

Effect of Nursing Guidelines on Obese Trauma Patients' Outcomes

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Abstract

Obese patients have alterations in respiratory physiology and circulatory physiology that significantly affect their evaluation and resuscitation. **Aim:** To evaluate effect of nursing guidelines on obese trauma patients' outcomes. **Research design:** A quasi experimental research design was utilized. **Setting:** This study was conducted in trauma emergency unite of Dayrut General Hospital. **Tool of data collection: (I):** obese trauma patient assessment and **(II):** Patient evaluation sheet. **Result:** There were statistically significant difference between study and control groups regarding patient assessment and distribution of complication as hypoxia and apnea. **Conclusion:** study group showed reduced in complication and achieved satisfactory level according achieved points regarding patient outcome after application of nursing guidelines. **Recommendation:** study need to conduct in a large number of patient and involved inpatient and ICU obese trauma patients.

Keywords: *Effect, Nursing Guidelines, Obese, Patients' Outcome & Trauma.*

Introduction

The worldwide prevalence rates of overweight and obesity have approximately doubled to an extent that over one-third of the world's population is now classified as overweight or obese (Chooi et al., 2019). Obesity is a remarkable risk to health in Egypt. High percentages of Egyptians are obese. This represents a high risk for several diseases such as heart disease and diabetes. Obesity it has reached an alarming rate of increase in Egypt. (Algoday et al., 2019). With the rise of obesity in the population, there has been a proportionate increase of obesity in the trauma population. (Licht et al., 2015).

Trauma is an important health problem worldwide. According to the chronological occurrence of death, trauma deaths are assorted in a tri-modal distribution. It is the biggest killer of people younger than 45 years in the UK. Obese patients have a higher risk for sustaining severe trauma. Compared to the average-sized adults with a similar injury severity score (ISS), they have higher rates of morbidity and mortality. Studies have shown that obese patients are less likely to wear their seat belts and are more likely to sustain chest injuries than abdominal injuries (Brian et al., 2018)

Obesity is a disease state with anatomic and physiologic alterations that increase the risk for complications, increase time in the intensive care unit, and increase length of hospital stay for critically injured patients compared with non-obese patients. The increasing prevalence of obesity mirrors the growth and expansion of trauma systems throughout the country. Higher BMI in patients aged >45 years

was found to be associated with higher rates of injuries of the upper torso and proximal upper extremities (Koba, 2018).

Critical care nurses should understand the physiological differences and practice guidelines for patients with a body mass index greater than 30. the management of critically ill obese and morbidly obese patients, including management of airways and breathing, minimizing nurses' back and other injuries, increasing awareness of bias, circulation problems, risks of decubitus ulcers and other skin breakdown, differences in drug calculations and metabolism, limitations in diagnostic equipment and imaging, diet and nutritional recommendations. (Berrios., 2016)

More patients with obesity are likely to be triaged to trauma centers. (Gray & Dieudonne 2018) This study was helped patients to receive proper nursing care and to improve their conditions, prevent and reduce complication. Also provide the data-base for quality nursing care that hold the nursing profession accountable for delivering consistent, high quality health care services. Therefore; the current study was attempt to establish nursing guidelines for obese trauma patients and aimed of this study is to evaluate effect of nursing guidelines on obese trauma patients' outcomes.

Significance of the study

The prevalence of obesity in Egypt ranges between 74% to 86% among women, and 69% to 77% among men (WHO, 2018). With nearly 70% of its adult population overweight Egypt has the highest

percentage of obese adults. A rising number of death resulting from diseases and injuries attributable to excess weight. About 1080 patients in 2018 admitted to Dayrut Hospital with health problem related to obesity. (**Statistical records of Dayrut Hospital, 2018**)

Aim of the study

Was to evaluate effect of nursing guidelines on obese trauma patients' outcomes.

Hypotheses

The obese trauma patient's outcomes will be decrease complications among study group than control group after application of the nursing guidelines.

Patients and Methods

Research design

A quasi-experimental research design (study- control) was adopted to conduct this study.

Variables

The independent variable in this study was the nursing guidelines while the dependent variables were the obese trauma patients' outcomes which include airway patent, vital signs in expected range, no overt signs of bleeding, fluid status in expected range and tissue perfusion in expected range.

