Effect of Changing Selected body Positions on Oxygen Saturation among Patients with Acute Stroke

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Abstract

Background: Body position generally effect on respiratory and stroke disease. Stroke morbidity increased by inappropriate position during the early recovery phase. **Aim:** To evaluate the effect of changing selected body positions on oxygen saturation among patients with acute stroke. **Research design:** Quasi-experiment research design applied in this study. **Sitting:** the study carried out at the stroke intensive care unit of the Neurological Department of Aswan University Hospitals. **Sample:** 60 patients with acute stroke within 24- 48 hours following mild to moderate and severe stroke allocated a randomized sequence of four positions. One hour spent in each position. SaO_2 was recorded each15 minutes by pulse oximetry with a finger probe. **Tools of data collection:** structured interview questionnaire sheet, Glasgow Coma Scale, the Scandinavian stroke scale, and oxygen saturation monitoring record. **Results:** mean score of SaO_2 at 2nd 15 min, 3rd 15 min, 4th min, and mean SaO_2 of one hour at the semi-sitting position was higher than different positions **(**Supine position, Right side position, and Left side position) with statistically significant differences with p-value .008, .05, .002, and .019 respectively, the semi-sitting position was the best position of all position. **Conclusion:** the study finding concluded that the semi-sitting position is the best position than other positions in improving oxygen saturation after one hour from positioning among stroke patients. **Recommendation:** use a semi-sitting position and implicate this positioning strategy in the future to improve arterial oxygen saturation in acute stroke patients.

Keywords: Acute Stroke, Body Positions, Oxygen Saturation

Introduction

A stroke is a clinical syndrome characterized by rapidly developing clinical symptoms and/ or signs of focal, and at times global (applied to patients in a deep coma and those with subarachnoid hemorrhage), loss of cerebral function, with symptoms lasting more than 24 h or leading to death, with no apparent cause other than that of vascular origin'. **(Benjamin et al., 2019)**. A stroke, also called a brain attack, is a brain injury caused by a sudden interruption in the blood supply of the brain. It occurs either when part of the brain does not receive the needed blood flow the blood supply to part of the brain is suddenly interrupted, or because a blood vessel in the brain ruptures and blood invades the surrounding areas. **(Perrin et al., 2018)**

The epidemiology of stroke is changing rapidly and the global stroke burden continues to increase worldwide, stroke incidence is astonishing, with about 17 million people having a stroke each year. **(Richard, 2017)**. World Health Organization is rating about 85% of stroke deaths in low and middle-income countries. The major health problem in the Egyptian population is a stroke; furthermore, Stroke Deaths in Egypt reached 56,710 or 11.04% of total deaths and thus ranks 3rd after heart disease &gastrointestinal with a crude prevalence rate of 963/ 100,000 inhabitants. The clinical characteristics of Egyptian stroke patients are generally similar to those in other world populations. **(Abotaleb et al., 2018)**

Post-stroke brain damage, which affects the central control of respiration, leads to various respiratory disorders. Stroke patients may experience a reduction of up to 50% in respiratory function when compared to age- and gender-matched norms. The reduction in respiratory function can lead to decreased endurance, dyspnea, and increased sedentary behavior, as well as an elevated risk of stroke. The reduction in respiratory function may also cause aspiration, leading to pneumonia due to an inability to protect the airways and clear the airway by coughing, and acute pulmonary embolism due to prolonged mobilization. **(Ptaszkowska et al., 2019)**

Hypoxemia is observed in many patients with injury to the central nervous system. Physiologic and scientific literature to date supports the clinical efficacy of two noninvasive interventions, namely positioning and mobilization, which have both direct and profound effects on multiple steps of the oxygen transport pathway, which is reflected by the oxygen saturation (SpO2) level in blood. The literature supports the benefits of frequent body position changes, particularly for a patient who is relatively immobile, unalert, severely debilitated, obtunded, breathing at low lung volumes, obese, aged or very young, or has lost the sigh mechanism. Appropriate positioning of critically ill patients can significantly improve gas exchange. **(Mehta et al., 2017)**

