

Assessment of nutritional status and response among stroke Patients: a Suggested Nutritional Brochure

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Abstract:

Background: Malnutrition is frequently observed in patients with acute stroke and during the rehabilitation period. Malnutrition is associated with poor outcome in these patients. This study **aimed** to assess nutritional status and response among stroke patients and developing a suggested nutritional brochure. **Research design:** A Descriptive cross-sectional research design has been utilized in the present study. **Sample:** Purposeful samples of 60 adult patients have stroke their age ranged from 16 to 83 years old both sex (male and females). **Setting:** Neurological department of Assuit university hospital. **Tools of Data Collection:** A structured interviewing questionnaire sheet including two parts; patients' socio-demographic data and patients' responses to malnutrition. **Results:** more than half two-thirds of studied patients were males, married, lived in rural areas, and more than half of them (55%) their ages more than 55 years with a mean of (54.2 ± 19.0 years). More than two-thirds of patients (66.7%) were suffering from Stroke/brain hemorrhage. The majority of them were bound in bed or wheelchair but they have not experienced any psychological illness or acute illness during the last three months and have not bed ulcer or skin dissection. There was a statistically significant difference between age, diagnoses, marital status and (the movement and ways to eat). **Conclusion:** There was a positive response of stroke patients to malnutrition. **The study recommendations:** Application of the suggested nutritional brochure on stroke patients and evaluating their nutritional status and their response after the application.

Keywords: Assessment, stroke, response, malnutrition, brochure.

Introduction:

A stroke is a sudden disruption in the brain's blood supply. Many strokes are caused by a sudden blockage of the brain arteries leading to ischemic stroke. Some strokes are caused by brain tissue damage when a blood vessel ruptured (hemorrhagic stroke). Stroke is also called a brain attack because it happens quickly and requires immediate treatment. When the symptoms of a stroke last only a short time (less than an hour), this is called a transient ischemic attack (TIA) or mini-stroke (**American stroke association, 2018**).

Stroke is the third leading cause of death in developed countries after coronary heart disease and cancer. In 2008, the U.S. reported 7 million people with an average of one patient dying from a stroke every 4 minutes. The frequency of strokes ranges from 100 to 700 cases per 100,000 inhabitants across European countries (**Scherbakov and Doehner, 2011**). The incidence of stroke is expected to increase over the next 5–10 years by 12 percent in the general population and by 20 percent in low-income subjects. Mortality rates for the first 30 days after stroke and one year are 20 percent and 30 percent respectively. In the Western world, the vast majority of strokes (65–85 percent) are ischemic, whereas hemorrhagic strokes are more affected, which are less common. About one-third and one-half of patients with hemorrhagic strokes do not recover and only 10–20 percent regain functional independence. (**Takahata, et al, 2011**).

While malnutrition in patients with strokes is under-recognized and under-treated, its intake prevalence is estimated at around 20%. Nevertheless, the prevalence of acute stroke malnutrition varies widely from 6.1% to 62%. The wide range was due to the specific duration of the test, patient characteristics and, most notably, diet assessment methods. Malnutrition before and after a serious stroke (**Gomes et al, 2016**).

Dysphagia, along with the insufficiency to meet daily energy and protein needs, is a major risk factor for vomiting and dehydration. Oropharyngeal neurogenic dysphagia is not sufficiently recognized to predispose sarcopenia and intestinal translocation to growth. Neurologists should be aware of the risk of malnutrition and dysphagia, and diagnosis should become a common practice. Evaluation of patients in these aspects (**Gungor, 2017**).

Several researches assessed the nutritional condition of different neurological patient classes, showing a prevalence of malnutrition in stroke patients ranging from 8% to 62%. (**Food Trial Collaboration 2003**). Nevertheless, in neurological patients as a population, the prevalence of malnutrition or the risk of malnutrition is uncertain. The prevalence of malnutrition in hospitalized stroke patients

increased from 12–20 percent during the first week of admission (**Yoo et al. 2008**)

and increased after two weeks from 16–35 percent. **(Davalos et al. 1996)**. No study was found to investigate how neurological patients' nutritional condition improves during admission to hospital.

Malnutrition is a potentially modifiable risk factor that has negative effects on the patient with the stroke. Premorbid under nutrition was found to be an independent mortality predictor at 30 days and 6 months after stroke using various evaluation techniques. Malnutrition was also associated with an increased incidence of infections and pressure after the first week of the stroke. **(Corrigan et al, 2013)**.

Health care providers need to be aware of the nutritional effects of neurological diseases and take the necessary steps to classify or risk the development of certain patients with malnutrition into their clinical practice. Key steps include evaluation, review, dietary preparation, tracking and registration, diagnostic identification and finally the entire process audit. **(Braun et al, 2012)**

Post-stroke patients may be put on specific diets to treat obesity, diabetes, hyperlipidemia, and hypertension. Such diets should be applied carefully as dietary restrictions can lead to a reduction in food intake, particularly among the elderly (> 65 years) and the elderly (> 80 years). Diet plans for patients with these conditions should be individualized according to medical expectations. doctors should be aware of the potential risks and benefits of therapeutic diets before implementation **(Darmon et al, 2010)**.

Significance of the study:

From the researcher clinical experience, it was observed that the majority of neurological patients suffered from malnutrition so, they recognized that nurses need to assess the patient's response to malnutrition and then apply suggested nutritional interventions to patients at risk of malnutrition as well as those who already are malnourished, which may prevent the nutritional status of these patients from deteriorating further.

Aim of the study:

This study aimed to assess nutritional status and response among stroke patients and developing a suggested nutritional brochure.

Research question:

What is the stroke patient's response to malnutrition?

