



ASSESSMENT OF NURSES' KNOWLEDGE AND PRACTICE REGARDING INTRA- ABDOMINAL PRESSURE MEASUREMENT AND ABDOMINAL COMPARTMENT SYNDROME PREVENTION

Omnia RamzyReyadAbd El-gwaad^{1*}, Furat Hussein Mahmoud²,
and Sabah NazehMohammed Eldriny³

¹Clinical Instructor at Faculty of Nursing, Damanhour University, Egypt.

²Assist Professor of Medical Surgical Nursing, Faculty of Nursing, Helwan University, Egypt.

³Lecturer of Medical Surgical Nursing, Faculty of Nursing, Helwan University, Egypt.

Cite this article:

Omnia R.E., Furat H.M., Sabah N.E. (2022), Assessment of Nurses' Knowledge and Practice Regarding Intra- Abdominal Pressure Measurement and Abdominal Compartment Syndrome Prevention. African Journal of Health, Nursing and Midwifery 5(4), 43-59. DOI: 10.52589/AJHNM-N7WUEQQN.

Manuscript History

Received: 28 May 2022

Accepted: 6 July 2022

Published: 3 Oct 2022

Copyright © 2022 The Author(s).

This is an Open Access article distributed under the terms of Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0), which permits anyone to share, use, reproduce and redistribute in any medium, provided the original author and source are credited.

ABSTRACT: *Background:* Intra-abdominal hypertension and abdominal compartment syndrome are potentially life-threatening conditions. Measuring intra-abdominal pressure helps identify patients developing intra-abdominal hypertension, which allows for timely intervention before progression to abdominal compartment syndrome. It is often measured by the bedside nurse in the intensive care unit, who plays a key role in managing critically ill patients and recognizing potential causes for clinical deterioration. Therefore, they should be knowledgeable about this entity. **Aim:** The aim of this study was to assess nurses' knowledge and practice regarding intra-abdominal pressure measurement and abdominal compartment syndrome prevention. **Design:** A descriptive exploratory design was utilized in this study. **Subject:** A convenience sample of about 60 male and female nurses. **Setting:** The study was carried out at intensive care unit and cardiac care units at Kom Hamada and Itay el Baroad Hospital. **Data collection tools:** two tools were used for data collection (I) Knowledge assessment questionnaire: which included (a) Socio-demographic data (b) Nurses' knowledge related to intra-abdominal pressure measurement, intra- abdominal hypertension and abdominal compartment syndrome prevention. (II): The observational checklist: To assess nurses' practices regarding intra-abdominal pressure measurement. **Results:** The results showed that the most studied nurses (80%) had poor knowledge regarding all items related to intra-abdominal pressure measurement, intra-abdominal hypertension, and complications of abdominal compartment syndrome. moreover, about (71.7%) of the studied nurses had an unsatisfactory level of practice regarding intra-abdominal pressure measurement. **Conclusion:** critical care Nurses' understanding of intra-abdominal hypertension and abdominal compartment syndrome is generally falling short in the areas of presentation and outcomes, necessitating tailored and targeted educational interventions.

KEYWORDS: intra-abdominal pressure, intra-abdominal hypertension and abdominal compartment syndrome.



INTRODUCTION

Critical care patients are at high risk for actual or potential life-threatening health problems. Patients who are more critically ill require more intensive and vigilant nursing care. Nurses are knowledge workers because they are highly vigilant and use their intelligence and cognition to go past tasks and quickly pull together multiple data to make decisions regarding subtle or deteriorating conditions. They work with both technical and theoretical knowledge (*Urden, Stacy and Lough, 2019*).

Intra-abdominal hypertension and abdominal compartment syndrome are increasingly recognized as complications for critical care patients requiring accurate diagnosis and timely management. Increases in intra-abdominal pressure beyond normal physiological parameters can alter organ perfusion and as a consequence end organ function. Despite the fact that critical care nurses are responsible for measuring and reporting of intra-abdominal pressure measurements, there is limited literature specifically focusing on registered nurses' knowledge regarding Intra-abdominal hypertension and abdominal compartment syndrome (*Smit, Meurs and Zijlstra, 2021*).