Patient positioning is an independent nursing intervention and, although it is important in patients with cardiovascular, cardiopulmonary dysfunction, and oxygenation problems, there is insufficient evidence to suggest a particular position. The correct positioning of patients can affect the blood oxygen saturation level by increasing lung volume, reducing the heart rate, helping mucociliary clearance, and improving ventilation/perfusion (V/Q) matching. Optimal oxygenation depends on the V/Q matching. **(Alan et al., 2019)**

The stroke care nurse has a very important role in the care and guidance of the stroke patient. A particular body position, the time a body remains in a particular position, or changes in body position. The nurse caring for stroke patients involves multitasking such as mobilization, positioning, feeding, and early multidisciplinary rehabilitation. During the acute phase, nurses monitor the occurrence of i.e. lung

inflammation, bedsores, urinary tract infections, thrombosis, delirium, depression, the degree of consciousness of the patient, injury of the affected side caused by neglect, inadequate posture, inadequate food or fluid intake. The SCN applies preventive interventions on the stroke care unit according to the hospital protocols to decrease the risk of those complications. **(Buijck et al., 2018)**

Significance of the Study:

Stroke is a common cause of morbidity and mortality worldwide. According to the World Health Organization, around 15 million people, worldwide, suffer from stroke each year. Four out of five strokes occur in low- and middle-income countries**.** Egypt is a developing country with a large population, the total lifetime prevalence of stroke in population aged 20 years and more in Upper Egypt (desert area) was 8.5/1,000. It lies within the range that is recorded in developing countries. **(Abd-Allah et al., 2018)**

Mild hypoxia is common in stroke patients and may have significant adverse effects on the ischemic brain after stroke. Hypoxemia in the first few hours after hospital admission is associated with an increased risk of death (**Roffe et al., 2014)** Positioning in the early stages of acute stroke is carried out as a part of respiratory care for optimal oxygen saturation **(Williams et al., 2020)** So, from previously mentioned our study will be carried out to investigate the effect of changing selected body positions on oxygen saturation among patients with acute stroke.

Aimed of the study:

The aim of the study is to evaluate the effect of changing selected body positions on oxygen saturation among patients with acute stroke.

Subjects and methods:

Research design:

Quasi-experimental research design utilized in this study.

Subjects (Sample):

A Purposive sample of (60) adult patients were admitted to ICU with a diagnosis of acute stroke.

For the sample size n, this calculator employs the following formula:

$n = N*X / (X + N - 1)$,

Where,

$X = Z_{\alpha/2}^2 * p*(1-p) / MOE^2$,

and Z/2 is the critical value of the Normal distribution at /2 (for example, for a 95percent confidence level, is 0.05 and the critical value is 1.96), MOE is the margin of error, p is the sample proportion, and N is the participant scale. The sample size formula (n=60) has been subjected to a Finite Population Correction.

Inclusion Criteria:

Aged over 18 -65 years, patients with the acute phase of stroke (24-48 hours), and attached with a pulse oximeter to monitor oxygen saturation

Exclusion criteria:

Patients with carbon monoxide poisoning, pyrexia, patients with chronic lung disease, patients with unstable cardiovascular disease, a poor peripheral perfusion especially in the hands, anemia and acute respiratory infection.

Setting:

The study conducted in intensive care unit (ICU) at Aswan University Hospital.

Study duration:

The total data collection collected for seven months from October 2018 to Abril 2019.

Study tools:

Four tools designed and used for collecting data for this study, these tools prepared and tested by the researcher, and content of the tools established after extensive literature review.