Study setting

This study was conducted in Trauma Emergency Unite at Dayrut General Hospital.

Study sample

A convenient sample of 60 adult patients from 20-60 years old admitted to trauma emergency unite was included in the study. They were divided into two groups 30 patients as control group and 30 patients as study group.

Inclusion criteria

Multiple traumas.

Exclusion criteria

- Patients with Body mass index (BMI) less than 18.5.
- Patients have traumatic brain injury with brain death.

Study tools

Two tools were utilized to collect data for this study:

Tool (I): Obese Trauma patient assessment developed by **Lee et al., (2016)** and modified by the researchers after reviewing related literature consisting of:

Part (1): Demographic data of the patient: it included (age, code, sex)

Part (2): Medical data: as age, sex, past medical history, and presence of any chronic disease).

Part (3): Assessment of physiological parameters: it includes vital signs (temperature, pulse, respiration and blood pressure).

Part (4): Laboratory investigations: It include (blood glucose level, hemoglobin, hematocrit,

platelets count, and prothrombin time), renal function test, liver function, electrolyte.

Part (5): Injury Severity Score (ISS) developed by **Baker et al., (1974):**

It is an anatomical scoring system that provides an overall score for patients with multiple injuries. Each injury is assigned an The Abbreviated Injury Scale (AIS) Injuries are ranked on a scale of 1 to 6, with 1 being minor, 5 severe, and 6 a no survivable injury. And is allocated to one of six body regions (Head, Face, Chest, Abdomen, Extremities (including Pelvis), and External). Only the highest AIS score in each body region is used. The 3 most severely injured body regions have their score squared and added together to produce the ISS score.

Part (6): Glasgow Coma Scale (GCS), developed by **Iankova., (2006):**

It is scored between 3 and 15, 3 being the worst, and 15 the best. It is composed of three parameters: Best Eye Response, Best Verbal Response, and Best Motor Response.

Part (7): Acute Physiologic Assessment and Chronic Health Evaluation (APACHE): developed by **Knaus et al., (1985):**

It composed of acute physiology score+ age points +chronic health points minimum score =0; maximum score =71.

Increasing score is associated with increasing risk of hospital death. APACHE II scores were calculated based on the worst physiologic parameters within the first 24 hours following hospital admission.

Part (8): Assessment of Anthropometric measures that developed by **Koba., (2016):**

It consisted of body weight, height and BMI. Body mass index is a measure that adults can use to know if they are a healthy weight for their size.

Below 18 Underweight range (18.5 - 24.9), Healthy weight range, (25 - 29.9) Overweight range, (30 - 39.9) obese range.

Scoring system:

Questions take two responses:

- 1-yes
- 0-no

Tool (II): Patient evaluation tool developed by **Kaplow et al., (2007)** and modified by the researchers after reviewing related literature consisting of:

Part (1): Assessing Outcomes of obese trauma patients according achieving satisfactory level in patient assessment, developed by **Kaplow et al., (2007)**

Part (2): Assessing studied groups regarding the patients' outcome related to Nutrition-Focused Physical Findings developed by **Koba., (2016):** It consisted of (edema, ascites, skin muscle wasting,

ambulant, slightly ambulant and very limited mobility).

Part (3): Assessing Complications in the first 24 hours after trauma, developed by **Kaplow et al., (2007)**: These complications included (multi organ failure, apnea, hypovolemic shock, air way obstruction, uncontrolled bleeding, aspiration, hypoxia, contaminated wound complications, and hypothermia).

Scoring system:

Questions take two responses:

- 1-yes
- 0-no

Ethical consideration

An official letter was issued from the Dean of the Faculty of Nursing to the Hospital Manager and Head of Trauma Emergency Unite in Dayruot General Hospital soliciting the necessary approval to conduct the present research. Each patient was informed with the purpose of the study. The investigator emphasized that the participation is voluntary and confidentially and anonymity of subjects was assured through coding of all data, and protection of the patients from hazard. Verbal consent was obtained from each patient prior to his/her contribution in the present study. Confidentiality of any obtained information was secured.

Content Validity and Reliability

Content validity for Tool (I) and (II) was established by jury of five experts' professors from Critical Care and Emergency Nursing Department. Who reviewed the tools for clarity, relevance, comprehensiveness, understanding, applicability and easiness for administrative, accordingly necessary modifications were done, and then the tools were designed in the final format and tested for reliability using internal consistency for all of the tools which was measured using Cronbach test. The tools proved to be reliable (0.827, 0.786 and 0.825 respectively).