Furthermore, in spite of best practice guidelines, there is limited uptake of recommendations. The available evidence indicates that there are variances in knowledge regarding Intra-abdominal hypertension and abdominal compartment syndrome definitions, intra-abdominal pressure measurement techniques, the uptake of intra-abdominal pressure monitoring the physiological impacts of Intra-abdominal hypertension and abdominal compartment syndrome. These knowledge gaps can lead to a delay in diagnosis, treatment, increased morbidity and mortality, increased health care cost and increased personal costs to the patient and their support system (*Hamoud et al., 2021*).

The intra-abdominal pressure is the steady-state pressure within the abdominal cavity. It is not static, varying with respiration, its normal range is (0- 5 mmHg). Intra-abdominal hypertension is defined as an intra-abdominal pressure equal to or greater than 12 mmHg. Abdominal compartment syndrome is a constellation of signs and symptoms of end organ dysfunction or failure when the intra-abdominal pressure is greater than 20 mmHg, with or without an abdominal perfusion pressure less than 60 mmHg (*Allen and Sarani, 2020*).

Abdominal compartment syndrome is diagnosed in the intensive care unit by measuring intra-abdominal pressure through intravesical catheter in a patient who has required massive resuscitation and who develops worsening renal function, increased peak airway pressures on the ventilator, worsening abdominal distention, and persistent hypotension. These signs occur in the end stage after the patient is suffering from the full effects of abdominal compartment syndrome (*Gottlieb, Koyfman and Long, 2020*).

Advanced nursing practice allows expert nurses to demonstrate increased clinical discretion, responsibility and autonomy when recognizing, assessing, and managing patients with intra-abdominal hypertension or abdominal compartment syndrome (*Makic, 2021*).



Aim of the study

To assess nurses' knowledge and practice regarding intra-abdominal pressure measurement and abdominal compartment syndrome prevention.

Research question

- 1- What is the level of nurses' knowledge about intra-abdominal pressure measurement and compartment syndrome prevention?
- 2- What is the level of nurses' practice regarding intra-abdominal pressure measurement?

SUBJECTS AND METHODS

Research design:

A descriptive study design was utilized.

Study setting:

This study was conducted at intensive care units and cardiac care Units at komhamada and Itayelbaroud hospitals.

Subjects:

Subjects of the study included a convenience sample of about 60 male and female nurses with different educational level representing approximately all practitioner nurses working at intensive care unit and cardiac care units at Kom Hamada and Itay el Baroad Hospital and willing to participate voluntarily in the study.

Tools of data collection:

Two tools were used for the purpose of data collection:

Tool I: "Knowledge assessment questionnaire"

It was adapted from (Wise et al.,2019.) to assess nurses' Knowledge and practice regarding intra- abdominal pressure measurement and abdominal compartment syndrome prevention, and was divided into two parts as the following :

Part (1): Demographic data of nurses:

This part of the questionnaire included 5 items, it was designed to collect socio demographic data of the subjects as gender, age, level of education, years of experience, and place of work.

Part II: Nurse's knowledge:

This part of the questionnaire included 13 multiple choice and closed and open ended questions, it was constructed to assess nurse's knowledge related to measuring intra-abdominal pressure and prevention of abdominal compartment syndrome.



Scoring System:

In relation to nurses' knowledge, answers were scored on 3 points likert scale as the following:

- Correct and complete answer = 2
- Not complete answer =1
- In correct answer or don't know = 0

Because the questionnaire was multiple choice, closed and open ended questions.

Total score for nurses' knowledge was classified as follows:

The total nurse's knowledge score was calculated and transferred to percentage as the following:

- Scoring of about four fifths (80%) of the studied nurses was considered as "poor knowledge".
- Scoring of only one fifth of the studied nurses (20%) was considered as "fair knowledge"

Tool II: The observational checklist:

It was adapted from (Tayebi et al, .2020) based on the extensive review of recent and relevant literatures to evaluate nurses' practices regarding intra-abdominal pressure measurement.

Scoring system:

Nurse's practices were scored on 2 points likert scale as the following:

- Practices done correctly and completely = 2
- Practices done in correctly/ not done = 0

The total nurse's practices score was calculated and transferred to percentage as the following: -

- Scoring of more than two thirds (71.7%) of the studied nurses had an incompetent level of total practice "unsatisfactory practices".
- Scoring of about one quarter of them (28.3%) had a "satisfactory practices".

