Maternity Nurses' Knowledge and Practice Regarding Postoperative Nausea and Vomiting Risk Screening

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Abstract

Background: Postoperative nausea and vomiting (PONV) is any nausea or vomiting within the first 24 hours after surgery that may lead to many physical and psychological complications. **Aim of the study:** To assess maternity nurses' knowledge and practice regarding postoperative nausea and vomiting risk screening. **Design:** A descriptive exploratory study was utilized. **Setting:** The study was conducted at operating departments of EL-Khosous Central Hospital. **Sample:** Convenient sample consisted of 54 nurses working in the previously mentioned setting. **Tools:** two tools were used. **Tool I**: A structured interview questionnaire sheet to assess nurses' socio-demographic characteristics and nurses' knowledge regarding PONV and Apfel's risk screening tool. **Tool II**: Maternity nurses practice observational checklist. **Result:** 88.9% of the studied sample had unsatisfactory knowledge regarding postoperative nausea and vomiting risk screening, 87% of the studied sample had unsatisfactory knowledge regarding postoperative nausea and vomiting and 94.4% of the studied sample had unsatisfactory knowledge regarding Apfel's score as screening tool for PONV. In addition, 96.3% of the studied sample were had incompetent practice towards postoperative nausea and vomiting risk screening using Apfel's score. **Conclusion:** Most of the studied nurses had unsatisfactory knowledge of regarding postoperative nausea and vomiting risk screening. Also, the most of them had incompetent practice towards postoperative nausea and vomiting risk screening using Apfel's score. **Recommendation:** Conducting educational and training programmers to improve maternity nurses' knowledge and practice regarding postoperative nausea and vomiting risk screening using Apfel's score.

Key words: Postoperative nausea and vomiting (PONV), Apfel's score, risk screening.

Introduction

Postoperative nausea and vomiting (PONV) is one of the most frequent adverse events after surgery and anesthesia. It is distressing for the patient and can lead to other postoperative complications ***(Jin, Gan & Bergese, 2020)***. Postoperative nausea and vomiting (PONV) is any nausea, retching, or vomiting which occurs during the first 24–48 hour after surgery. Its prophylactic treatment should be dependent on patients' risk. So, that risk assessment is important to prevent postoperative nausea and vomiting ***(Stephenson et al., 2021).***

The consequences of PONV could be physical, metabolic and economic in nature. PONV imposes a lot of impacts on patients, which leads to decreased quality of life and patient satisfaction, And results in simple to severe complications such as anxiety, patient discomfort, bleeding at the operation site and electrolyte imbalance. It could lead to life-threatening complications such as related cardiac arrhythmias, pulmonary aspiration and wound dehiscence ***(Jin, Gan & Bergese, 2020).*** This could lead to unplanned admission and prolonged hospital stay by approximately 3 to 4 times ***(Majors, 2021).***

Furthermore, there are several known risk factors that lead to increased incidence of PONV. These factors are divided into patient, anesthetic, and surgical factors. Patient factors include female sex, prior history of PONV, nonsmoking status, history of motion sickness, and younger age. Women are three times as likely to experience for it compared to men. The anesthetic factors include the use of volatile anesthesia, long and duration of general anesthesia and postoperative opioid use. Lastly, particular surgical procedures including cholecystectomy, gynecological surgery, or laparoscopic surgery have all been associated with increased incidence of PONV compared to other types of operations ***(Lacy et al., 2019).***

So, the general principles of treatment for PONV include minimization of risk factors, prophylactic medication based on risk assessment of PONV prior to surgery. A patient's baseline risk should be objectively assessed using a validated score that is based on independent predictors. The two most commonly used risk screening scores for inpatient undergoing anesthesia are the Apfel's score and the Koivuranta score ***(Lacy et al., 2019).***

As well, **Apfel score** is a commonly clinically useful and most simplified risk screening score for PONV post gynecological surgeries based on the evidence. This score is based on four questions such as patient gender, the patient a non-smoker, patient have a history of PONV/ motion sickness and the patient receiving post-operative opioids. Each question with and answer of "yes", will be equal 1 point, with a possible total of 4 points and can be categorized into low (0-1), medium (2-3) or high (4) risk based on the number of risk factors ***(Majors, 2021).***

Nurse role is an important role for prevention of PONV and its complications throughout using risk assessment by hazard identification analyze and evaluate the risk associated with that hazard (risk analysis, and risk evaluation). Determine appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated (risk control). So that it is important to use evidence-based nursing guideline regarding nausea and vomiting risk screening to improve maternity nurses' knowledge and practice ***(Teshome, Fenta & Hailu, 2020).***

Justification of the study:

PONV is a common side effect that women experience after undergoing gynecologic surgery also is more insidious in female surgical patients than in male. PONV may potentially lead to many unwanted physical and psychological complications for patient after surgery. For some patients, it may only cause a small delay in discharge time; however, for others, it could lead to life-threatening complications such as pulmonary aspiration, dehydration, increase inter-cranial/ intra-ocular pressures, esophageal rupture and wound dehiscence. Psychological complications may include anxiety, distress, shame, embarrassment, and potentially fear of further surgeries. Complications requiring an overnight stay and increase costs for patients, as well as the facility due to potential overtime for staff ***(Hailu et al., 2022).***