Research design:

A descriptive cross-sectional research design has been utilized in the present study.

Setting: Neurological department of Assuit university hospital

Patients:

Purposeful samples of 60 adult patients diagnosed with stroke their age ranged from 16 to 83 years old both sex (male and females).

Tools of the study: A structured interviewing questionnaire sheet was designed by the researcher that aims to assess the neurological disorders patient's response to malnutrition. The interviewer read the questions aloud and record respondents' answers.

The questionnaire includes the following parts:-

Part 1: patients' socio-demographic data:

This includes (Participant's age, gender, diagnoses, marital status, occupation, Residence, hospital residence, weight, height, body mass index, and arm & leg circumference).

Part 2: Mini Nutritional Assessment (MNA):

The Mini Nutritional Assessment (MNA) developed by **(Rubenstein et al, 2001)**. It was recently developed and validated to provide a single, rapid nutritional status assessment in elderly patients in the clinics, hospitals, and nursing homes. The MNA exam consists of simple measurements and brief questions that can be completed in approximately 10 minutes.

Scoring system: The sum of the MNA score distinguishes between elderly patients with: 1) adequate nutritional status, $MNA \geq 24$; 2) protein-calorie malnutrition, $MNA < 17$; 3) at risk of malnutrition, MNA between 17 and 23.5. Mortality and hospital costs were also found to predict the scale of the MNA. Most importantly, people at risk of malnutrition can be identified before severe weight or albumin level changes occur, scores between 17 and 23.5. These people are more likely to have a reduction in caloric intake that can be easily corrected through nutritional intervention.

Suggested Nutritional Brochure for stroke patients:

The suggested nutritional brochure was designed by the researchers according to the literature review, researchers' experience, and the opinions of medical and nursing expertise. It has been written in an easy Arabic language with clear illustrations and figures. The nursing educational booklet included brief information about:

- Definition, Types, signs, and symptoms of a stroke.
- **Encouraging Eating Despite Low Appetite after a Stroke:**

1. Be vigilant about what the stroke patient considers most palatable foods. Your patient who recovers from a stroke is likely to eat their favorite foods as long as they can chew and drink it. Try to serve the most nutritionally dense foods to him that are delicious.
 2. Set specific times to design a schedule for meals. Sharing mealtime with your patient will also help make the experience more fun and social. Be careful and don't hurry to finish eating your loved one.
 3. Serve food when your patient has the most energy. This is typically earlier in the day.
 4. Encourage the patient first to consume higher calories and more nutrient-dense, nutritious foods.
- **Soft Foods That Are Easy for Stroke Patients to Eat:**
 1. Pureed fruits and vegetables: it is possible to purify fruits and vegetables with milk to encourage eating and add nutritional value. Try with making smoothies in the blender!
 2. Yogurt: Yogurt is one of the best foods for stroke patients because it is easy to eat, as well as a great source of protein, and some yogurts contain probiotics that help with digestive health.
 3. Custard or jelly: These sweets have high palatability, which may make eating easier.
 4. Porridge with milk: eating warm porridges such as oatmeal is an easier way for patients with strokes to receive grains than bread or rice.
 5. Soft scrambled eggs: Eggs contain protein and several beneficial nutrients including choline, biotin, and vitamin B12, which should be easy to eat.
 6. Liquid meal substitutes: Although nutrition from whole foods is preferable if possible, protein shakes and other meal supplements can be helpful for patients with stroke who have difficulty preparing and chewing food.
 7. Stay away from any foods that are either sticky or dry like peanut butter or rice, as these will be very difficult to swallow even if they can be chewed.
 - **Food for Stroke Patients with Diabetes:**

1. Stroke survivors with diabetes have specific health concerns that should be addressed through their diet under guidance from a doctor.
2. The stroke rehabilitation diet protocols are quite close to those for diabetics. Stroke patients are often instructed to focus on eating lean protein and fruits and vegetables that are dense in nutrients while reducing sugar, salt, and fats.
3. Many liquid meal substitutes contain substantial amounts of added sugar, as do many soft, palatable foods, including most yogurts, puddings, and jellos. Make sure to be careful about these and choose sugar-free versions if caring for a stroke patient with diabetes.

- **Nutritional Supplements for Stroke Recovery:**

1. Potassium: Potassium regulates blood pressure and after a stroke will result in a better outcome.
2. Omega-3: Omega-3 fatty acids can be found in fish and several other natural sources, but as a supplement, they can also be eaten. Omega-3 is associated with both the prevention of stroke and recovery of stroke.
3. Vitamin B3: Researches showed that vitamin B3 can help recover brain function after a stroke, present in turkey and other natural sources at high levels.

Patients & Methods

Ethical considerations:

All research ethics principles were fulfilled according to *the Helsinki Declaration (1996)*. Before the conduction of the pilot study as well as the actual study, official permission and consent were obtained from the dean of the Faculty of Nursing, as well as the director of the Neurology department after explaining the nature and purpose of the study. The subject of the analysis has the right to refuse to participate and/or withdraw from the study without reason at any time. During data collection, the research topic of privacy was not considered to pose any health hazards. Participants were told that all their data are highly confidential.

Pilot study:

A pilot study was done on 10% (6 pts.) of the sample to test the clarity and feasibility of the developed tool. It had also provided an estimate of the time needed to fill out the tools. The purpose of the pilot study was:

- Ensure the clarity of designed study tools.
- Examine the utility of designed tools.
- Identify any difficulties or problems needed to handle before applying it.