Validity:

The adapted tools were submitted to a jury of 5 experts in the fields of Medical-Surgical Nursing department, Faculty of Nursing, Helwan University to check its content validity, construction clarity, and completeness of items and accordingly, all necessary modifications were introduced.



Reliability:

All tools (I, II) were tested for its reliability using Cronbach's Alpha statistical test. Results illustrated that, the reliability of the tool I was 0.719 related to 18 items, and for tool II it was 0.969 related to 10 items which indicated that both tools were reliable.

Ethical considerations:

The researcher introduced herself to the nurses and explained the purpose of the study, then assured that the study was for educational purpose only. Written consent for the questionnaire was obtained from each nurse after explanation of the aim of the study. Written witness consent was obtained from the head nurse after explanation of the aim of the study, for the application of the observation checklist. Privacy and anonymity were maintained for all participant nurses. Confidentiality of the collected data was assured. Participation in the research was voluntary. The right to withdraw from the study was confirmed.

Pilot study:

A pilot study was conducted on 5 nurses, to test tools for its clarity and feasibility. Since the total number of nurses is small, the pilot study was included in the study subjects.

Field work:

The fieldwork included the following:

- Approval from ethical committee, Faculty of Nursing, Helwan University was obtained.
- An official written letter was obtained from the Faculty of Nursing - Helwan University to the directors of the selected setting to take permission to carry out the study after explaining its purpose.
- An official written permission was obtained from the directors of the selected setting after explanation of the aim of the study.
- Written consent for the questionnaire was obtained from each nurse after explanation of the aim of the study.
- For knowledge assessment regarding intra-abdominal pressure measurement and abdominal compartment syndrome prevention (tool I), all nurses were asked to fill the questionnaire through face to face interviewing at the previously mentioned setting during morning and afternoon shifts. It took from 15-20 minutes for every nurse to complete the structured questionnaire, according to their break time in their nursing room. Any clarification or instruction statements were given to all nurses during filling the questionnaire.
- The researcher observed each nurse during their implementation of the measurement, by using tool II for five different patients, throughout the morning and afternoon shifts, to assess nurses' practices regarding intra-abdominal pressure measurement.



- The data were collected throughout a period of four months from the beginning of November 2020 up to February 2021.
- Data collection was done 2 days/ week by the investigator in the morning and afternoon shifts.

III- Administrative Design:

After explanation of the study aim and objectives an approval to carry out this study was obtained from the dean of the faculty of nursing ,Helwan university and the general managers of komhmada and itayelbaroad hospital asking for cooperation and permission.

IV- Statistical Design:

Statistics analysis:

- ❖ The collected data were coded and entered in a special format to be suitable for computer feeding.
- ❖ Following data entry, checking and verification process were carried out to avoid any errors.
- ❖ Data were analyzed using the statistical package for social science IBMSPSS Statistics (Version 26).

RESULTS

Table (1) indicates that, more than three quarters of the studied nurses (78.3%) within the age group (20-30) and about two thirds of them were female. Half of the studied nurses (50 %) were having a bachelor degree in nursing science, while about one quarter (23.3%) of them was graduated from a technical institute of nursing and the last quarter (26.7) had a master's degree in nursing science. The majority of the studied nurses (80%) working in a general intensive care unit and about two thirds of them (65%) their years of experience from (1 to 5 years).

The first research question was supported as presented in the following figure (1), tables (2 and 4).

Table (2) indicates that, the majority of the studied nurses had an unsatisfactory level of knowledge regarding all items related to intra-abdominal pressure measurement, intra-abdominal hypertension, and complications of abdominal compartment syndrome.

Table (4) indicates that, four fifths (80%) of the studied nurses had unsatisfactory level of total knowledge, while only one fifth of them (20%) had a satisfactory level of total knowledge.

Figure (1): Pie graph representing total knowledge of the studied nurse, and illustrated that the percentage of the studied nurses had an unsatisfactory level of total knowledge was high, while only (20%) had a satisfactory level of total knowledge.



The second research question was supported as presented in the following figure (2), tables (3 and 5).