First Tool: Structured Interview questionnaire sheet, it includes (two parts): 1st part: Sociodemographic characteristics of the patients: It is including socio demographic data such as, age, gender, marital status, level of education, date of admission etc……) **2 nd part: (A) Medical history**: It constructed and developed by the researcher based reviewing of literature to assess past and present medical history of the patient and family of the same disease, side of hemiparesis, smoking habits etc…) **(B): Current health status:** It constructed and developed by the researcher based reviewing of literature to assess respiratory pattern, stroke classification, oxygen treatment, pulse etc….). **(Anderson et al.,2019) (Lam et al.,2019) (Tan et al., 2020)**

Second Tool: Glasgow Coma Scale (GCS): Second Tool: Glasgow Coma Scale (GCS): This scale was developed by **(Teasdale et al., 1974).** A neurological scale aims to give a reliable and objective way of recording the conscious state of a person for initial as well as subsequent assessment. It is composed of three parameters: Best Eye Response, Best Verbal Response, and Best Motor Response. The GCS is scored between 3 to 15 and 3 being the worst, and 15 the best. Coma Score of 13 or higher correlates with a mild brain injury; 9 to 12 is a moderate brain injury and 8 or less a severe brain injury.

Third Tool: Scandinavian Stroke Scale (SSS): This scale was developed by **(Scandinavian Stroke Study Group. 1985).** The SSS is currently utilized to predict the severity of the neurological impairment (stroke severity). SSS has nine items include Consciousness, Eye movement, Arm/hand/leg motor power (each assessed only on the affected side), Orientation, Speech, Facial palsy, and Gait.

Scoring system: The SSS scale's minimum score is '0' and the maximum '58'. The whole score was categorized into 4 levels of stroke severity: 1) from 0-18 described as (Very severe stroke). 2) From (19 to 32) is considered Severe stroke, from (33–44) refers to moderate stroke, and the score of 45–58 refers to mild stroke

Fourth Tool: Oxygen saturation monitoring record: It was developed by the researcher to monitor the patient's oxygen saturation. Oxygen saturation was monitored by using a pulse oximeter for all patients. Monitoring was done before; during and immediately after changing positions, changing position every one hour for all stroke patients in selected position, and oxygen saturation monitoring will be done every 15 minutes for each test position (supine, right side, left side, Simi sitting) positions.

Tools Validity and reliability:

- The study tools were developed after reviewing the related literature. To determine face validity, these tools were tested by a Jury committee that consists of five medical surgical-nursing experts. Recommendations were followed; the questions that were not appropriate were taken out and some questions needed clarification and modifications were done.
- Tools reliability was done to identify the extent of tools items were measurable with study concept and correlation with each other using Cronbach's Alpha test.
- Cronbach's Alpha reliability of GCS was (0.875) and reliability for SSS was (0.817).

Pilot study:

A pilot study was carried out on six patients (10.0%) who were admitted to ICU at Aswan University Hospital, who fulfilled the inclusion criteria to test the feasibility, objectivity, applicability of the study tools, and to estimate the needed time to fill the data collection. Based on the results of the pilot study, no refinement/ modifications were done for data collection instruments; patients who shared in the pilot study were included in the actual study sample.

Ethical consideration:

Ethical Approval was taken from the scientific ethical committee in the faculty of nursing at Minia University. Official permission was obtained from the head of ICU to conduct the study at Aswan University Hospital. Oral consent was obtained prior to enrollment. In the event that patients were unable to give oral consent due to aphasia or mental status changes, consent was obtained from a legally authorized representative. The purpose and nature of the study explained to all patients and they could withdraw at any time of the study. Only patient records meeting the inclusion criteria of the study were included in the study. Data assured confidentiality and anonymity of information protected. Ethics, values, culture, and beliefs respected.

Study Procedure:

- All patients included in the study were informed about the aim of the study & all of them gave oral or written informed consent before engaging in the study if possible and they could withdraw at any time of the study.
- The researcher fulfilled socio-demographic data and medical history sheet, then vital signs were measured and recorded before putting the patient in any position, then the GCS Scale was measured to assess the patient's consciousness level then the SSS Scale were measured to assess patient's severity of stroke.
- The patient was put in four positions (semi-sitting, supine, right side & left side position), patients still in each position were included in the study for one hour, during this hour SaO2was measured & recorded every 15 minutes for all patients before, during and immediately after changing positions in that hour by using a pulse oximeter.
- Positions sequence determined by a modified randomization procedure to avoid ordering effects, if the patient was already in the test position or one closely approximating to it, this position was excluded from the randomization process at this stage and this position was included in the process when the next position was selected.