Procedures

The study proceeded using the following phases:

- **Assessment phase:**

- Official permission was obtained from the research ethics committee of the faculty of Nursing.
- The researcher develops the tools used in data collection after reviewing relevant national and international literature.
- Based on baseline data obtained from the assessment and relevant review of literature, the suggested nutritional instructions were developed by the researcher in a form of printed Arabic

brochure to satisfy the studied prides deficit knowledge about nutrition.

- **Validity of tools:** The questionnaire was piloted on a jury committee consisting of a group of 5 medical and nursing professors who reviewed the method for consistency, validity, Comprehensiveness, perception and applicability. A pilot study (10%) of the participants (6 patients) from the sample was conducted to test the applicability and clarity of the tool's questions and the necessary modification was done.

- **Implementation phase:**
 - Data were obtained and recorded by the researcher, at the beginning of the interview, the researcher greeted each participant, explained the purpose, duration, and activities of the study, oral consent was taken.
 - The researcher collects data from the patients using the study tool during the interview with patients.
 - The patients confirmed that their participation was completely voluntary and informed their rights as research owners.
 - After gathering the information from patients, a suggested nutritional brochure was given to patients in simple Arabic language and illustrations to simplify the information especially for illiterate patients and their relatives.

- **Statistical analysis**

By using SPSS version (20) to check research questions, the data collected were tabulated, computerized, analyzed and summarized. Chi-square and P. value were used to equate pretest data with posttest data, taking into account the P. value as 0.05 (significant) and 0.001 (highly significant).

Results:

Table (1): Percent distribution of studied patients' socio-demographic data:

| Items | Study group(n=60) | |
|---|-------------------|------|
| | No. | % |
| Age: | | |
| 18 to 35 | 13 | 21.7 |
| 36 to 55 | 14 | 23.3 |
| > 55 | 33 | 55.0 |
| Range | 16.0 –83.0 | |
| Mean±SD | 54.2 ± 19.0 | |
| Gender: | | |
| Male | 43 | 71.7 |
| Female | 17 | 28.3 |
| Do you suffer from other diseases? | | |
| Nervous cramps | 5 | 8.3 |
| Stroke or brain hemorrhage | 40 | 66.7 |
| Inflammation of the nerves | 5 | 8.3 |
| Muscle weakness | 6 | 10.0 |
| MS | 3 | 5.0 |
| Weakness in the lower limbs | 1 | 1.7 |
| Marital Status: | | |
| Single | 8 | 13.3 |
| Married | 52 | 86.7 |
| Residence: | | |
| City | 15 | 25.0 |
| Village | 45 | 75.0 |
| Occupation: | | |
| Working | 4 | 6.7 |
| Not working | 56 | 73.3 |
| Hospital Residence: | | |
| 1 day to 15 days | 36 | 60.0 |
| 15 days to 60 days | 22 | 38.7 |
| > 60 days | 2 | 3.3 |
| Range | 2.0 – 120.0 | |
| Mean±SD | 16.2 ± 20.7 | |
| Weight: | | |
| Range | 50.0 – 90.0 | |
| Mean±SD | 71.6 ± 9.1 | |
| height: | | |
| Range | 150.0 – 180.0 | |
| Mean±SD | 166.6 ± 6.8 | |
| Body range: | | |
| Range | 5.0 – 170.0 | |
| Mean±SD | 72.2 ± 17.5 | |
| Leg: | | |
| Range | 20.0 – 70.0 | |
| Mean±SD | 34.4 ± 11.8 | |
| Arm: | | |
| Range | 10.0 – 50.0 | |
| Mean±SD | 24.5 ± 10.2 | |

Table (1): This table shows that; more than half two-thirds of studied patients were males, married, lived in rural areas, and more than half of them (55%) their ages more than 55 years with a mean of (54.2 ± 19.0 years). (73.3%) of studied patients not working and more than half of them have hospital residences from 1-15 days. More than two-thirds of patients (66.7%) were suffering from

Stroke/brain hemorrhage. the mean weight of patients was (71.6 ± 9.1 kg), while the mean height was

(166.6 ± 6.8 cm). Leg circumference mean was (34.4 ± 11.8 cm) while arm circumference means was (24.5 ± 10.2 cm).

Figure (1): Percentages distribution of studied patients according to age:

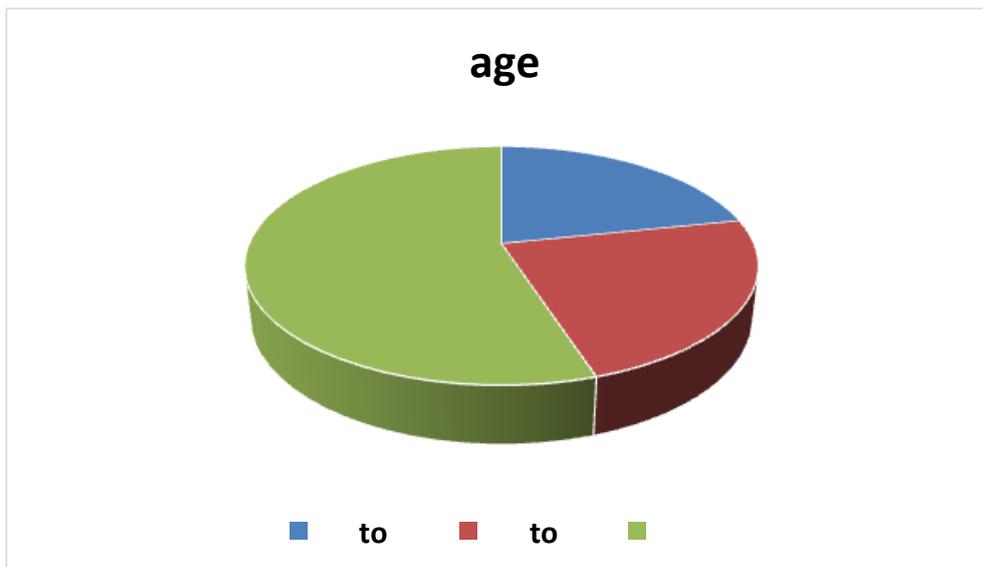


Figure (1): This figure illustrated that the majority of patients their ages were more than 55 years.