Pilot study

A pilot study carried out in that conducted on 10% of the sample in a selected setting to evaluate the applicability, clarity of the tools and identify any difficulties, it was on 10% (6 patients) who added to the study later, it had also provided an estimate of time needed to fill out the tools.

Procedure

The study proceeded through the following:

The researcher was obtained an official permission from the directors of Trauma Emergency unit in Dayruot General Hospital, Assuit Governorate and Ethical approval was obtained from Committee of faculty of Nursing. Number of 60 patients' using questionnaire after its final modification according to the functions of the pilot study. The study will carry

out in Dayruot General Hospital, Assuit Governorate at Trauma Emergency Unit.

- The study sample fulfilling the research criteria was renormalized assigned into two groups (control group- study group).
- The researcher introduced herself to initiate communication, explained the nature and purpose of the study for patients, and the patient's agreement was obtained.
- The researcher collected the needed data from patients by applying tool (I)
- Each patient involved in the study was assessed for demographic data primary assessment, secondary assessment, ISS, GCS, APACHE (II) score, and anthropometric measures tool (I).

The control group was received the routine hospital nursing care for obese trauma patients. Where assess by the investigator using the first and second tool. Assess patient demographic data and medical data from patients or guidance then assess this was done in the first hour of admission and for 24 hours.

The investigator was assessed and observed the obese trauma patients from the first hour of admission and for 24 hours by using tool (I).

Then the researchers implement the nursing guidelines with assistance of the nurses that involved in providing direct patients care by using the following nursing guidelines from the first hour of admission and for 24 hours:

- Initial resuscitation beginning form the first hour of admission and for 24 hours after injury this includes assessment of (Airway, Breathing and ventilation, Circulation and hemorrhage control).
- Assess air way clearance to prevent airway obstruction
- Place the patient in proper position by elevated head of the bed at 30 degree (Trendelburg position) or 25 degree head up position to improve oxygenation and safe apnea time in morbidity obese trauma patients.
- Assess tissue oxygenation and promote adequate by Administer humidified oxygen through oral with mask ventilation or nasal with high flow nasal cannula to prevent hypoxia in obese trauma patient.
- Maintain adequate fluids resuscitation by administer IV fluids as prescribed to prevent hypovolemic shock in obese trauma patients.
- Assess and observe signs of hypovolemic shock.
- Arterial blood pressure monitoring by using appropriate sphygmomanometer cuff size in

- measuring blood pressure large size cuff specific for obese trauma patients.
- Assessing and Promoting adequate nutritional requirements that are involved high protein feeding and vitamins with hypo caloric feeding specific for obese trauma patients.
 - Assess the vital signs.
 - Collect total intake, output and balance it.
 - Give patient fluid according need and weight.
 - Observe the patients for complications.
 - Apply large venous cannula proper with obese patient. Assess whether the patient is hypovolemic.
 - Look for other signs of a poor cardiac output such as a decreased level of consciousness. If the patient has a urinary catheter, check for reduced urine output (urine output of < 0.5 mL/kg/hr) and assess for any signs of external bleeding from wounds or drains.
 - Manage any injury which may compromise breathing and ventilation.
 - Monitor oxygen saturation as ordered.
 - Assist with removal of airway secretions as needed.

- If the patient isn't intubated, have supplies ready to possible intubation.
- Both groups (study and control) was evaluated during the after application of the nursing guidelines using the tool (II) for development of complications, to determine effect of nursing guidelines on the occurrence of complications of obese trauma patients (Gray & Dieudonne, 2018)

Statistical analysis

Data entry was done using a compatible personal computer by the researcher. All data were entered into statistical package for the social science (SPSS) version 20.0(Chicago, Illinois, USA) software for analysis and excel for figures. The content of each tool was analyzed, categorized and then coded by the researcher. Data was presented using descriptive statistics in the form of the frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variable. The statistical significant difference was considered when statistical significant was considered at p-value <0.05.

Result

Table (1): Distribution of demographic data of studied groups (n. =60).