Limitation of the study:

Research findings can't be generalized because of the small sample size among patients with acute stroke, lack of previous research studies on the topic, and time for data collection is a problem for some patients to still in the same position for a long time.

Statistical analysis:

The collected data organized categorized, tabulated, and analyzed using SPSS ver. 24. Data presented in tables and charts using numbers and percentages, statistics and associations have done using mean, standard deviation SD, t-test and P-value Significant of the result: no Significant if p->0.05, Significant if p-<0.05 and Highly Significant if p-<0.001

Results:

Table (1): Frequency distribution of the studied sample regarding their sociodemographic characteristics (n = 60).

Variables	No.	%
Age/ years		
18- 29	2	3.3
30 -39	8	13.3
40-49	14	23.4
50-60	36	60.0
Means ± SD	٤٧,٩١±9.31	
Sex		
Male	32	53.3
Female	28	46.7
Marital status		
Single	6	10.0
Married	43	71.7
Divorce	3	5.0
Widow or widower	8	13.3
Education level		
Illiterate	7	11.7
Read and Write	26	43.3
Primary education	11	18.3
Secondary education	16	26.7

Occupation		
Employee	14	23.3
Retired	15	25.0
Housewives /Unemployed	31	51.7

Table (1) shows that 60.0% of the studied sample aged between 50- 60 years, 53.3% of them were male, 71.7% of them were married, 43.3% of them had read and write, and 51.7% of them were housewives.

Table (2): Mean and standard deviation for vital signs of the studied sample (n = 60).

Vital signs	1st 15 min of the hour	2nd 15 min of hour	3rd 15 min of hour	4th 15 min of hour	F (P – value)
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Systole Blood pressure/mmHg	143.7 ± 24.0	139.2 ± 21.0	138.8 ± 21.3	137.9 ± 20.2	4.127(.003**)
Diastole Blood pressure /mmHg	84.6 ± 10.9	82.7 ± 9.7	82.1 ± 9.6	81.4± 9.3	5.174(.005**)
Pulse b/ Min	88.0 ± 7.4	84.0 ± 6.1	81.2 ± 5.9	81.2 ± 5.9	3.254(.001**)
Body temp/ ^{0} C	37.3 ± .313	37.0± .415	36.9 ± .514	36.9 ± .514	3.375(.019**)
Respiration/ C / min	22.2 ± 2.3	21.8 ± 2.5	21.3 ± 3.1	20.2 ± 4.5	2.874 (.05*)

Table (2) presents that the mean score of systolic and diastolic blood pressure, patient heart rate, their body temperature, and their respiration was more stable in the 4th 15 minutes of first hours after position change with highly statistically significant differences.