Table (3) indicates that, the majority of the studied nurses had an unsatisfactory level of practice regarding all items of intra-abdominal pressure measurement.

Table (5) indicates that, more than two thirds (71.7%) of the studied nurses had an incompetent level of total practice, while about one quarter of them (28.3%) had a competent level of total practice.

Figure (2) illustrates that, more than two thirds of the studied nurses had an incompetent level of total practice, while about one quarter of them (28.3%) had a competent level of total practice.

Correlation between nurses' knowledge and socio-demographic characteristic:

Table (6) shows that, There was no statistically significant association between age, gender, level of education, place of work, & years of experience and the nurses' knowledge (P -value=0.752, 0.466, 0.222, 0.771, and 0.751 respectively).

Correlation between nurses' between nurses' practice and socio-demographic characteristic:

Table (7) shows that, There was no statistically significant association between age, gender, level of education, place of work, & years of experience and the nurses' practice (P -value=0.582, 0.224, 0.804, 0.314, and 0.581 respectively).

Correlation between nurses' knowledge and practice:

Table (8) shows that, there was no statistically significant difference among the studied nurses regarding the correlation of total knowledge and their practice with P -Value (0.779).

Table (1): Frequency and percentage distribution of socio-demographic data of the studied nurses (n=60):-

Items	The studied Nurses (n=60)	
	No	%
Age:		
• 20-30	47	78.3
• 31-40	11	18.3
• 41-50	0	0
• 51-60	2	3.3
Gender:		
• Male	22	36.7
• Female	38	63.3



Level of education:		
• Diploma nursing degree	0	0
• Technical Institute of Nursing	14	23.3
• Bachelor nursing degree	30	50
• Master's in nursing science	16	26.7
What is the place of work?		
• Emergency unit	10	16.7
• General intensive Care unit	48	80
• Cardiac care unit	2	3.3
Years of experience:		
• Less than 1 year	4	6.7
• 1 to5 years	39	65
• 6 to 10 years	15	25
• 11to15 years	2	3.3
• More than 15 years	0	0

Table (2): Frequency and percentage distribution of nurses' knowledge about intra-abdominal pressure (n=60).

Items	The studied Nurses (n=60)	
	No	%
6-Do the nurse know the definition of intra-abdominal pressure ?		
• Yes	30	50
• No	30	50
(If yes) what is it?		
• Wrong answer	26	43.3
• Incomplete answer	30	50
• Complete answer	4	6.7
7- Do the nurse know the definition of Intra-abdominal hypertension?		
• Yes	29	48.3
• No	31	51.7
(If yes) what is it?		
• Wrong answer	23	38.3
• Incomplete answer	32	53.3
• Complete answer	5	8.3
8- Do the nurse know the definition of abdominal compartment syndrome?		
• Yes	20	33.3
• No	40	66.7



(If yes) what is it? <ul style="list-style-type: none"> • Wrong answer • Incomplete answer • Complete answer 	24 34 2	40 56.7 3.3
9- -Is intra-abdominal pressure measured in the Unit? <ul style="list-style-type: none"> • Yes • No 	12 48	20 80
(If no), tell why? (Cross one of the following) (n=44) <ul style="list-style-type: none"> • I do not know how to do it 	44	73.3
If yes, what is method used to measure intra-abdominal pressure? <ul style="list-style-type: none"> • Wrong answer • Incomplete answer • Complete answer 	21 35 4	35 58.3 6.7
10-For the bladder technique, what volume do you instill into the bladder before measurement? <ul style="list-style-type: none"> • Wrong answer • Incomplete answer • Complete answer 	47 0 13	78.3 0 21.7
11- After instillation of the fluid into the bladder , do the nurse wait before reading the intra-abdominal pressure? <ul style="list-style-type: none"> • Wrong answer • Incomplete answer • Complete answer 	42 0 18	70 0 30
12- In what patients is intra-abdominal pressure measured? <ul style="list-style-type: none"> • Wrong answer • Incomplete answer • Complete answer 	23 29 8	38.3 48.3 13.3
13- How many times should the nurse measure intra-abdominal pressure? <ul style="list-style-type: none"> • Wrong answer • Incomplete answer • Complete answer 	47 0 13	78.3 0 21.7
14- the normal range of intra-abdominal pressure in healthy adult is..... <ul style="list-style-type: none"> • Wrong answer • Incomplete answer • Complete answer 	51 0 9	85 0 15
15 - What is the level which considered elevated intra-abdominal pressure in adult? <ul style="list-style-type: none"> • Wrong answer • Incomplete answer 	54 0	90 0