	Study		Control	
	no	%	no	%
Age:				
Less than 30 years	12	40.0	12	40.0
From 30-40 years	5	16.7	10	33.3
More than 40 years	13	43.3	8	26.7
Mean \pm SD	36.53 \pm 11.50		35.33 \pm 11.53	
Sex				
Male	23	76.7	28	93.3
Female	7	23.3	2	6.7
Past Medical history				
No	25	83.3	29	96.7
Yes	5	16.7	1	3.3
Chronic diseases				
No	17	56.7	20	66.7
Yes	13	43.3	10	33.3

Chi-square test Independent T-test

Table (2): Comparison between studied groups regarding the physiological parameters (n. =60)

	Study	Control	P.value
	Mean \pm SD	Mean \pm SD	
Vital signs			
Temperature	37.71 \pm 0.77	37.54 \pm 0.89	0.428
Respiration	18.47 \pm 2.71	18.67 \pm 3.69	0.812
Heart rate	76.32 \pm 6.2	76.41 \pm 10.97	0.969
SBB	122.99 \pm 17.62	111.44 \pm 17.7	0.014*
DBB	78.22 \pm 12.06	70.45 \pm 12.18	0.016*
Laboratory investigations			
Blood picture:			
•Hemoglobin:	10.74 \pm 1.24	11.05 \pm 1.41	0.382
•Hematocrit	30.65 \pm 2.79	32.38 \pm 3.9	0.053
•Platelets count:	184.9 \pm 43.6	202.48 \pm 56.57	0.183
•Prothrombin time (PTT, PT)	12.47 \pm 1.04	12.47 \pm 1.07	1.000
•WBC	1459.72 \pm 7968.09	5.47 \pm 1.78	0.322
Blood glucose level:	162.9 \pm 82.79	126.07 \pm 47.77	0.039*
Renal function:			
•Serum urea	15.8 \pm 3.6	16.5 \pm 2.36	0.376
•Serum creatinine	1.26 \pm 0.26	1.21 \pm 0.25	0.509
Liver function:			
•Serum protein	6.94 \pm 0.52	6.91 \pm 0.56	0.792
•Albumin level	4.48 \pm 0.64	4.36 \pm 0.68	0.472
Electrolytes:			
•Potassium K	4.22 \pm 0.6	4.35 \pm 0.51	0.369
•Sodium Na	141.13 \pm 3.99	139.73 \pm 3.99	0.179
•Calcium CA	9.89 \pm 0.99	9.75 \pm 0.95	0.587
•Phosphorus Ph.	3.6 \pm 0.87	4.38 \pm 3.6	0.252
•Magnesium Mg	1.78 \pm 0.19	1.82 \pm 0.2	0.505

**Independent T- test *statistically significant difference ($p < 0.05$).

Table (3): Comparison between studied groups regarding ISS, GCS, APACHE Score and Body mass index (n. =60).

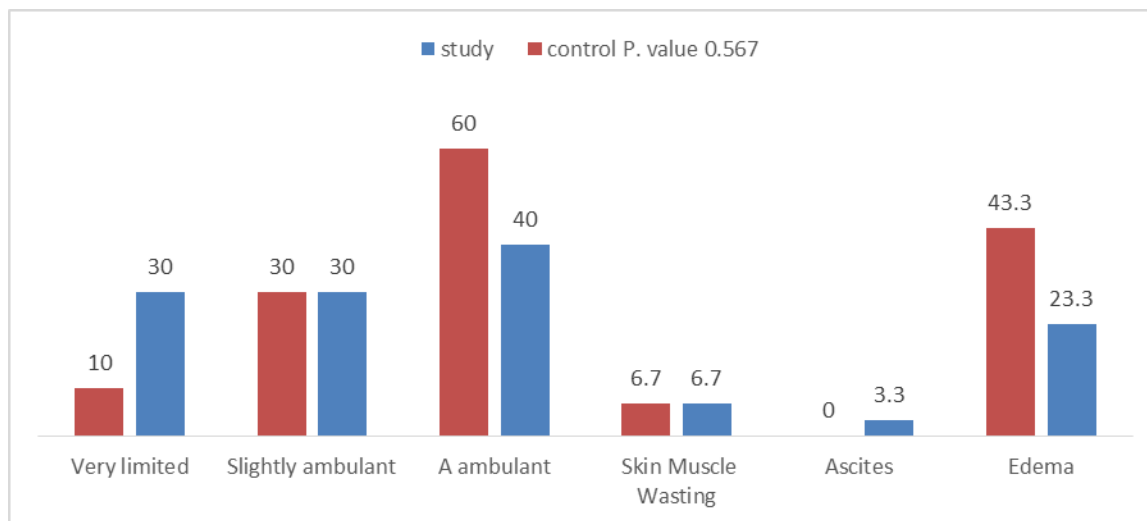
	Study	Control	P. value
	Mean \pm SD	Mean \pm SD	
ISS	35.6 \pm 15.46	38.2 \pm 18.89	0.562
Glasgow coma score	7.07 \pm 2.72	7.97 \pm 4.34	0.340
APACHE	13.07 \pm 2.48	13.23 \pm 2.39	0.792
Body mass index	35.5 \pm 3.35	34.96 \pm 2.53	0.484