Figure (2): Percentages distribution of studied patients according to Hospital Residence:

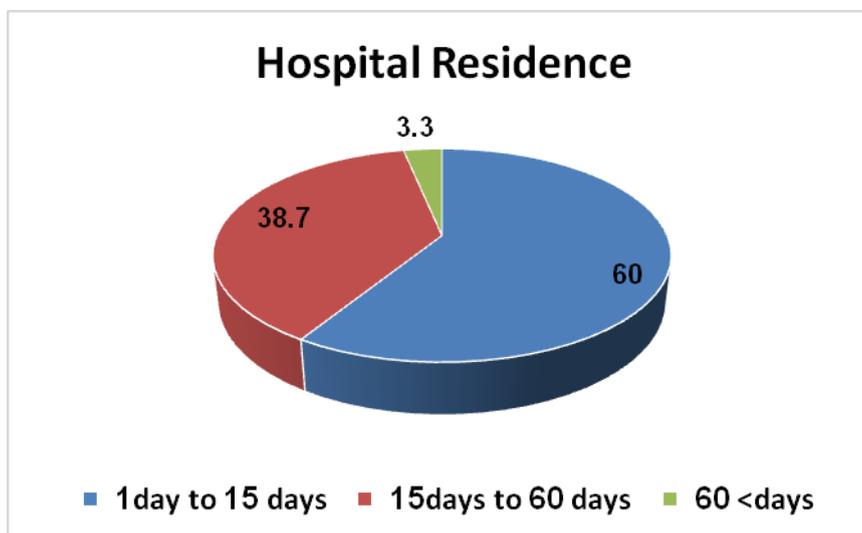


Figure (2): This figure demonstrated that more than half of patients have a hospital residence ranged between 1 to 15 days.

Figure (3): Percentages distribution of studied patients according to residence:

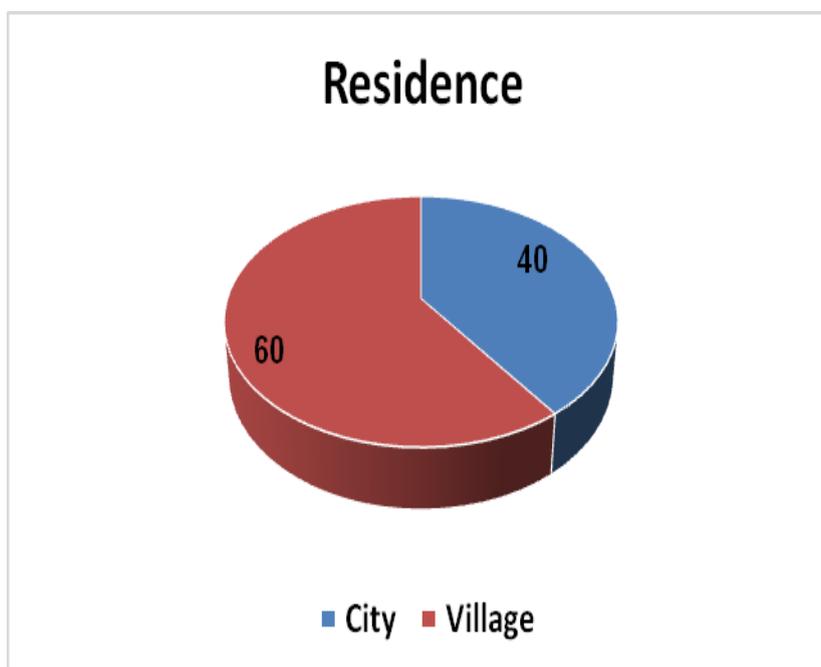


Figure (3): This figure reported that more than half of the patients lived in rural areas.

Figure (4): Percentages distribution of studied patients according to menstrual status:

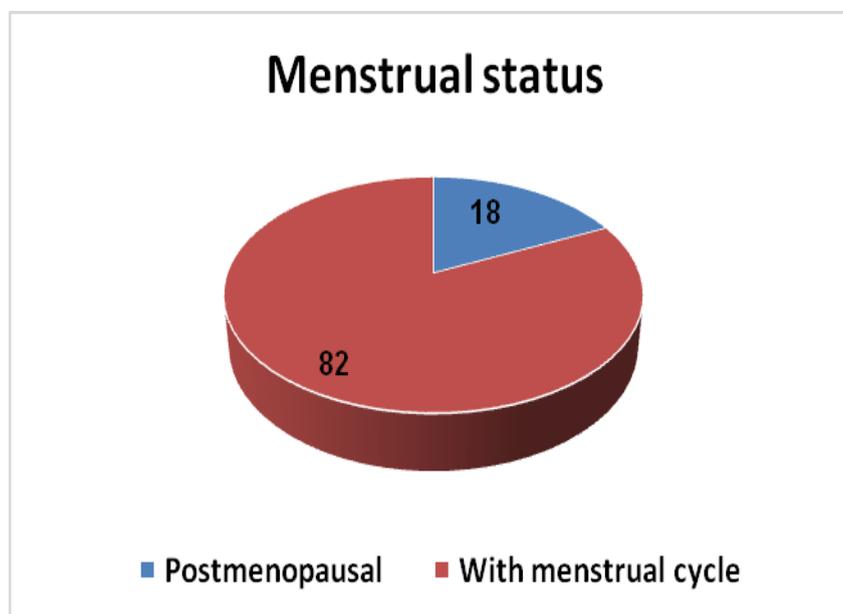


Figure (3): This figure showed that 82% of patients were with menstrual cycle while only 18% of them were postmenopausal.