<ul style="list-style-type: none"> • Complete answer 	6	10
16- Are the signs and symptoms of abdominal compartment syndrome known to nurse ?		
<ul style="list-style-type: none"> • Yes • No 	15 45	25 75
- If (yes) what is it?		
<ul style="list-style-type: none"> • Wrong answer • Incomplete answer • Complete answer 	43 12 5	71.7 20 8.3
17- what are the complications of abdominal compartment syndrome?		
<ul style="list-style-type: none"> • Wrong answer • Incomplete answer • Complete answer 	18 31 11	30 51.7 18.3
18- Do the nurse aware of the World Society of Abdominal Compartment Syndrome?		
<ul style="list-style-type: none"> • Yes • No 	5 55	8.3 91.7

Table (3): Percentage distribution of nurses' practices regarding intra-abdominal pressure measurement (n=60):-

Items	Competent		Incompetent	
	No	%	No	%
<u>Preparation:</u>				
<ul style="list-style-type: none"> • Hand washing • Wear gloves 	51 49	85 81.7	9 11	15 18.3
1- Assemble the entire pressure transducer system and flush the system with normal saline solution.	35	58.3	25	41.7
2- Attach the 25 or 30 ml syringe to the distal stopcock.	36	60	24	40
3- Place the patient in supine position.	50	83.3	10	16.7
4- Adjust the height of the transducers so that the top of the 3 way tap (atmospheric port) is levelled at the cross section of the mid-axillary line and the iliac crest and zero the transducer.	30	50	30	50
5- Clamp the drainage tube to the urine bag.	54	90	6	10
6- Cleanse the sampling port in the urinary drainage system with a chlorhexidine swab and aseptically attach the end of the pressure tubing with the sampling port.	42	70	18	30



7- Turn the stopcock attached to the syringe off to the patient and open to the fluid bag and syringe. Activate the fast –flush mechanism while pulling back on the syringe plunger to fill the syringe to 25 ml.	35	58.3	25	41.7
8- Turn the stopcock off to the fluid bag and open to the syringe and patient. Inject the 25 ml normal saline solution into the bladder.	42	70	18	30
9- Close the stopcock of the syringe and allow 30 to 60seconds for equilibrium to occur.	32	53.3	28	46.7
10- Expel any air seen between the clamp and urinary catheter by opening the clamp and allowing the saline solution to flow back past the clamp then reclamp.	37	61.7	23	38.3
11- Obtain the mean pressure reading of the intra-abdominal pressure upon end expiration (this minimizes the effects of pulmonary pressures).	34	56.7	26	43.3
12- Once a reading has been obtained, unclamp the urinary drainage system. The pressure monitoring system may be left connected or disconnected and capped to maintain sterility of the system.	32	53.3	28	46.7
13- Record the bladder pressure on the patient flow sheet and remember to subtract the 25 ml of instilled saline solution from the hourly urine output.	22	36.7	38	63.3

Table (4): Frequency and percentage distribution of the total nurses' knowledge.

Items	Total nurses' Knowledge	
	No	%
Unsatisfactory	48	80
Satisfactory	12	20

Table (5): Frequency and percentage distribution of the total nurses' practice.

Items	Total nurses' practice	
	No	%
Incompetent Level	43	71.7
Competent Level	17	28.3



Table (6): Descriptive statistics and results of the association between nurses' knowledge and socio-demographic characteristic.

