre- to post-intervention but no change in smoking habit, with statistically significant differences between study and control groups ($P = 0.0002$).

Figure 1 illustrates the mean score of KAP regarding stroke among the study participants. The table labels that the mean score of total knowledge of the study group increased from 1.72 pre-intervention to

16.62 post-intervention. In relation to total attitude, the mean score of the study group changed from 1.10 pre-intervention to 4.15 post-intervention. Moreover, the mean score of total practice for prevention of stroke changed from 0.33 pre-intervention to 7.78 post-intervention. Also, the control group had some improvement, but it was limited.

Table 5 identifies the mean changes of scores of total KAP regarding stroke among study and control group post-intervention. Table 5 indicates marked improvements among the study group compared to the control group regarding KAP with a statistically significant difference ($P = 0.0001$).

Table 6 demonstrates a statistically significant positive correlation among the scores of the total knowledge, attitude ($r = 0.502$ and $P = 0.001$), and practice ($r = 0.684$ and $P = 0.0001$) of the study group post-program. Also, a statistically significant positive correlation between the scores of the total knowledge and attitude ($r = 0.416$ and $P = 0.008$) post-intervention.

Variables	Study group (n = 40)				Control group (n = 40)				χ^2/P	
	Pre-program		Post-program		Pre-program		Post-program		Pre-program	Post-program
	n	%	n	%	n	%	n	%		
<i>Smoking</i>										
No smoking	8	20	6	15	14	35	15	37.5		
Ex-smoker	4	10	1	2.5	11	27.5	11	27.5		
Active smoker	23	57.5	28	70	12	30	11	27.5		
Passive smoker	5	12.5	5	12.5	3	7.5	3	7.5		
χ^2	2.58				0.08				8.86	20.10
P	0.461				0.994				0.031*	0.0002*
<i>Physical activity practicing</i>										
No	34	85	18	45	27	67.5	24	61.5		
Sometimes	2	5	10	25	5	12.5	4	10.3		
Yes	4	10	12	30	8	20	11	28.2		
χ^2	14.26				0.75				3.42	3.46
P	0.0001*				0.688				0.181	0.177

Note: *Significant ($P < 0.05$).

Table 4. Smoking and physical activity practicing of the studied stroke high-risk patients (study and control groups) pre- and post-program (N = 80).