Although there is no accurate information on the prevalence of PONV worldwide, individual studies indicate the incidence of PONV is even higher especially after gynecologic surgery, ranging from 60% to 70% reach 70%–80% in high-risk populations "tonsillectomy, strabismus, and laparoscopy" ***(Amirshahi et al., 2020).*** Moreover, there was a higher incidence of PONV in Uganda (40.7%), in Nigeria (41%), in Tanzania (41.4%), in Ghana (34%), and in South West Ethiopia (27.4%), as reported by ***Obsa et al., (2020).*** But there is no clear incidence about PONV in Egypt ***(Ibrahim et al., 2020).*** So it's important to conduct this research to assess maternity nurses' knowledge and practice regarding postoperative nausea and vomiting risk screening post gynecological surgeries.

Operational Definitions:

- **Postoperative nausea and vomiting (PONV)** is defined as any nausea, retching, or vomiting occurring during the first 24– 48 h after surgery in patients.
- **Risk screening** is a process used in healthcare to identify patients who may be at risk of harm and take steps to minimize those risk.

Aim Of The Study

This study aimed to assess maternity nurses' knowledge and practice regarding postoperative nausea and vomiting risk screening for women undergoing gynecological surgeries.

Research question

Q1: What is the level of nurses' knowledge regarding postoperative nausea and vomiting risk screening for gynecological surgeries?

Q2: What is the level of nurses' practice regarding postoperative nausea and vomiting risk screening?

SUBJECTS AND METHODS

Research Design:

A descriptive exploratory study design was utilized in the current study. Descriptive research design provides a comprehensive snapshot of a population or phenomenon, but does not aim to determine the reasons behind the observed characteristics or behaviors. It is a

valuable tool for gaining initial insights to guide further investigation.

Setting:

This study was conducted at operating departments of EL-Khosous Central Hospital. As it is one of the most important rural hospital in Qalyubia governorate. Therefore, it provides preventive and curative health services for women. It consisted of three floors; the first floor contained the emergency department, observation rooms, the orthopedic clinic, radiology department, the laboratory and the pharmacy. The second floor included gynecological operating department, sterilization department, administration offices, the surgery clinic and the dental clinic. The third floor included the clinics (Pediatric, Obstetric and Gynecological, Family Planning and Dermatology).

Subject (sampling):

Sample Type: Convenient sample was used in this study.

Sample size:

All nurses working at previous mentioned setting (54 nurses).

Tools of data collection: Two tools were used in the study:

Tool I: Named maternity nurses knowledge regarding nausea and vomiting risk screening that was developed by the researcher based on review of literature considering the aim of the study and the data needed to be collected. It was divided into three parts and consisted of 31 questions filled by nurses, as the following:

- **Part I: General characteristics:** This part designed to assess maternity nurses' personal data as; age, educational level, years of experiences and residence. Included 4 MCQ questions from (Q1 –Q4).
- **Part II:** It was used to assess maternity nurses' knowledge regarding post-operative nausea and vomiting it was adapted from ***Yetneberk et al. (2020)***. It consisted of 20 True and false questions from (Q5 –Q24). For example: definition of post operation nausea and vomiting, the overall incidence of it, high risk gender, high risk age group and type of anesthesia that increases the risk for it, et al.

Scoring system:

The nurses' knowledge scored as the following; Score (2) was given for the correct answer and score (1) for incorrect answer. The total score ranged from (20-40). The total score was sum and converted into two categories as the following:

- Satisfactory knowledge: if total score 85% or more of total score. (34-40) scores.
- Unsatisfactory knowledge: If less than 85% of total score. (20-33) scores.

- **Part III:** It was used to assess maternity nurses' knowledge regarding Apfel's score and was adapted from ***(Bilbao, 2022)*** it consisted of 7 MCQ questions from (Q25–Q31). For example: definition of Apfel score, factors that increase the woman's undergoing gynecological surgeries risk of vomiting and nausea after surgery, how to calculate the total scores of every risk factor item in the Apfel score and according to Apfel score how to categorize a woman's undergoing gynecological surgeries according risk category (0-1) is low risk, (2-3) moderate risk and (4) high risk factor, etc…

Scoring system:

The nurses' knowledge scored as the following; Score (2) was given for the correct answer and score (1) for incorrect answer. The total score ranged from (7-14). The total score was sum and converted into two categories as the following:

- Satisfactory knowledge: if total score 85% or more of total score. (12-14) scores.
- Unsatisfactory knowledge: If less than 85% of total score. (7-11) scores.