Items	Nurses' Knowledge				Test	P-value
	Un satisfactory		Satisfactory			
	No	%	No	%		
Age: <ul style="list-style-type: none"> • 20-30 • 31-40 • 41-50 • 51-60 	37	61.7	10	16.7	$\chi^2 = 0.571$	0.752
Gender: <ul style="list-style-type: none"> • Male • Female 	17	28.3	5	8.3	Fisher's Exact test = 0.161	0.466
Level of education: <ul style="list-style-type: none"> • Technical institution • Bachelorious • Master degree 	9	15	5	8.3	$\chi^2 = 3.010$	0.222
What is your place of work? <ul style="list-style-type: none"> • Emergency • General intensive Care unit • Cardiac care unit 	8	13.3	2	3.3	$\chi^2 = 0.521$	0.771
Years of experience: <ul style="list-style-type: none"> • Less than 1 year • 1 to5 years • 6 to 10 years • 11to15 years 	3	5	1	1.7	$\chi^2 = 1.210$	0.751

Table (7): Descriptive statistics and results of the association between nurses' practice and socio-demographic characteristic:

Items	Total practice				Test	P-value
	Incompetent		Competent			
	No	%	No	%		
Age: <ul style="list-style-type: none"> • 20-30 • 31-40 • 41-50 • 51-60 	33	55	14	23.3	$\chi^2 = 1.070$	0.586



Gender:						
• Male	14	23.3	8	13.3	Fisher's Exact test = 1.103	0.224
• Female	29	48.3	9	15		
Level of education:						
• Technical institution	11	18.3	3	5	x ² = 0.437	0.804
• Bachalorious	21	35	9	15		
• Master degree	11	18.3	5	5		
What is your place of work?						
• Emergency	9	15	1	1.7	x ² = 2.319	0.314
• General ICU	33	55	15	25		
• Cardiac care unit	1	1.7	1	1.7		
Years of experience:						
• Less than 1 year	3	5	1	1.7	x ² = 1.957	0.581
• 1 to5 years	29	48.3	10	16.7		
• 6 to 10 years	9	15	6	10		
• 11to15 years	2	3.3	0	0		

Table (8): Correlation between nurses' knowledge and practice:

Items	Total knowledge	
	Correlation Coefficient (r)	P-value
Practice	-0.037	0.779

*: Significant at $P \leq 0.05$

DISCUSSION

Sustained intra-abdominal hypertension can lead to abdominal compartment syndrome, a condition which if left untreated can lead to renal and cardiorespiratory complications and ischemic bowel. Defined as a steady-state pressure within the abdominal cavity, intra-abdominal pressure is governed by the elasticity of the abdominal wall and by the characteristics of the abdominal contents. Whereas intra-abdominal hypertension is defined as: "a sustained or repeated pathophysiological elevation in intra-abdominal pressure ≥ 12 mmHg (Newman, Dayal and Dominique, 2021).

Identifying patients at risk of developing intra-abdominal hypertension is the important step in the early diagnosis and prevention of abdominal compartment syndrome. The concepts related to abdominal compartment syndrome, diagnosis and proper practices in the treatment are not widely known by nurses. Critical care nurses play a key role in managing critically ill patients and recognizing potential causes for clinical deterioration such as abdominal compartment syndrome therefore should be knowledgeable about this entity (Gray, Christensen and Craft, 2018).



So, this study was carried out to assess nurses' knowledge and practice regarding intra-abdominal pressure measurement and abdominal compartment syndrome prevention.

The findings of the present study showed that, as regards to **socio demographic characteristics** of the studied nurses: it was noted that; concerning "**age**", more than three quarters of the studied nurses (78.3%) within the age group (20-30 years). These findings agree with the study done by (**Mahdy, Hamed and Shehata (2019)**) that conducted a study entitled "Efficacy of Safety Measures and Discharge Planning Guidelines on Nurses for Enteral Nutrition of Comatose Patients" and found that majority of nurses had ages from (20: 30 years).

With respect to their "**level of education**", half of the studied nurses (50 %) were having a bachelor degree in nursing science, while about one quarter (23.3%) of them was graduated from a technical institute of nursing and the last quarter (26.7) had a master's degree in nursing science. These results are contradicted with results of (**Jabr, Taha and Metwally (2022)**). Who conducted study of "Nurses' Knowledge and Practice Regarding Care for Patients Undergoing Cardiac Catheterization." Who revealed that the three quarter of their studied samples had diploma of secondary school.

As regarding to distribution of the nurses according to their '**level of knowledge** regarding intra-abdominal pressure measurement and abdominal compartment syndrome prevention', the results of the current study revealed that the majority (about four fifths (80%)) of the studied nurses had an unsatisfactory level of total knowledge regarding all items related to intra-abdominal pressure measurement, intra-abdominal hypertension, and complications of abdominal compartment syndrome. While only one fifth of them (20%) had a satisfactory level of total knowledge.