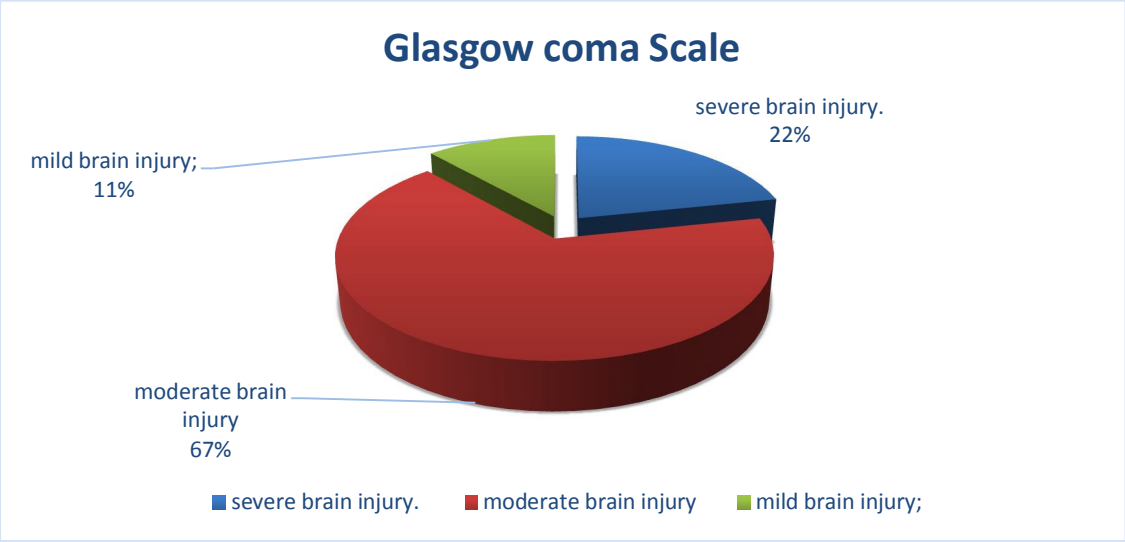

Figure (1): illustrated the total grades of Glasgow Coma Scale, more than two third of studied sample was moderate brain injury.

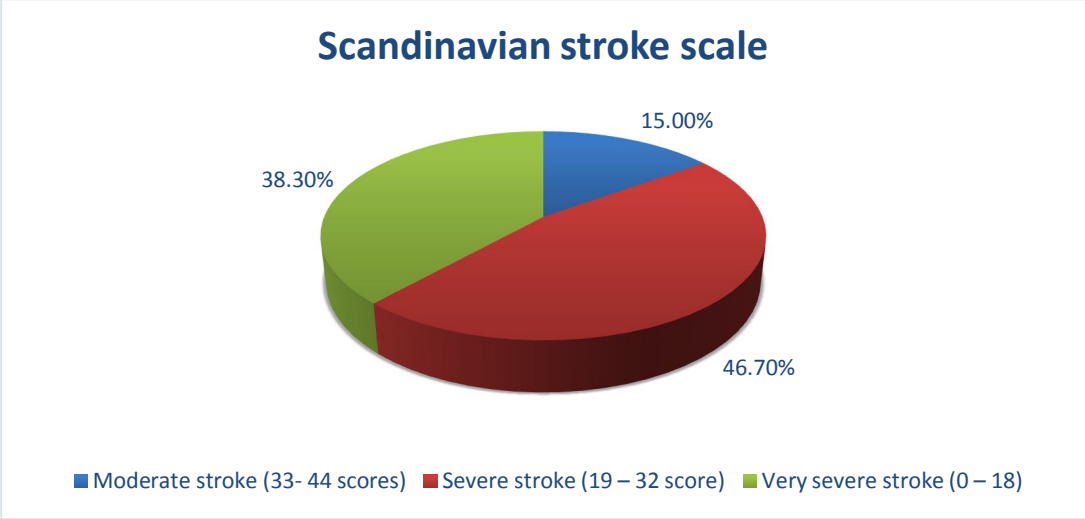

Figure (2): illustrates the Total Grades of Scandinavian Stroke Scale , 46.7% of the studied sample can be had a severe stroke, 38.3% of them had a very severe stroke, and 15.0% of them had a moderate stroke.

Table (3): Mean and standard deviation of SaO2 during total one hour spending in each position of studied sample (n= 60).

Position	Semi sitting position	Supine position	Right side position	Left side position	F (P - value)
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
1st 15 min of the hour	96.7 ± 2.1	96.5 ± 2.0	96.6 ± 1.9	96.3 ± 2.1	.379 (.768)
2nd 15 min of hour	97.5 ± 1.8	96.9 ± 2.0	96.9 ± 2.1	96.7 ± 1.9	3.995 (.008**)

3rd 15 min of hour	97.2 ± 1.8	96.6 ± 1.9	96.5 ± 2.2	96.4± 1.8	2.301 (.05*)
4th 15 min of hour	97.3 ± 11.7	96.7 ± 2.3	96.7 ± 1.8	96.6 ± 2.0	5.059 (.002**)
Mean of SaO_2 of the total hour	97.3 ± 1.5	96.7 ± 1.7	96.7 ± 1.6	96.4 ± 1.7	3.375 3.376 (019*)

*= Statistically significance differences **= Highly statistically significance differences

Table (3) : illustrated Oxygen saturation monitoring, the present study results founded that the highest mean score of O2 saturation in semi sitting position was higher than anther (Supine, Right, and Left) positions.