Tool II: ***Maternity nurses practice observational checklist*** adapted from ***Bilbao, (2022)*** to observe maternity nurses' practice regarding postoperative nausea and vomiting risk screening post gynecological surgeries using Apfel's score: it consist of 4 steps (Assess women who undergoing gynecological surgeries, assess them for PONV risk factors by Apfel's score, categorized woman risk for PONV into low risk (0-1), medium risk (2-3) or high risk (4) based on the number of risk factors, referred to PONV Prophylaxis Protocol for prevention based on woman's score) each nursing response scored as (3, 2,1). It was filled by researcher after observing each nurse

Scoring System:

Score (3) was given for the step done, score (2) for incomplete done and score (1) for not done. The total score will be ranged from (4-12). The total score was sum and converted into two categories as **the following:**

- Competent Practice: if total score 95% or more of total score. (11-12) scores.
- Incompetent Practice: If less than 95% of total score. (4-10) scores.

Content validity:

The developed tool was formulated and submitted to three experts in Maternal and Neonatal Health Nursing to assess the content validity for comprehensiveness, accuracy and clarity in language.

Reliability:

Testing the reliability of the tools was through Alpha Cronbach reliability analysis, coefficient test was revealed the tools consist of relatively homogenous items.

Tools	Alpha Cronbach
Structured Interview Questionnaire Sheet	**0.725**
Nurses' practice Observational checklist	**0.904**

Pilot study

A pilot study was carried out on 10% from the total sample (5 nurses) to evaluate the feasibility, applicability and time needed to fill the tool to find the possible obstacles that might be faced during data collection. There were no modifications found after the pilot study. So, nurses on pilot study included in main study samples.

II- Administrative design:

An official approval letter clarifying the tittle and aim of the study was obtained from the Dean of the Faculty of Nursing at Ain Shams University to the director of the previous mentioned setting to conduct this study.

Ethical Consideration:

- The research approval was obtained from Scientific Research Ethical committee in Faculty of Nursing at Ain Shams University before starting the study.
- An official permission was obtained from director of EL-Khosous Central Hospital.
- Informed consent was obtained from nurses after explaining the purposes of the study.
- No harmful methodology was used.
- Each nurse had the right to withdraw from the study at any time.
- Confidentiality was maintained and using coding system for data.
- Human rights were used.
- All tools of data collection were burned after statistical analysis to promote the confidentiality of the study.

III-Operational design

Field work:

This study started from beginning of February 2023, till the end of April 2023, covering three months for data collection. The previously mentioned setting was attended by the researcher three days/week Monday and Tuesday in morning shift from 9 am to 2 pm and Wednesday afternoon shift from 2 pm to 8 pm. The investigator reviewed, the advanced national and international literature related to the present study topic, then tools for data collection were designed. Finally, the investigator conducted the pilot study to a certain content validity of the used tools. Then, the researchers started the interview by introducing herself to nurses and explained the aim of the study. Then the written consent of the nurses was obtained to share in the study. The researcher met nurses in nursing room and divided them in groups; the total sample (54) was divided into small groups (8 groups), and each group consisted of 7 nurses approximately. Using two tools, The first tool (a structured interview questionnaire sheet to assess nurses' socio-demographic characteristics and nurses' knowledge regarding PONV and nurses' knowledge regarding Apfel's screening tool) was filled by nurses and second tool {Maternity nurses practice observational checklist to observe maternity nurses' practice regarding post-operative nausea and vomiting risk screening using (Apfel's score)} it was filled by researcher after observing each nurse. Time required for filling this tools about 25 minutes (15 minutes for first tool and 10 minutes for second tool).

IV– Statistical design:

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 25. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (X) and standard

deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (X2). In addition, R- test were used to identify the correlation between the study variables.

Degrees of significance of results were considered as follows:

- P-value > 0.05 Not significant (NS).
- P-value < 0.05 Significant (S).

Results

Table (1): Shows that, less than one third of (31.5%) the studied sample their age ranged between (36 – 45) years old, the mean age was (36.88 ± 9.58) years. Also, most of them (87.0%) live in urban areas. Moreover, more than half (53.7%) of the studied nurses had ≥ 15 years of experiences with mean (14.76 ± 4.86) years.

Figure (1): Illustrates that, half (50.0%) of the studied sample had nursing diploma. Also, more than one third (37.0%) of them their educational level is health technical institute. While, more than one tenth (13.0%) of them had bachelor of nursing**.**

Table (2): indicates that, (66.7%, 57.4%, 22.2%, 63.0%, 70.4% and 50.0%) of studied sample have correct knowledge about the overall incidence of PONV, High-risk age for PONV, Women who smoke are at high risk for PONV, Gynecological surgeries increase the risk of PONV, Surgeries that last longer than 30 minutes increase the risk of PONV and Chewing gum after surgery reduces PONV respectively.

Table (3): revealed that, (88.9%, 94.4% and 96.3%) of the studied sample have incorrect knowledge about definition of Apfel score, A patient with a risk rate of (0 - 1) is the risk factor for postoperative vomiting and nausea and A patient with a risk rate of (4) is the risk factor for postoperative vomiting and nausea respectively.