Table (2): Percent distribution of studied patients' responses:

| Items | Study group(n=60) | |
|---|-------------------|-------|
| | No. | % |
| 1. Has the rate of eating been reduced during the last three months because: | | |
| Loss of appetite | 9 | 15.0 |
| Problems of digestion | 2 | 3.3 |
| Difficulty of chewing | 1 | 1.7 |
| Difficulty of swallowing | 1 | 1.7 |
| No | 47 | 78.3 |
| 2-Is anorexia: | | |
| High | 0 | 0.0 |
| Average | 6 | 10.0 |
| Very weak | 7 | 11.7 |
| No | 47 | 78.3 |
| 3. Has there been a loss of weight in the last three months? | | |
| Yes | 7 | 11.7 |
| No | 53 | 88.3 |
| 4. For the movement: | | |
| Bound in bed or wheelchair | 50 | 83.3 |
| I can move between the bed and the wheelchair, but I don't. | 4 | 6.7 |
| Move freely | 6 | 10.0 |
| 5. Have you experienced any psychological illness or acute illness during the last three months? | | |
| Yes | 0 | 0.0 |
| No | 60 | 100.0 |
| 6. Is there a psycho-social problem you have? | | |
| Extreme depression | 2 | 3.3 |
| Simple hiding | 2 | 3.3 |
| No psychological problems | 56 | 92.4 |
| 7-Do you live alone? | | |
| Yes | 1 | 1.7 |
| No | 59 | 98.3 |
| 8. Do you take more than three medications a day? | | |
| Yes | 12 | 20.0 |
| No | 48 | 80.0 |

Table (2): Cont. Percent distribution of studied patients' responses:

| Items | Study group(n=60) |
|-------|-------------------|
|-------|-------------------|

| | No. | % |
|--|-----|------|
| 9. Is there a bed ulcer or skin dissection? | | |
| Yes | 5 | 8.3 |
| No | 55 | 91.7 |
| 10. How many full meals do you eat daily? | | |
| One meal | 1 | 1.7 |
| Two meals | 11 | 18.3 |
| Three foods | 48 | 80.0 |
| 11. What kind of protein is it addressed: | | |
| Once a day (milk-cheese-yogurt) | 3 | 5.0 |
| Two or more times weekly (legumes-egg) | 0 | 0.0 |
| Fish, meat or chicken every day | 33 | 55.0 |
| All | 24 | 40.0 |
| 12. Are two or more fruits or vegetables consumed daily? | | |
| Yes | 27 | 45.0 |
| No | 33 | 55 |
| 13. How many fluids do you eat daily from (water, juice, milk, tea, etc.) | | |
| Less than three Cups | 1 | 1.7 |
| 3-5 cups | 30 | 50.0 |
| More than five cups | 29 | 48.3 |
| 14. What is the way to eat? | | |
| I can't eat without help | 45 | 75.0 |
| Eat alone, but hardly | 7 | 11.7 |
| I eat alone without problems | 8 | 13.3 |
| 15-How do you see yourself in your food situation? | | |
| I see myself in malnutrition | 1 | 1.7 |
| Food situation unstable | 6 | 10.0 |
| I don't have food problems | 53 | 88.3 |
| 16-How do you see your health compared to your age? | | |
| Not good | 5 | 8.3 |
| I don't know | 27 | 45.0 |
| Acceptable | 9 | 15.0 |
| Good | 19 | 31.7 |

Table (2): More than three-quarters of patients were have not anorexia, weight loss or reduced the rate of eating the last 3 months. The majority of them were bound in bed or wheelchair but they have not experienced any psychological illness or acute illness during the last three months and have not bed ulcer or skin dissection. More than two-thirds of patients eat three meals daily, Fish, Meat or chicken every day. Halfe of them have not consumed fruits or vegetables daily, but drink 3-5 cups of fluids. More than three-quarters of patients can't eat without help and they think that they don't have food problems. More than one-third of them don't know their health compared to your age.

Table (3): Relation between patients' responses and socio-demographic data:

| Items | Age | Gender | Diagnoses | Marital Status | Residence | Occupation |
|---|---------|---------|-----------|----------------|-----------|------------|
| | P-value | P-value | P-value | P-value | P-value | P-value |
| 1. Has the rate of eating been reduced during the last three months because: | 0.525 | 0.392 | 0.715 | 0.747 | 0.251 | 0.726 |
| 2-Is anorexia: | 0.823 | 0.665 | 0.683 | 0.890 | 0.539 | 0.664 |
| 3. Has there been a loss of weight in the last three months? | 0.181 | 0.389 | 0.902 | 0.214 | 0.494 | 0.592 |
| 4. For the movement: | 0.001** | 0.269 | 0.0001*** | 0.003** | 0.642 | 0.759 |
| 5. Have you experienced any psychological illness or acute illness during the last three months? | - | - | - | - | - | - |
| 6. Is there a psycho-social problem you have? | 0.493 | 0.422 | 0.921 | 0.214 | 0.223 | 0.749 |
| 7-Do you live alone? | 0.672 | 0.534 | 0.102 | 0.698 | 0.083 | 0.938 |
| 8. Do you take more than three medications a day? | 0.001** | 0.009* | 0.444 | 0.133 | 1.000 | 0.522 |
| 9. Is there a bed ulcer or skin dissection? | 0.110 | 0.104 | 0.870 | 0.368 | 0.792 | 0.248 |
| 10. How many full meals do you eat daily? | 0.385 | 0.844 | 0.416 | 0.826 | 0.871 | 0.890 |
| 11. What kind of protein is it addressed: | 0.385 | 0.847 | 0.340 | 0.306 | 0.315 | 0.907 |
| 12. Are two or more fruits or vegetables consumed daily? | 0.359 | 0.736 | 0.514 | 0.278 | 0.782 | 0.352 |
| 13. How many fluids do you eat daily from (water, juice, milk, tea, etc.) | 0.369 | 0.305 | 0.007* | 0.852 | 0.582 | 0.592 |
| 14. What is the way to eat? | 0.005* | 0.848 | 0.0001*** | 0.008* | 0.607 | 0.619 |
| 15-How do you see yourself in your food situation? | 0.188 | 0.355 | 0.810 | 0.367 | 0.126 | 0.132 |
| 16-How do you see your health compared to your age? | 0.121 | 0.250 | 0.630 | 0.553 | 0.467 | 0.185 |