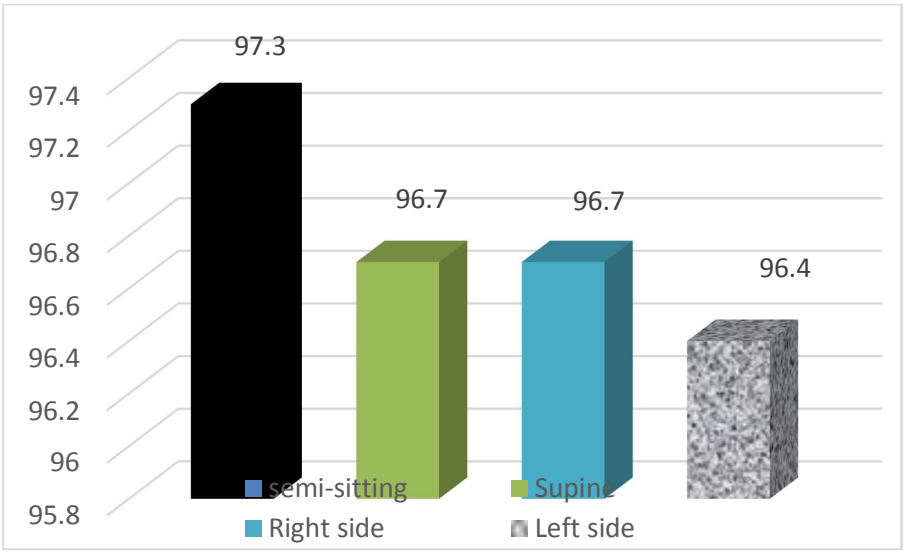

Figure (3): present that, the mean score of SaO2 at 2nd 15 min, 3rd 15 min, 4th min, and mean SaO2 of one hour at the semi-sitting position was higher than different positions (Supine position, Right side position, and Left side position) with statistically significant differences with p-value .008, .05, .002, and .019 respectively, the semi-sitting position was the best position of all position.

Table (4): Correlation between oxygen saturation and (Semi setting position, Supine position, Right, Left side) positions.

Variables		Semi setting position	Supine position	Right side	Left side
Oxygen saturation	Pearson Correlation	.597**	.540**	.517**	.499**
	Sig. (2-tailed)	.001	.001	.001	.001

Table (4): Shows that there was a significant positive correlation between oxygen saturation and Semi setting position.

Discussion:

In developed countries, stroke is a causative factor of acquired adult disability and associated with high mortality. Stroked patient may exhibit a decline of more than fifty percent in respiratory function. Mild hypoxia is commonly to occur in stroke patients, and may lead to supplementary damage to the brain as a result of reduced blood supply. Position changing is considering an independent nursing care, as the frequent shifting of body position affects oxygenation of the blood and improves gas exchange in cardiac or respiratory patients. **(Williams et al., 2020)**.

Positioning patients to maximize the ventilation–perfusion ratio is one way to improve oxygen supply. Body positioning in critically ill patients may have a significant impact on arterial oxygenation. Since body posture has a direct and potent effect on oxygen transport, therapeutic body positioning is a central, noninvasive, and single most important goal of physical therapy. **(Andrson, 2019)**.

Concerning socio- demographic characteristic of the studied sample, results of the present study demonstrated that more than half of the stroke cases were male. Estrogens are well known for their neuroprotective properties on multiple levels, including the suppression of stroke risk factor pathology through antiatherogenic effects in the vasculature and adipogenesis regulation. Estrogens also help to prevent stroke by dilating the coronary arteries and providing direct neuroprotection to brain and glial cells during ischemia. Estrogens are important in female ischemic resistance, according to **Roy-O'Reilly et al., (2018)**.