Independent T- test

Table (4): Comparison between studied groups regarding the Complications (n. =60).

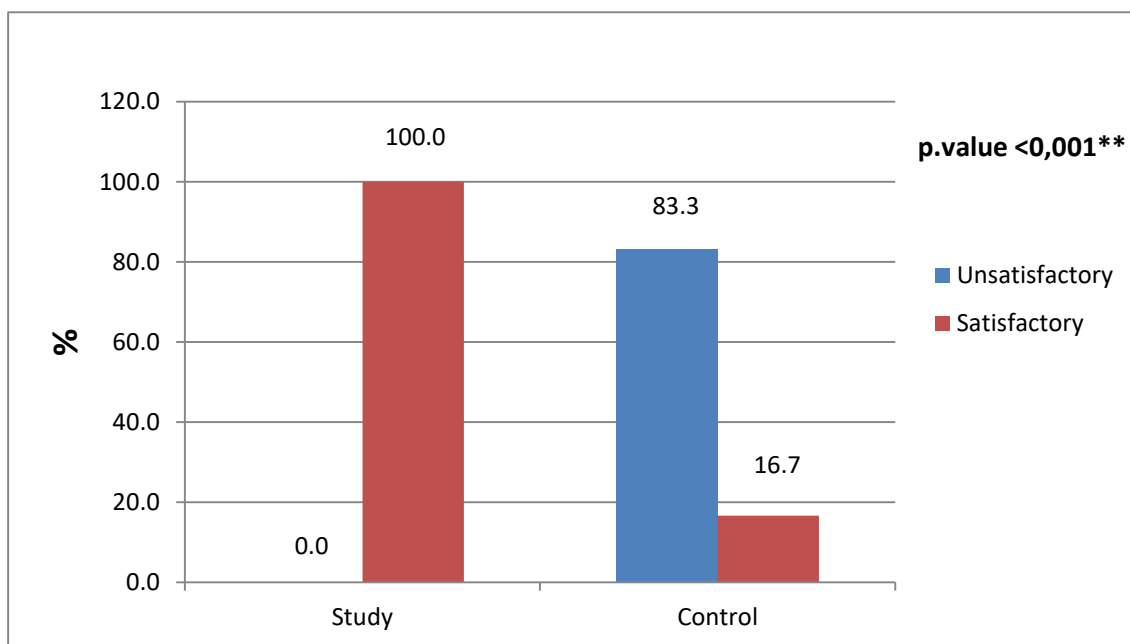
	Study		Control		P. value
	no	%	no	%	
Multi organ failure	0	0	0	0	-
Un controlled bleeding	6	20.0	12	40.0	0.091
Airway obstruction	1	3.3	3	10.0	0.301
Hypoxia	4	13.3	20	66.7	<0.001**
Contaminated wound complications	0	0.0	1	3.3	0.313
Hypovolemic shock	0	0.0	3	10.0	0.076
Apnea	6	20.0	20	66.7	<0.001**
Hypothermia	7	23.3	5	16.7	0.519
Aspiration	1	3.3	2	6.7	0.554

Chi -square test **statistically significant difference ($p < 0.001$).



Chi-square test

Figure (1): Comparison between studied groups regarding the patients' outcome related to Nutrition-Focused Physical Findings (n. =60).