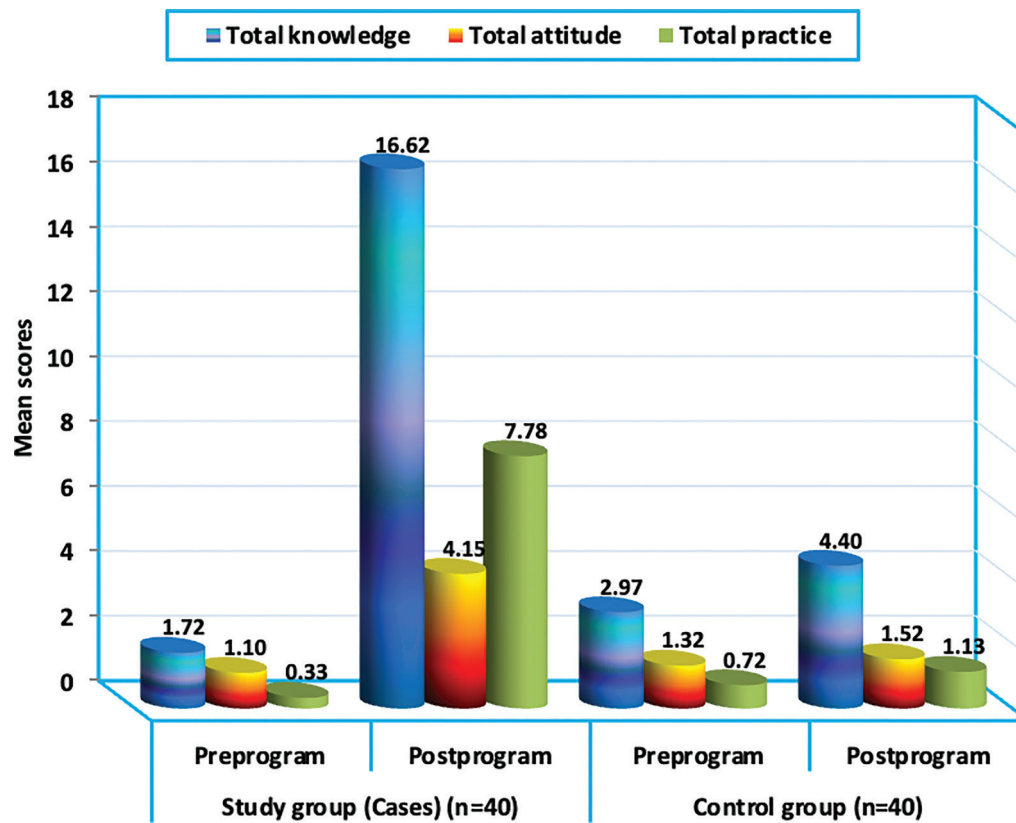


Figure 1. Mean scores of total KAP regarding stroke among the studied stroke high-risk patients (study and control groups) pre- and post-program (N = 80).

Note: KAP, knowledge, attitude, and practice.

Variables	Study group (n = 40)	Control group (n = 40)	Z value	P
<i>Total knowledge</i>			5.435	0.0001*
Range	-4.00 to 25.00	-1.00 to 6.00		
Mean $\pm$ SD	14.90 $\pm$ 6.13	1.42 $\pm$ 1.82		
<i>Total attitude</i>			5.199	0.0001*
Range	0–6.00	-3.00 to 3.00		
Mean $\pm$ SD	3.05 $\pm$ 1.81	0.20 $\pm$ 0.97		
<i>Total practice</i>			5.295	0.0001*
Range	0–14	0–3		
Mean $\pm$ SD	7.45 $\pm$ 3.65	0.40 $\pm$ 0.81		

Note: *Significant ($P < 0.05$); Z value of the Mann–Whitney *U* test; KAP, knowledge, attitude, and practice; SD, standard deviation.

Table 5. Mean changes of scores of total KAP regarding stroke among the studied stroke high-risk patients (study and control groups) post-program (N = 80).

Variables	Study group (n = 40)		Control group (n = 40)	
	Total knowledge	Total attitude	Total knowledge	Total attitude
<i>Total attitude</i>				
<i>r</i>	0.502	-	0.416	-
<i>P</i>	0.001*	-	0.008*	-
<i>Total practice</i>				
<i>r</i>	0.684	0.427	0.264	0.288
<i>P</i>	0.0001*	0.006*	0.1	0.071

Note: *Significant ($P < 0.05$); *r* = correlation coefficient; KAP, knowledge, attitude, and practice.

Table 6. Correlation between changes of scores of total KAP regarding stroke among the studied stroke high-risk patients (study and control groups) post-program (N = 80).

4. Discussion

The number of stroke attacks is continuously increasing; this may be attributed to the stressful lifestyle. There is a need to educate the high-risk patients to stroke prevention practices for bringing down morbidity and mortality rates due to stroke. To increase awareness about stroke among risky people, an intervention program was developed targeting the risk factors, warning signs, and prevention of stroke and also focused on attitude of patients regarding stroke. Previous studies and a literature review indicated that these components are important factors for stroke awareness. So, this study aimed to evaluate the effect of nursing intervention on improving awareness of high-risk people about stroke prevention.

According to a previously revealed hypothesis, the results of this study showed that the majority (97.5%) of the study group participants had the poor level of knowledge at pre-intervention. This was probably due to poor publicity given to the disease in Egypt compared to other diseases as communicable diseases. This result was in line with a study done in Egypt by El Tallawy et al.¹¹ who found that the knowledge of stroke appears poor among individuals working at the two university hospitals studied. Moreover, Shehata et al.⁷

mentioned that the knowledge toward stroke in Cairo University Hospitals' nonclinical workers appears to be relatively poor.

The existing study results indicated that the knowledge level of the intervention group improved after exposure to the program; however, there was no change in the level of knowledge of the control group. In this context, Bay et al.¹ stated that the changeability in stroke awareness and knowledge is the need to enhance stroke-related health literacy that facilitates understanding of risk factors that reduce morbidity and mortality after stroke in people. Similar results were reported by Ibrahim and Soliman¹² in Egypt who found that the knowledge about stroke, warning signs, and symptoms, risk factors, and prevention of complications and immediate action were improved by the educational program for high-risk people of stroke.