Figure (2): shows that, (87.0% and 94.4%, respectively) of the studied sample had unsatisfactory level of total knowledge regarding post-operative nausea & vomiting and Apfel's scale.

Table (4): shows that, (92.6%, 96.2% and 96.3%, respectively) of the studied sample not done assessed woman who undergoing gynecological surgeries, assessed the patient for PONV risk factors by Apfel's score and categorized patient risk for PONV into low risk (0-1), medium risk (2-3) or high risk (4) based on the number of risk factors.

Figure (3): show that, (96.3%) of the studied sample were incompetent practice regarding post-operative nausea and vomiting risk screening using Apfel's score.

Table (5): displays that, there was highly statistically significant relation between total level of knowledge regarding post-operative nausea and vomiting among the studied nurses and their years of experiences at (P= <0.01). While, were no statistically significant relation with age, educational level and residence with total level of knowledge regarding post-operative nausea and vomiting among the studied nurses at (P= > 0.05).

Table (6): reveals that, there were no statistically significant relation between total practice score among the studied nurses and their age, educational level, residence and years of experiences at (P= > 0.05).

Table (1): Frequency distribution of the studied sample according to their general characteristics (n=54).

General characteristics	No.	%
Age (years)		
18 -	**10**	**18.5**
26 -	**16**	**29.6**
36 -	**17**	**31.5**
* 46 -	**11**	**20.4**
Mean ± SD	***36.88 ± 9.58***	
Residence		
Rural	**7**	**13.0**
Urban	**47**	**87.0**
Years of experiences		
1 -	**15**	**27.8**
5 -	**2**	**3.7**
10 -	**8**	**14.8**
≥ 15	**29**	**53.7**
Mean ± SD	**14.76 ± 4.86**	

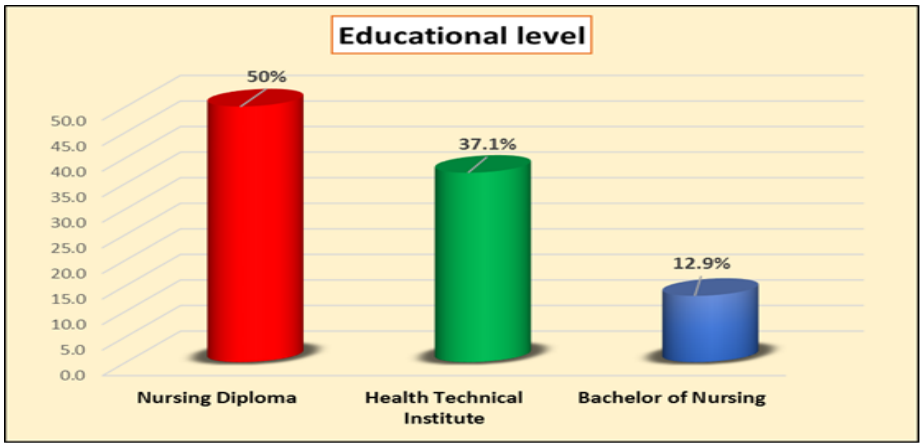

Figure (1): Percentage distribution of the studied sample according to their educational level (n=54).

Table (2): Frequency distribution of the studied nurses according to their knowledge regarding post-operative nausea and vomiting. **(n=54)**

Items	Correct		Incorrect	
	No.	%	No.	%
Definition of PONV	49	90.7	5	9.3
The overall incidence of PONV	**36**	**66.7**	18	33.3
High risk gender for PONV	45	83.3	9	16.7
High risk age for PONV	**31**	**57.4**	23	42.6
Type of anesthesia group that increases the risk for PONV	49	90.7	5	9.3
Relationship between motion sickness and for PONV	38	70.4	16	29.6
Are Women who smoke are at high risk for PONV?	**12**	**22.2**	40	77.8
Gynecological surgeries increase the risk of PONV	**34**	**63.0**	20	37.0
Giving opioids before and after operations increase the risk of PONV because it increases bowel movement.	20	37.0	34	63.0
The intensity of pain after surgeries increases PONV	40	74.1	14	25.9
Fasting before surgery for a long time can lead to PONV	31	57.4	23	42.6
Surgeries that last longer than 30 minutes increase the risk of PONV	**38**	**70.4**	16	29.6
Increasing the time of anesthesia leads to PONV	47	87.0	7	13.0
Reducing concentrations of anesthesia and recovery drugs reduces PONV	36	66.7	18	33.3
Antiemetic drugs reduce the incidence of PONV	46	85.2	8	14.8
Chewing gum after surgery reduces PONV	**27**	**50.0**	27	50.0
Giving appropriate intravenous fluids pre- surgeries reduce PONV	45	83.3	9	16.7
Giving appropriate intravenous fluids after surgeries reduce PONV	41	75.9	13	24.1
Risk assessment of PONV is an effective strategy to reduce it.	43	79.6	11	20.4
Use of Apfel score is appropriate strategy to treat PONV	36	66.7	18	33.3

Table (3): Frequency distribution of the studied nurses according to their knowledge regarding Apfel scale. (n=54).