Table (3): Cont. The relation between patients' responses and socio-demographic data:

| Items | Hospital Residence | Weight | Tall | BMI | Leg | Arm |
|---|--------------------|---------|---------|-----------|-----------|---------|
| | P-value | P-value | P-value | P-value | P-value | P-value |
| 1. Has the rate of eating been reduced during the last three months because: | 0.715 | 0.824 | 0.265 | 0.887 | 0.0001*** | 0.047 |
| 2-Is anorexia: | 0.300 | 0.720 | 0.267 | 0.726 | 0.044* | 0.295 |
| 3. Has there been a loss of weight in the last three months? | 0.197 | 0.213 | 0.582 | 0.072 | 0.023* | 0.005* |
| 4. For the movement: | 0.776 | 0.261 | 0.829 | 0.113 | 0.564 | 0.911 |
| 5. Have you experienced any psychological illness or acute illness during the last three months? | - | - | - | - | - | - |
| 6. Is there a psycho-social problem you have? | 0.063 | 0.783 | 0.302 | 0.835 | 0.329 | 0.029* |
| 7-Do you live alone? | 0.429 | 0.935 | 0.941 | 0.985 | 0.700 | 0.494 |
| 8. Do you take more than three medications a day? | 0.491 | 0.984 | 0.664 | 0.993 | 0.574 | 0.747 |
| 9. Is there a bed ulcer or skin dissection? | 0.112 | 0.961 | 0.924 | 0.992 | 0.730 | 0.959 |
| 10. How many full meals do you eat daily? | 0.376 | 0.859 | 0.710 | 0.781 | 0.421 | 0.533 |
| 11. What kind of protein is it addressed: | 0.907 | 0.704 | 0.773 | 0.547 | 0.143 | 0.442 |
| 12. Are two or more fruits or vegetables consumed daily? | 0.466 | 0.728 | 0.522 | 0.698 | 0.119 | 0.225 |
| 13. How many fluids do you eat daily from (water, juice, milk, tea, etc.) | 0.202 | 0.691 | 0.504 | 0.839 | 0.558 | 0.499 |
| 14. What is the way to eat? | 0.669 | 0.429 | 0.247 | 0.273 | 0.975 | 0.973 |
| 15-How do you see yourself in your food situation? | 0.394 | 0.106 | 0.019* | 0.0001*** | 0.408 | 0.087 |
| 16-How do you see your health compared to your age? | 0.782 | 0.512 | 0.499 | 0.326 | 0.351 | 0.254 |

Table (3): this table demonstrated that there was a statistically significant difference between age, diagnoses, marital status and (the movement and ways to eat). Also, a statistically significant difference was found between the diagnoses and the number of fluids consumed daily from (water,

juice, milk, tea, etc.)

Figure (5): Correlation between patients' age and gender and their weight, height, and measurements:

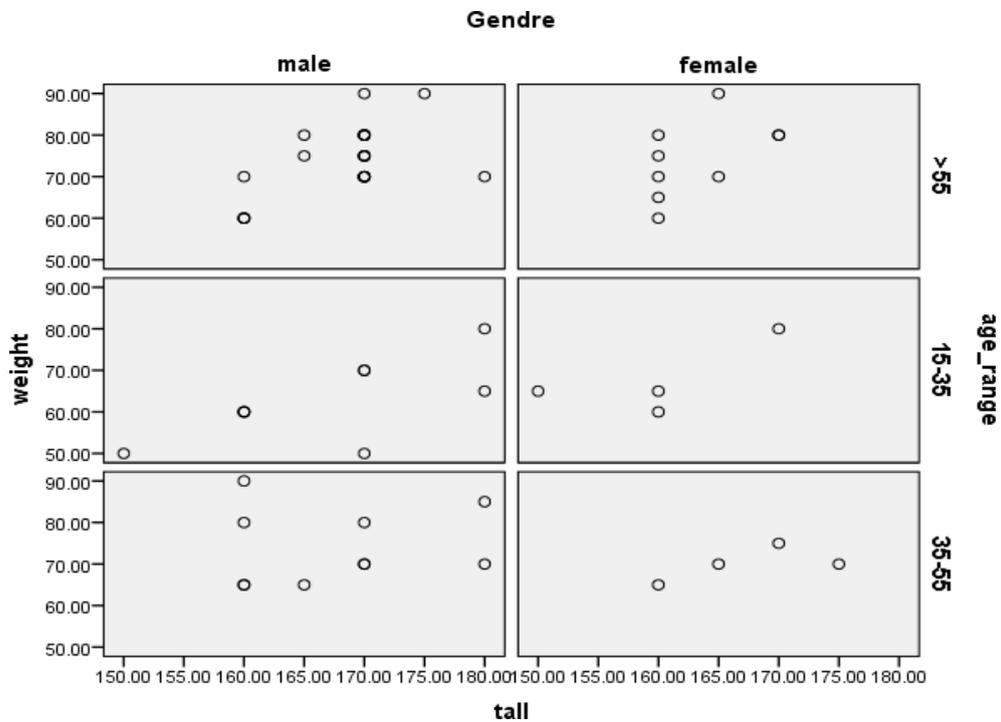


Figure (5): reported that there was a positive correlation between patients' age and gender and their weight, height, and measurements.