This result is matching with **Haya et al., (2016)** who studying relation between sex and underlines that the sex steroid hormones linked with high risk of stroke in men. Also, it was agreed with **Rayegani et al., (2016)** who reported that more than two-third of studied patient were male., and in accordance with **Ojaghihaghighi et al., (2017)** who reported that equal to half of studied patient were male. Also this result was confirmed by **Westerlind et al., (2017)** who reported that more than two-third of the stroked patients were male.

Regarding the age of stroke patients in this study, we found that less than two- third of the studied sample aged between 50- 60 years with a mean age of (47.91). The evidence indicates that an increase in the prevalence of these risk factors, such as atrial fibrillation, obesity, type 2 diabetes, hypertension, hypercholesterolemia, and coronary artery disease, in the elderly population is primarily responsible for increased stroke incidence. **Ritzel et al., (2018) and Crapser et al., (2016)** previously found that the increased susceptibility of older people to stroke is linked to distinct, non-modifiable risk factor profiles and injury mechanisms as compared to younger patients.

These findings were supported by the studies carried out by **Boehme et al., (2017)** and **Cámara et al., (2020)** which handling age as a risk factor for stroke and established that the incidence rate of stroke is increased with aging, with a duplication of the incidence rate for each decade after 55 years of age. Likewise, this result came in the same line with **Mandowara et al., (2020)** who stated that the mean age of studied sample was 60.01. Additionally, results of the current

study were supported by **Taha et al., (2020)** who documented that more than third of the studied patients were within the age group of (50-60) years old.

Concerning marital status; the current study findings confirmed that about three -quarter of the sample was married. In my opinion, possible explanations could related to Stress-related theory, which suggests that partner conflict or poor quality relationships, financial worries, and stressful life events may have a harmful influence on the economic, behavioral and emotional status. This was Similarly with **Wong et al., (2018)** suggested the possibility that stress may ultimately worsen the rate of the heart, impaired vagal tone, hyperlipidaemia, diabetes and the progression of atherosclerosis, cardiovascular risk factors such as hypertension, thus aggravate the risk of stroke. This result was in the same line with **Liu et al., (2018)** who reported that three-quarter of stroke survivors were married.

Regarding educational level of stroke patients, the results reflected that about near half of the studied sample read and write, in otherwise about third of the study sample have a secondary education. In my point of view, socioeconomic is highly influences the health, those with lower socioeconomic position are greater risk for health problems including cerebrovascular disease. Furthermore, poorer lifestyle activity and clinical stroke risk factors were linked to lower educational status. Low education level is associated with increased stroke risk in men and women, according to studies conducted by **Wen et al., (2020)** and **Jackson et al., (2018)** who examined education and risk of stroke.

This study are consistent with a study done by **Taha et al., (2020)** who reported that more than half of the patients were illiterate or can read & write. This level of education may be a barrier to complain with treatment and awareness of the warning signs of the stroke, and about near third of the study sample were have secondary education.

Regarding stroke patient occupation the current study showed that more than half of the study samples were housewives and unemployed people. This result come in agree with **Oh et al., (2019)** who found that more than half of the study sample were housewife and unemployed.

Also, the current study showed that mean score of systolic and diastolic blood pressure; patients heart rate, body temperature, and respiration were more stable at the end of the first one the from changing positions. This fact can be attributed to the hypothesis that a few minutes may be required to stabilize consequent cardiovascular adjustment during a shift of position. It seems likely to **Mehta et al., (2017)**, who reported that the vital parameters were seen to stabilize at lower values at the end of changing every position session.

While this finding does not support **Lam et al., (2018)** who stated that significant transient changes were seen in the most of peripheral and cerebral hemodynamic parameters during changing positions. Although this study has not confirmed previous research by **Jang et al., (2015)** who reported that there were no differences in hemodynamic parameters between positions.

Concerning to level of consciousness that is measured GCS; the present study showed that more than two-third of studied sample had moderate brain injury. These findings were supported by **Tipirneni et al., (2017)** who mentioned that change in neurologic status occurs in more than one-third of acute stroke patients during transport and the early emergency destination, with improvement more common in acute cerebral ischemia and deterioration more common in intracerebral hemorrhage. Also, this result was confirmed by **Lobanova et al., (2020)** who mentioned that the most of the stroke patients were in moderate brain injury during ICU admission.