Items	Correct answer		Incorrect answer	
	No.	%	No.	%
Definition of Apfel score.	**6**	**11.1**	48	88.9
Factors that increase the patient's risk of vomiting and nausea after surgery.	6	11.1	48	88.9
The total scores of risk factors are in the Apfel score	3	5.6	51	94.4
A patient with a risk rate of (0 - 1) is the risk factor for postoperative vomiting and nausea.	**3**	**5.6**	51	94.4
A patient with a risk rate of (4) is the risk factor for postoperative vomiting and nausea.	**2**	**3.7**	52	96.3
A patient who smokes cigarettes and will not use opioid analgesics and has not had motion sickness before, is her risk factor for postoperative vomiting and nausea.	2	3.7	52	96.3
What is the risk rate for a patient who has never smoked and will not use opioid analgesics and will frequently get motion sickness?	1	1.9	53	98.1

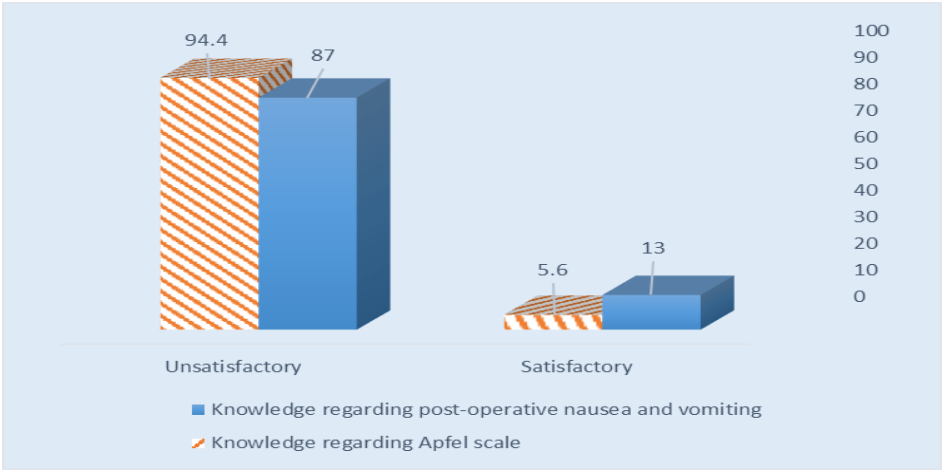

Figure (2): Frequency distribution of the studied nurses according to their total knowledge score regarding post-operative nausea & vomiting and Apfel's scale risk screening. (n=54).

Table (4): Frequency distribution of the studied sample according to their practice regarding postoperative nausea and vomiting risk screening using Apfel's score. (n=54).

Items	Done		Incomplete Done		Not Done	
	No.	%	No.	%	No.	%
Assess woman who undergoing gynecological surgeries	4	7.4	0	0.0	50	92.6
Assess patient for PONV risk factors by Apfel's score	1	1.9	1	1.9	52	96.2
Categorized patient risk for PONV into low (0-1), medium (2-3) or high (4) risk based on the number of risk factors	2	3.7	0	0.0	52	96.3
Manage PONV Prophylaxis Protocol for prevention based on patient's score.	1	1.9	1	1.9	52	96.2

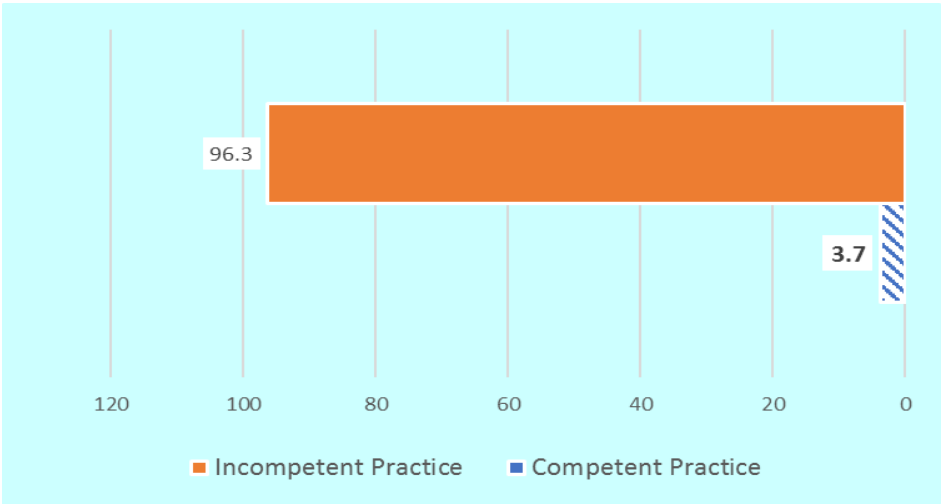

Figure (3): Frequency distribution of the studied nurses according to their total practice regarding postoperative nausea and vomiting risk screening using Apfel's scale **(n=54).**

Table (5): Relationship between general characteristics of the studied nurses and their total knowledge score. **(n=54)**.