Figure (6): Correlation between patients' age and gender and their leg and arm measurements:

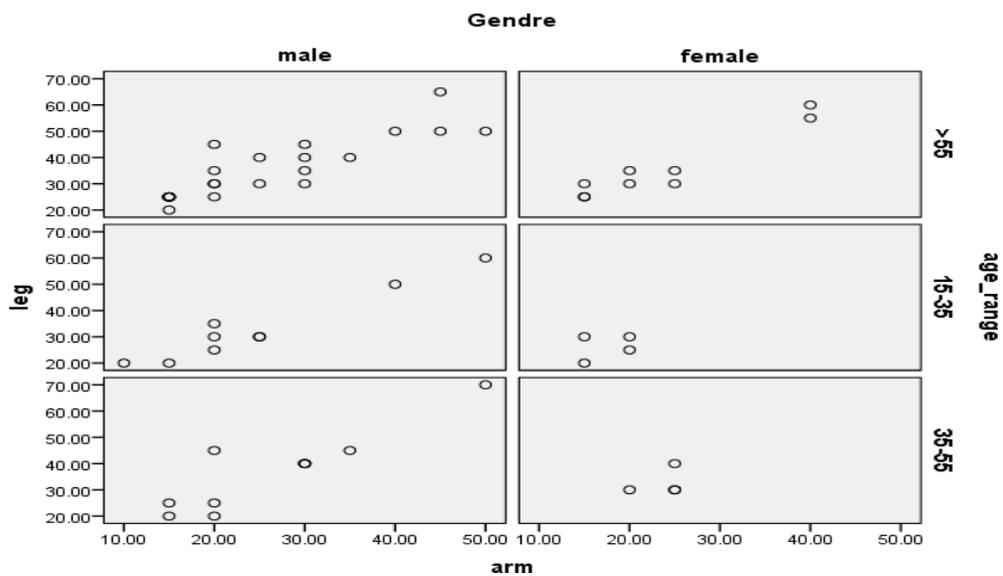


Figure (6): reported that there was a positive correlation between patients' age and gender and their leg and arm measurements.

Discussion:

Malnutrition is a significant complication preventable from acute stroke and is used to identify a large number of dietary anomalies. It has a long-standing adverse imbalance in energy and protein use and requirements, with metabolic demands exceeding nutritional intake resulting in altered body composition and impaired biological function. (Jensen et al, 2010).

So, this research aimed to assess the nutritional status and response among stroke patients, besides, to develop suggested nutritional brochure

The present study showed that; more than half of them their ages more than 55 years old with a mean of (54.2 ± 19.0) years). Harker et al., (2015) mentioned that the age- and gender-matched case-control study served as a pilot study on the association with general neurological diseases.

More than half two-thirds of studied patients were males and Three-quarters of studied patients not working. This agreed with Marrie et al., (2015) who found that most of the stroke patients were male. While, Hanamsagar & Bilbo, (2016) documented that there was no difference between the two sexes regarding the neurological disturbance occurrence. On the other hand, Mbewe et al., (2015) found that; female predominance is an almost consistent finding in many other studies, which reflects the fact, that stroke is common in women. This finding not agreed with Alvarado-Esquivel et al., (2017) who found mean age (52.65 ± 17.89) years old and included 213 females and 131 males. There was no difference in age between cases and controls. However, there was low participation of males in this study, probably because males have poor health-seeking behavior (McCabe et al., (2016).

Regarding the marital status, majority of the studied patients were married in this regard, Roberts et al., (2016) found an association between marital status and stroke, with an excess risk observed among never-married individuals. **Regarding the residence** of the studied patients' majority of them lived in rural areas, this agreed with Patel et al., (2016) who found that; mean age of the participants was 40.6 ± 15 years; the majority were females. About three-fourth of the patients were from rural regions. However, in this respect Kaddumukasa et al., (2016) documented that; the stroke is a common cause of morbidity and mortality in developing countries. Available evidence on urban-rural differences in neurological diseases is scaring in such countries.

Regarding the patient's diagnosis; more than two-thirds of patients were suffering from stroke/brain hemorrhage. This not match with Awan et al., (2019)who referenced that; the common neurological diseases were headache disorders 3613 (33.4%), nerve and root lesion 2928 (27.1%), vascular diseases 1440 (13.3%), epilepsies 566 (5.2%), muscle disorders 424 (3.9%), psychiatric

disorders 340 (3.1%) and CNS infection 303 (2.8%). In this respect, **Ferri et al., (2011)** found a comparison between the urban and rural samples showed that ischaemic stroke (72.7% vs. 82%) and psychiatric disorders (2.1% vs. 3.5%) were more prevalent in the rural area as compared to an urban setting.