Chi-square test, Independent T-test

Figure (2): Comparison between studied groups regarding the patients' outcome according achieving satisfactory level in patients' assessment (n. =60):

Table (1): Shows distribution of demographic data no statistical difference between study and control related to age groups. The numbers of males' patients more than females. No statistical difference between two groups related to past medical history. No statistically difference between studied groups related to chronic diseases.

Table (2): Revealed that there was no statistically significant difference between both groups regarding

all physiological parameters except regarding the blood pressure level and blood glucose level.

Table (3): Shows that there no statistically significant difference between both groups regarding ISS, GCS, Apache Score and Body mass index

Table (4): This table shows distribution of complications in studied groups using number and percentage of patients in each item of complications. We found significant difference <0.001** between

study and control in hypoxia and apnea. There was no statistically difference in others of complications.

Figure (1): Shows that the outcome of the studied groups related to Nutrition-Focused Physical Findings after application of the nursing guidelines. The table also, found no statistically significant difference between study and control.

Figure (2): Shows achieved points in levels of satisfaction between studied groups in primary and secondary nursing assessment regarding patients' outcome. The table also, found statistically significant difference P. value <0.001** between study and control regarding patients' outcome.

Discussion

Fluid resuscitation is calculated based on ideal body weight, and the obese patient is significantly under resuscitated (**GBD 2015 Obesity Collaborators, 2017**). These studies were agreed with our study that showed the obese trauma patients must be give IV fluids according his weight to avoid under resuscitation.

Obstructive sleep apnea can make it difficult for obese patients to lie flat, increasing the risk for obstructing the airway or aspiration especially obese patients (**Lang et al., 2017**). This study is agreed with our study that showed sleep apnea occur in obese trauma patient in lying position so we should rise head 30-45 degree to prevent air way obstruction.

The researcher opinion that the evaluation and management of obese trauma patients should follow advanced trauma life-saving precepts, with attention paid to the airway, breathing, circulation, disability, and full exposure.

So, our study aimed to assess the effect of nursing guidelines on the obese trauma patients' outcome.

Our finding in this study showed the majority of sample in studied groups from male gender. This study was agreed with **Durgun et al., (2016)** and **(Stringer, 2020)**. Who found that multi trauma is usually seen in male gender more than female. The study was agreed with our study in applying the trauma care process in management of obese trauma care.

High-flow nasal cannula used for oxygenation of obese patients, allowing for oxygen delivery during the apnea period and ventilation reduced complications less than thirty percent (**Jaber et al., 2016**). This study agreed with our study that showed the patient had adequate oxygenation and ventilation but with no significance differences in reducing respiratory complications.

There was a statistically significance deference between the study and control groups regarding blood pressure level. The researcher opinion that appropriately sized blood pressure cuffs are critical to

the rapid identification and treatment of hyper/hypotension in the obese trauma patient. (**Nerenberg et al., 2018**) agreed with our finding in using a large cuff size in measuring blood pressure to obtain the accurate reading of blood pressure.

The researchers point of view that the guidelines had appositive effect on the study group than control one.

Our finding in this study showed obese trauma patients have higher rate complication in uncontrolled bleeding and uncontrolled platelets, PPT and PT leading to hypovolemic shock, so patients' needs massive transfusion from IV fluids and blood components. This finding was agree with **De Jong et al., (2016)** who found Obesity directly related to a higher rate of massive transfusion due to abnormal platelet counts.

Our study showed no statistical difference between studied groups in ISS. That agreed with **liu et al., (2013)** that suggest no difference was observed in study population in ISS between the studied groups.

Trendelenburg position improves oxygenation. (**Hodgson et al., 2015**). Our study was agreed with these while nursing guidelines advised to put patient in Trendelenburg position among study group patients to prevent airway obstruction and improve oxygenation and decrease apnea among study group than control with a statistically significant difference between them after the guidelines application.

Finally, The researcher opinion that that application of the nursing guidelines as changing position helps the patient to breath and take easy inspiration and expiration so, it improve patient out-come (oxygenation) and positively decrease complications.

Conclusions

Based on the result of present study, it can be concluded that:

Study group showed reduction in complication, improving outcomes and achieved satisfactory level in patient assessment after application of the nursing guidelines.

Recommendations

1. Booklet should be available at Trauma Emergency Unite about nursing guidelines of obese trauma patients' care.
2. Future studies should be involved patients in ICU and inpatients units
3. Apply this research on different governmental hospital for generalization.

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