Items	Levels of total knowledge				X^2	P value
	Satisfactory (n=6)		Unsatisfactory (n=48)			
	No.	%	No.	%		
Age (year)						
18 - 25	2	33.3	8	16.7	5.99	0.112
26 - 35	2	33.3	14	29.2		
36 - 45	2	33.3	15	31.3		
46 - 60	0	0.0	11	22.9		
Educational level						
Nursing Diploma	2	33.3	25	52.1	0.721	0.69
Health Technical Institute	4	66.7	16	33.3		
Bachelor of Nursing	0	0.0	7	14.6		
Residence						
Rural	1	16.7	6	12.5	0.57	0.302
Urban	5	83.3	42	87.5		
Years of experiences						
1 -<5	1	16.7	14	29.2	7.85	0.04*
5 -< 10	1	16.7	1	2.1		
10 -< 15	2	33.3	6	12.5		
≥ 15	2	33.3	27	56.3		

Table (6): Relationship between general characteristics of the studied nurses and their total practice regarding Apfel's. **(n=54)**.

Items	Levels of total practice				X2	P value
	Competent (n=2)		Incompetent (n=52)			
	No.	%	No.	%		
Age (year)						
18 - 25	1	50.0	9	17.2	0.682	0.877
26 - 35	0	0.0	16	30.8		
36 - 45	1	50.0	16	30.8		
46 - 60	0	0.0	11	21.2		
Educational level						
Nursing Diploma	0	0.0	27	52	2.737	0.255
Health Technical Institute	0	0.0	20	38.4		
Bachelor of Nursing	2	100	5	9.6		
Residence						
Rural	0	0.0	7	13.5	0.601	0.385
Urban	2	100	45	86.5		
Years of experiences						
1 -<5	0	0.0	15	28.8	1.512	0.677
5 -< 10	1	50.0	1	1.9		
10 -< 15	0	0.0	8	15.4		
≥ 15	1	50.0	28	53.8		

Discussion

Postoperative nausea and vomiting (PONV) describe nausea and/or vomiting or retching occurring in the post-anesthesia care unit (PACU) or during the first 24–48 hours after surgery. Not only is PONV a distressing complication from the patient's perspective but also it can result in numerous physical and psychological complications, in addition to prolonged hospital stay, unanticipated hospital admission or readmission, and increased medical costs ***(Rajan & Joshi, 2021).***

The Apfel simplified risk score, is the most widely used tool for risk stratification of postoperative nausea and vomiting (PONV) ***(Jai et al., 2021).*** Nurses play a key role in preventing PONV by first identifying patients at risk. Administering medication and fluids, providing comfort measures, and assessing the patient throughout the postoperative course are crucial nursing functions in the treatment of PONV ***(Wayne, 2023).***

Regarding to general characteristics of the studied nurses the present study finding revealed that, less than one third of the studied sample their age ranged between 35 up-to 44 years old, with mean age was 36.88 ± 9.58 years, and more than half of the studied nurses had ≥ 15 years of experiences with mean 14.76 ± 4.86 years. In addition, half of the studied sample had nursing diploma as educational degree.

This finding in the same line with ***Homa, & Kuhn, (2017)*** who carried out a descriptive, study to assess the current knowledge and attitudes among 109 certified registered nurse anesthetists (CRNAs) regarding the use of acupressure for PONV treatment in Chicago and found that less than one third of the studied nurses (29.3%) the studied nurses their age ranged between 30 to 39 years and one fifth (20.2%) their age between 40 to 49 years old. Adding to nearly one third (31.2%) of the studied nurses had > 20 years of experiences.

This finding was differed with ***Fentie, et al, (2021)*** who carried out institutional based cross-sectional study on 407 health professionals to assess practice and associated factors of antiemetic prophylaxis among health professionals in referral hospitals of Northwest Ethiopia and found that, minority (6.6%) of participants' age ranged from 36 years and above also, only 9.1% of participant had above 10 years of experiences.

Moreover, this result was controverting with ***Yetneberk et al., (2020)*** who conducted a multicenter cross-sectional study to assess knowledge, practice, and predictors of knowledge regarding postoperative nausea and vomiting management among 407 health professionals working in referral hospitals in northwest Ethiopia and reported that more than half of the studied sample their age ranged between 25 – 30 years old with more than two thirds of them had less than 5 years of experiences and 57% of health professionals were BSc degree holders. The possible explanation for this variation might be due to the difference in type of profession and level of education since this study included a variety of professions with different level of education.

Moreover, the dominance profession in current study was nursing and most of working force in governmental hospital in Egypt still had nursing diploma as educational qualification.

Concerning the studied nurses' **knowledge** about post-operative nausea and vomiting "PONV" the current study, indicates that, almost two thirds of studied nurses had correct knowledge about the overall incidence of PONV and more than half of them had correct knowledge about High risk age for PONV Also, more than one fifth of studied nurses had correct knowledge about Women who smoke are at high risk for PONV and less than two thirds of them had correct knowledge about Gynecological surgeries increase the risk of PONV.