This result is congruence with study done by **Hunt et al., 2017** who conducted a study of "A survey of critical care nurses' knowledge of intra-abdominal hypertension and abdominal compartment syndrome." and found that Critical care nurses' general knowledge about intra-abdominal hypertension and abdominal compartment syndrome was limited.

In relation to, **total nurses' practice** the current study revealed that more than two thirds (71.7%) of the studied nurses had an inadequate practice regarding measuring intra-abdominal pressure, while about one quarter of them (28.3%) had adequate practice. In same line to the study done by **Mahran et al, (2018)** who conducted a study of "Effect of Teaching Program on Nurses' Knowledge and Skills And Development Of Abdominal Compartment Syndrome Among Intensive Care Patients. " and found that Regarding to the skills of measuring IAP, **68.8%** of pre-teaching group had poor skills.

Regarding to "**relationship between the studied nurses' knowledge levels and their demographic characteristics**" this study indicated that There was no statistically significant association between nurses' knowledge and age (P -value=0.752), as well as no significant relationship between knowledge and gender (P -value=0.466). Also, there was no significant relationship between nurses' knowledge and level of education (P -value=0.222). In addition, there was no significant relationship between nurses' knowledge and place of work (P -value=0.771). Concerning the years of experience no significant relationship between nurses' knowledge and years of experience (P -value=0.751).



These findings agree with the study done by (Osman, El Banna, Sharaf and Mohammed, (2021)). Who conducted a study that entitled "The Effects of Educational Interventions on Nurses' Knowledge and Practices in Hemodialysis Unit Regarding Infection Control Practices" and found that there was no statistical significant relationship between nurses' knowledge levels and their socio demographic data after application of the educational interventions (immediately, one month later).

Regarding "**relationship between the studied nurses' practice mean scores and their demographic characteristics**", the results of the current study revealed that no statistical significant differences were found between nurses' practice mean scores and nurses' age, gender, level of education, place of work, & years of experience.

These findings to some degree consistent with the study done by (AchsahMerlight 2018). Who conducted a study that entitled " assess the effectiveness of video assisted teaching on safety measures while handling chemotherapy drugs on knowledge, attitude and practice of nurses in selected hospital at Kanyakumari District and "revealed that, there was no significant association between practice with age and marital status. These findings may be related to the difference in socio demographic characteristics of the studied nurses.

Regarding to "**relationship between the studied nurses' practice mean scores and their knowledge levels**", the results of the current study revealed that no statistical significant differences were found between nurses' practice mean scores and their knowledge levels with P-Value (0.779). These alarming findings reveal that nurses may not follow the best recommended practices, even if they are known and available.

These findings to some degree consistent with the study done by (Strang et al, .2017) who conducted a study of " Recognition and management of intra-abdominal hypertension and abdominal compartment syndrome; a survey among Dutch surgeons" that demonstrated the awareness and knowledge of the surgeon with the largest relevant experience and knowledge, but the clinical practice guidelines use is limited.

In contrast a study done by (Khaliel, Mohamed and Ghonaem (2022)). Who conducted a study that entitled "Evaluate Nurses' Performance regarding Safety Measures in Cardiac Catheterization Unit at Benha University Hospital and Suggested Guidelines" that revealed that there is positive correlation between total nurse's knowledge and total practice scores at ($p < 0.000$), which means when nurses' knowledge are adequate , the nurses' practice will be improvement

CONCLUSION

Intra-abdominal pressure monitoring is important in identifying intra-abdominal hypertension and abdominal compartment syndrome. Intra-abdominal hypertension and abdominal compartment syndrome are potentially life threatening conditions. Findings from this study showed knowledge of critical care nurses' who were assessed was generally low. This was most noticeable in the ability to identify patients at risk of intra-abdominal hypertension and abdominal compartment syndrome as the conditions are not considered to have a significant impact of patient outcomes.



Recommendations

Based on the findings of this study the following recommendations are suggested:

- Nursing team needs to educational program about intra-abdominal pressure measurement methodology and knowledge about intra-abdominal hypertension and its clinical implications and prevention of abdominal compartment syndrome.