The existing study results pointed to a statistically significant difference pre- and post-intervention regarding the improvement in knowledge among the study group. Similar findings were reported in a study done in India by Sane¹³ who found that the results were obvious to affirm that the intervention had a statistically significant impact in the improvement of knowledge on stroke to hypertensive patients. Also, Song and Nam¹⁴ in

South Korea stated that after the intervention, significant improvements were found in the experimental group for stroke risk awareness. Moreover, Duque et al.¹⁵ in San Francisco clarified that education was associated to better knowledge of stroke risk factors and warning signs in a study performed among the high-risk group. On the contrary, Skidmore et al.⁹ in Pittsburgh found that small nonsignificant improvements in stroke-related health knowledge were detected at posttest. This may be due to the regularity of the participants attending all stroke education sessions.

Concerning the attitude, the results of this study found that the majority (95.0%) of the study group had negative attitude regarding stroke pre-intervention. Consistently, Shehata, et al.⁷ mentioned that the attitude toward stroke among Cairo University Hospitals' non-clinical workers appears to be relatively poor. The results of this study confirmed that the intervention program on stroke prevention had an impact on improving the attitude to be positive among patients, with a statistically significant difference pre- and post-intervention. Similarly, Ibrahim and Soliman¹² found that the attitude toward the stroke became positive after the educational program. Other author reported that less proportion of the studied participants changed their attitude toward acute stroke.¹⁵

As regards practices for prevention of stroke, this study found that the majority (97.5%) of participants had the bad level of practice before intervention, but after program, more than half (60%) of them had the moderate level, while no change in the control group was observed with a statistically significant difference between both groups. On the same line, Sane¹³ in India found that the hypertensive patients had improvement in their practices to stroke prevention after intervention with a statistically significant impact. These results disagreed with another study done by Duque et al.¹⁵ who reported that several educational interventions have been carried out worldwide in order to improve recognition of risk factors and warning signs of stroke. Nevertheless, its impact on changing behavior was poor.

One of the main findings in this study was that statistically significant positive correlations were found between the scores of the knowledge and attitude and practice among the study group at post-program. This finding confirmed that the increased awareness about stroke risk was likely to enhance participants' motivation to make decision for behavioral change with their own informed choices about how to behave. Similarly, Sane¹³ found that the results were obvious to affirm that the intervention had a statistically significant impact in the improvement of knowledge on stroke to hypertensive patients that had implication to the attitude and practices to stroke prevention among these observed patients. Moreover, studies have shown that increased

awareness of stroke risk factors among people at high risk for stroke leads to improve compliance with stroke prevention practices.¹⁶

In line with former studies, this study results indicated that the study group had a significant change of the physical activity from pre- to post-program, but no change was observed in smoking habit, with statistically significant differences between study and control groups. Such result may be attributed to the fact that smoking habits need long time and intense desire to quit. This was in agreement with a study done in Korea by Kim et al.,¹⁷ who found that 50% of the participants in the intervention group reported positive changes in physical activity, but no statistically significant differences in change between the two groups to smoking.

5. Conclusions

Based on the results of this study and research hypothesis, current results revealed a poor level of knowledge, negative attitude, and a bad level of practice regarding stroke prevention at pre-intervention. However, after intervention, the high-risk people had a fair level of knowledge with moderate practice for stroke prevention and positive attitude, with a statistically significant difference between pre-post program and for study and control groups. In the end, the study revealed that the intervention seemed to change the KAP of subjects to stroke prevention. This, in turn, implies that awareness to prevention of stroke and high-risk factor control could be important to reduce the burden of stroke in Egypt.

Recommendation

Based on the results of this study, it is recommended that nursing intervention at the community level is needed in order to improve stroke awareness among the Egyptian population to increase the speed of hospital attendance after stroke onset; develop guidelines for the prevention of stroke for patients at high risk to modify their lifestyle and to tackle risk factors; ultimately, further researches on larger scale are required to assess the effectiveness of interventions in improving knowledge and behavior for stroke prevention and control.

Ethical approval

This study was approved by the ethics committee of the Faculty of Nursing College, Zagazig University (no reference number).

Conflicts of interest

All contributing authors declare no conflicts of interest.

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