This result was supported with ***Yetneberk et al., (2020)*** who applied to assessment showed that less than two thirds of the studied sample had correct knowledge about the overall incidence of PONV is less than ten percent, while the majority of them had correct knowledge about high risk age for it. This result may be due to the participants learned about PONV in academic class and had training programs regarding its management before.

In the opposite line, a cross-sectional study carried out by ***Alle et al., (2021)*** to assess the knowledge and factors associated with PONV management among health professionals in referral hospitals of Northwest Ethiopia among 407 health care professionals and reported than half of the studied nurses had correct knowledge about smokers are less likely to experience PONV, less than three quarters of the studied nurses had correct knowledge about gynecological surgeries are high risk procedures for PONV. The researcher thought that, the difference between studied samples may be due to receive training program and educational level between studied samples.

Concerning to **total** nurses' knowledge score about post-operative nausea and vomiting, the majority of the studied nurses had unsatisfactory knowledge regarding post-operative nausea and vomiting. The **present**

study's researcher thought that, this result reflects needs of studied nurses to educational program to increase nurses' knowledge regarding PONV.

Moreover, this result is on the opposite side a study done in Singapore by, ***Jiaming and Mai, (2015)*** who applied descriptive study among 109 health care providers to assess the attitudes. Knowledge and anti-emetic prescribing practices of health care providers toward PONV. And revealed that half of respondents had good knowledge in PONV management and identifying risk factors and reported that Knowledge of health professionals on PONV management had a great role in the reduction of PONV following anesthesia and surgery. This result may be due to studied samples' level of education and they had previous training program regardiog PONV.

Concerning to **knowledge** regarding **Apfel score** the majority of the studied nurses had incorrect knowledge about definition of Apfel score, A patient with a risk rate of (0 - 1) is the risk factor for postoperative vomiting and nausea and A patient with a risk rate of (4) is the risk factor for postoperative vomiting and nausea. This result may be due to the studied nurses' educational level.

This result was contrasted with ***Woodward, (2022)*** who reported after intervention that the majority of studied samples had correct knowledge about Apfel scale. As regard to ***Gunawan et al., (2020)*** who conducted a cross-sectional study to compare the scores of Apfel, Koivuranta, and Sinclair as predictors of PONV in adult patients after general anesthesia among 100 patients who underwent elective surgery under general anesthesia and reported that the Apfel scoring system is the most accurate scoring system in preventing postoperative nausea and vomiting.

Concerning to **total** nurses' knowledge score about Apfel score. The present study indicate that, The most of them had unsatisfactory knowledge about Apfel score. Concerning source of information about the Apfel score, the most of the studied nurses don't have information about the Apfel score**.** As a researcher's aspect the studied nurses need more information and training courses regarding the Apfel score.

Regarding nurses' **practice** of Apfel's score**,** the current study result showed that, minority of the studied nurses assessed the patient for PONV risk factors by Apfel's score. Also, less than one tenth of the studied nurses categorized patient risk for PONV into low risk (0-1), medium risk (2-3) or high risk (4) based on the number of risk factors.

This result was supported with ***Stoltzfus, (2020)*** who applied pre- and post-implementation quality improvement design study to evaluate the implementation of a simplified risk score and its ability to decrease the incidence of postoperative nausea and vomiting in scheduled surgical patients in Pennsylvania among 28 participants and found that applying the Apfel risk screening to participants during the intervention phase as a primary prevention. Participants were assessed for risk factors and identified for the potential of an increased risk for PONV. And, when the nurses notified the participants' increased risk for PONV, the secondary prevention phase occurred.

As regard **total** sample' **practice** regarding Apfel's score. Present study result showed that, the most of them had incompetent practice towards Apfel's score. This result may be due to level of education among studied nurses.

In the opposite line, ***Basak, (2010)*** who applied descriptive correlation design to examine relation between Knowledge and attitude of nurses and their practice regarding postoperative pain, nausea and vomiting management in Bangladesh. Among 78 nurses and reported that studied nurses had moderate level of practice.

Concerning to relationship between general characteristics of the studied sample and their total knowledge score concerning post-operative nausea and vomiting, the current study result displayed that, there was statistically significant relation between total knowledge score concerning post-operative nausea and vomiting among the studied sample and their years of experiences at ($P= < 0.05$). While, there was no statistically significant relation with age, educational level and residence at ($P= > 0.05$). This result may be due to when increase years of experiences increase level of knowledge.

This result was contrasted with ***Yetneberk et al., (2020)*** who reported that gender, profession, and training on PONV

management were factors significantly affecting the knowledge level of health professionals.

Conclusion

Based on the results of the study, it is concluded that: Most of the studied nurses had unsatisfactory level of total knowledge regarding postoperative nausea and vomiting risk screening. Also, the most of the studied nurses had incompetent practice towards postoperative nausea and vomiting risk screening using Apfel's score.