REFERENCE:

- Allen, R., & Sarani, B. (2020). Evaluation and management of intraabdominal hypertension. *Current Opinion in Critical Care*, 26(2), 192-196.
- Gottlieb, M., Koyfman, A., & Long, B. (2020). Evaluation and management of abdominal compartment syndrome in the emergency department. *The Journal of Emergency Medicine*, 58(1), 43-53.
- Hamoud, S., Abdelgani, S., Mekel, M., Kinaneh, S., & Mahajna, A. (2021). Gastric and urinary bladder pressures correlate with intra-abdominal pressure in patients with morbid obesity. *Journal of Clinical Monitoring and Computing*, 1-8.
- Makic, M. B. F. (2021). Recognizing and Nursing Management of Abdominal Compartment Syndrome. *Journal of Perianesthesia Nursing: Official Journal of the American Society of Perianesthesia Nurses*, 36(6), 732-733.
- Smit, M., van Meurs, M., & Zijlstra, J. G. (2021). Intra-abdominal hypertension and abdominal compartment syndrome in critically ill patients: A narrative review of past, present, and future steps. *Scandinavian Journal of Surgery*, 14574969211030128.
- Urden, L. D., Stacy, K. M., & Lough, M. E. (2019). *Priorities in Critical Care Nursing-E-Book*. Elsevier Health Sciences.
- AchsahMerlight, A. (2018). A study to assess the effectiveness of video assisted teaching on safety measures while handling chemotherapy drugs on knowledge, attitude and practice of nurses in selected hospital at Kanyakumari District (Doctoral dissertation, Christian College of Nursing, Neyyoor).
- El SayedKhaliel, W., Said Mohamed, S., & ElsayedGhonaem, S. (2022). Evaluate Nurses' Performance regarding Safety Measures in Cardiac Catheterization Unit at Benha University Hospital and Suggested Guidelines. *Journal of Nursing Science Benha University*, 3(1), 64-77.
- Gray, S., Christensen, M., & Craft, J. (2018). The gastro-renal effects of intra-abdominal hypertension: Implications for critical care nurses. *Intensive and Critical Care Nursing*, 48, 69-74.
- Hunt, L., Frost, S. A., Newton, P. J., Salamonson, Y., & Davidson, P. M. (2017). A survey of critical care nurses' knowledge of intra-abdominal hypertension and abdominal compartment syndrome. *Australian Critical Care*, 30(1), 21-27.
- Jabr, E. M., Taha, N. M., & Metwally, E. A. (2022). Nurses' Knowledge and Practice Regarding Care for Patients Undergoing Cardiac Catheterization. *Zagazig Nursing Journal*, 18(1), 1-15.
- Mahdy, A. Y., Hamed, L. A., & Shehata, A. A. M. (2019). Efficacy of Safety Measures and Discharge Planning Guidelines on Nurses for Enteral Nutrition of Comatose Patients. *International Journal of Novel Research in Healthcare and Nursing*, 6(3), 220-231.



-
- Mahran, G. S. K., Abozied, S. A. S., Ahmed, G. H., Abd El-Hakeem, E. E., & Abd El-Hafez, A. I. (2018). Effect of Teaching Program on Nurses' Knowledge and Skills And Development Of Abdominal Compartment Syndrome Among Intensive Care Patients.
- Newman, R. K., Dayal, N., & Dominique, E. (2021). Abdominal compartment syndrome. In StatPearls [Internet]. StatPearls Publishing.
- Osman, F. K., El Banna, H. M., Sharaf, A. Y., & Mohammed, Y. F. (2021). The Effects of Educational Interventions on Nurses' Knowledge and Practices in Hemodialysis Unit Regarding Infection Control Practices. *The Egyptian Journal of Hospital Medicine*, 84(1), 1739-1748.
- Strang, S. G., Van Lieshout, E. M., Verhoeven, R. A., Van Waes, O. J., & Verhofstad, M. H. (2017). Recognition and management of intra-abdominal hypertension and abdominal compartment syndrome; a survey among Dutch surgeons. *European Journal of Trauma and Emergency Surgery*, 43(1), 85-98.