Regarding nutritional status; the mean weight of patients was (71.6 ± 9.1 kg), while the mean height was (166.6 ± 6.8 cm). Leg circumference mean was (34.4 ± 11.8 cm) while arm circumference means was (24.5 ± 10.2 cm). Regarding the weight of the studied patients, **Devinsky et al., (2016)** found Weight loss in the previous 3 months was recorded among stroke patients. Besides, **Stanghellini et al., (2016)** found the mean weight of the studied patient was weight 64.2 ± 15 kg. The study of **Patterson et al., (2017)** matches our study that, the mean BMI in neurologic disorder was 23.9 ± 4.6 , with a weight loss of 4.15 ± 9.6 kg. This not match with **Chen et al., (2017)** who found only 13 % of the low weight and low BMI was among patients who suffered from neurological disturbances.

Regarding hospital length of stay (LOS) more than half of patients stay at the hospital from 1 to 15 days. In this regard, **Birnbaum et al., (2017)** found that; neurologic disorders special care units (SCUs) in nursing homes are increasingly prevalent, but little is known about their effects on residents' outcomes. This wasn't matched with **Tsai et al., (2016)** who found neurological disorder length of stay was 29.45 ± 25.13 days. However, **Broman et al., (2018)** mentioned that; the height and weight are a good marker of LOS and increased weight loss in admission levels produces an increase in LOS. **Allard et al., (2016)** documented that; The length of stay was significantly higher in the patients with stroke, 3.84 days (95% confidence interval, 0.51–7.17; $P < 0.05$), and multiple regression showed that neurologic impairment was positively associated with the length of stay.

The data of the present study revealed that the majority of studied patients were with menstrual cycle while only a few numbers of them were postmenopausal. This against **Trans et al., (2009)** results who found that; there is a significant increase in occurring of stroke in women as they age and undergo menopause.

Regarding nutritional patients' responses:

The existing study revealed that more than three-quarters of patients were have not anorexia, weight loss or reduced the rate of eating the last 3 months. This agreed with **Vo et al., (2017)** who found that stroke patients mainly had anorexia which leads to weight loss when asses nutritional habits. While other research by **Barichella et al. (2017)** found no eating habits changes found among the patients suffered from a stroke.

In addition, our study found the majority of them were bound in bed or wheelchair but they have not experienced any psychological illness or acute illness during the last three months. This match with **Calatayud et al., (2016)** found that there was a significant relationship between a decrease in body weight and a decrease in muscle movement. But on the other hand, **Parrish, & Teske, (2017)** mentioned that; decreasing the movement or bedridden minimizing activity leads to a decrease in the energy needed which helps in increasing the weight and BMI.

More than two-thirds of patients eat three meals daily, Fish, Meat or chicken every day. Half of them have not consumed fruits or vegetables daily, but drink 3-5 cups of fluids. More than three-quarters of patients can't eat without help and they think that they don't have food problems. In this respect; **Cereda et al., (2016)** found that the management of protein intake and the treatment of constipation should be considered to be an integral part of the care of stroke patients. Attention should always be focused on energy intake also. Neurologic patients had lower BMI and reported higher food intake than controls. BMI was found to be inversely associated with disease duration and severity (**Kerley et al., 2016**).

Preis et al., (2016) concluded that; malnutrition is common in stroke patients and is associated with reduced quality of life and a higher prevalence of fatigue which appears not to be due to a higher prevalence of depressive disorders. **Penner & Paul, (2017)** recommended; standardized nutritional screening should routinely be conducted to identify malnourished patients and enable early intervention with multimodal treatment.

Regarding the relation between patients' responses and socio-demographic data: The present study demonstrated that there was a statistically significant difference between age, diagnoses, marital status and (the movement and ways to eat). Also, a statistically significant difference was found between the diagnoses and the number of fluids consumed daily from (water, juice, milk, tea, etc.). This matches with **Song, (2015)** who emphasized the necessity for clarifying the cause of fatigue (for example, early respiratory failure, malnutrition, anemia, and medication effects) in patients with stroke, and proposes that occupational and physical therapists should be involved in their care.

Regarding fluid intake and relation between age, **Rosinger et al., (2016)** found that; adequate water intake is critical to physiologic and cognitive functioning. While water requirements increase with the size of the body, it remains unclear whether the weight status affects the relationship between water intake and hydration in patients with strokes. Therefore, **Brooks et al., (2017)** recommended an age-dependent cutoff for dehydration that takes this decrease into account.

Regarding the correlation between patients' age and gender and their weight, height, and measurements: The present study reported that there was a positive correlation between patients' age and gender and their weight, height, and measurements. These matches with **Kebede et al., (2016)** study indicate that 40–50% of hospitalized patients show malnutrition, a variable that is associated with length of stay and morbidity. The measurements of different parameters such as triglyceride and anthropometric measurement (body mass index (BMI), waist-hip ratio (WHR), waist-height ratio (WHtR) and neck circumference (NC) in patients with strokes alter following postmenopausal obesity. (**Jeemon et al., 2011**).

Conclusions:

more than half two-thirds of studied patients were males, married, lived in rural areas, and more than half of them (55%) their ages more than 55 years with a mean of (54.2 ± 19.0 years). More than two-thirds of patients (66.7%) were suffering from Stroke/brain hemorrhage. The majority of them were bound in bed or wheelchair but they have not experienced any psychological illness or acute illness during the last three months and have not bed ulcer or skin dissection

Recommendations:

In the light of previous findings the following recommendations are suggested:

1. Application of the suggested nutritional brochure on stroke patients and evaluating their nutritional status and their response after the application.
2. Further research is needed to examine the effectiveness of applying the suggested nutritional brochure on stroke patients
4. Repeat this study on a larger sample with a different group of patients should be tried.

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