Regarding to severity of neurological impairment that are measured by SSS, the current study illustrated that about half of the studied sample had severe stroke, and the mean of SSS being 21.3±12.5. This was in the same line with **Vinding et al., (2019)** who mentioned that more than half ranged from sever to very severe. While the current result disagreed with **Kumar et al., (2017)** who mentioned that the most studied patient had moderate stroke. Also, this result disagrees with **Elbaih et al., (2018)** who found that more than half of studied patient had mild stroke severity.

Regarding Oxygen saturation monitoring, the present study results founded that the highest mean score of SO_2 in semi-sitting position was higher than anther (Supine, Right, and Left) positions. As far as we know, there is evidence to support the hypothesis that gravity affects oxygen transport in many indirect ways. It influences lung volume and lung capacity as well as respiratory mechanisms in contexts ventilation–perfusion matching. A study was made by **Rudd et al., (2021)** seem likely to confirm the hypothesis, who reported that the semi-sitting positions- is better in improving ventilation–perfusion matching.

Our findings also supported **Abd El-Moaty et al., (2017)** findings that the semi-sitting position affects oxygenation and arterial blood gas parameters by rising SpO2, PaO2, and decreasing paCo2. This can be discussed as the semi-fowler position maximizes lung volumes, flow rate, and capacities, decreases abdominal contents' pressure on the diaphragm, and increases respiratory system compliance, resulting in increased oxygenation and decreased PaCO2. Besides, **Bhogal et al., (2017)** found that when the head of the bed was in a semi-sitting position, there was a significant increase in oxygen saturation and a significant decrease in end-tidal CO2.

Also, the results of the current study were supported by **Ceylan et al., (2016)** who found that the average oxygen saturation value was measured while sitting in an upright position was significantly higher than another that was measured while the patient was lying on the right or left side of the body.

Furthermore, **Mehta et, al., (2017)** conducted a study and concluded that the level of SpO2 is substantially higher in more upright positions, and discusses that the upright position is ideal for optimizing the ventilator system and ventilation–perfusion. Another study was in the same line with our finding by **Najafi et al., (2018)** who stated that the average oxygen saturation percentage in the semi-sitting position is significantly higher than the supine and prone positions.

Regarding correlation between different positions of the studied sample and their oxygen saturation, the findings of this study indicate that there was a significant positive correlation between oxygen saturation and (Supine, Right, and Left) positions. This result agrees with **Ceylan et al., (2016)** who found that the variations in oxygen saturation values according to different body positions were statistically significant, and suggesting that putting the patient in the Simi sitting position at the appropriate time enhances gas exchange and leads to recovery.

Although the results in the same line with **(Mehta et al., (2017)** who demonstrate that upright position achieves

significant rise in arterial SpO2 paralleled to any other positions. Furthermore the result is consistent with the study of **Najafi et al., (2018)** that revealed a significant correlation between oxygen saturation and positions.

Conclusion:

In the light of the present study finding, it might concluded that more than half of studied sample was married male and aged between 50- 60 years and near to three quarters of them had not family history of stroke.

Mean score of systolic and diastolic blood pressure, patient heart rate, their body temperature, and their respiration were more stable in the 4th 15 minutes of first hours after position change with highly statistically significance differences.

Mean score of SaO_2 at 2nd 15 min, 3rd 15 min, 4th min, and mean SaO_2 of one hour at semi sitting position was higher than different positions **(**Supine position, Right side position and Left side position) with statistically significance differences with p – value .008, .05, .002, and .019 respectively, semi sitting position was the best position of all position.

Recommendations:

Based on the findings of the present study, the researcher comes up with the following recommendations:

- Use semi-sitting position and implicate this positioning strategies in the future to improve to improve arterial oxygen saturation in acute stroke patients.
- An educational training program is mandatory for intensive cere unit nurses about effect of different position during acute phase of stoke disease.
- Further research must utilize a randomized controlled trial to further support this position

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