Recommendations

In light of the findings of this study, the following recommendations are suggested:

1- Designing and implementing of educational programmers regarding nausea and vomiting and its risk screening for woman under-going gynecological surgeries.

2- Conducting training programmers for maternity nurses about nausea and vomiting risk screening using Apfel's score to improve their practice level.

References

Alle, Y.F., Tawuye, H. Y., Belayneh, T., Mersha, A.T. & Yetneberk, T. (2021). Factors associated with knowledge towards postoperative nausea and vomiting management among health professionals in referral Hospitals of Northwest Ethiopia. A multi-center cross-sectional study. Annals of Medicine and Surgery, 69, 102825.

Amirshahi, M., Behnamfar, N., Badakhsh, M., Rafiemanesh, H., Keikhaie, K.R., Sheyback, M., Sari, M. (2020). Prevalence of postoperative nausea and vomiting: A systematic review and meta-analysis. Saudi J Anaesth. 2020 Jan-Mar; 14(1): 48-56. doi: 10.4103/ sja. SJA_401_19.

Basak, S. (2010): Knowledge and attitude of nurses and their practice regarding postoperative pain, nausea and vomiting management in Bangladesh. https://core.ac. uk/ download/pdf/14979707.pdf.

Bilbao, M. E. (2022). Implementation of Postoperative Nausea and Vomiting Screening and Referral Practice Change.

Fentie, Y., Tarekegn, A., Gelaw, M. & Fenta, E. (2021). Antiemetic Prophylaxis Practice and its Associated Factors among Health Professionals in Referral Hospitals of North West Ethiopia: Multicenter Cross-Sectional Study. International Journal of Surgery Protocols, 25(1), 98-107.

Gunawan, M.Y., Utariani, A., Maulydia, M. & Veterini, A.S. (2020). Sensitivity and specificity comparison between APFEL, KOIVURANTA, and SINCLAIR score as PONV predictor in post general anesthesia patient. Qanun Medika-Medical Journal Faculty of Medicine Muhammadiyah Surabaya, 4(1), 69–76

Hailu, S., Mekonen, S. & Shiferaw, A. (2022). Prevention and management of postoperative nausea and vomiting after cesarean section: A systematic literature review. Annals of Medicine and Surgery, 103433.

Homa, K. & Kuhn, J. (2017). CRNA's knowledge and attitudes regarding acupressure as an adjunct to postoperative nausea and vomiting prevention (Doctoral dissertation, DePaul University).

Ibrahim, H.A., Al Sebaee, H.A. & El-Deen, D.S. (2020). Effect of diaphragmatic breathing exercise on postoperative nausea, vomiting, and retching among orthopedic surgery patients. Egyptian Nursing Journal, 17(1), 47.

Jai, D., Handscombe, M., Brooke, M., Karena, S., Arune, S. & Leslie, K. (2021). Interpretation of the four risk factors for postoperative nausea and vomiting in the Apfel simplified risk score: an analysis of published studies. Canadian Journal of Anesthesia, 68(7), 1057-1063.

Jiaming, L. and Mai, J. (2015). PONV attitudes, knowledge and anti emiemetic prescribing practices among surgeons in a paediatrics hospital macrojornals 3 (1) 1–25.

Jin, Z., Gan, T.J. & Bergese, S.D. (2020). Prevention and treatment of postoperative nausea and vomiting (PONV): a review of current recommendations and emerging therapies. Therapeutics and Clinical Risk Management, 1305-1317.

Lacy, B., DiBaise, J., Pimentel, M. & Ford, A. (2019). Essential medical disorders of the stomach and small intestine. Springer International Publishing.

Majors, L. (2021). Post-operative Nausea and Vomiting Risk Assessment.

Obsa, M.S., Edosa, D.C., Desalegn, Z.M., Fanta, N.D., Tamiru, S.M. & Mokenin,

G.T. (2020). Incidence of post-operative nausea and vomiting and it's predictors among adult elective surgical patients at Jimma Medical Center, south west Ethiopia.

Rajan, N. & Joshi, G.P. (2021). Management of postoperative nausea and vomiting in adults: current controversies. Current opinion in anaesthesiology, 34(6), 695-702.

Stephenson, S., Jiwanmall, M., Cherian, N., Kamakshi, S. & Williams, A. (2021). Reduction in post-operative nausea and vomiting (PONV) by preoperative risk stratification and adherence to a standardized anti emetic prophylaxis protocol in the day-care surgical population. Journal of family medicine and primary care, 10(2), 865–870. https://doi.org/10.4103/ jfmpc. jfmpc _1692_20

Stoltzfus, L.E. (2020). Evaluating the Implementation of a Risk Screening Tool to Decrease the Incidence of Postoperative Nausea and Vomiting. West Chester University Doctoral Projects. 67. https://digitalcommons. wcupa. edu/all_doctoral/67.

Sussanne, B., Arweström, C., Baker, A. & Berterö, C. (2010): Nurses' experiences in the relief of postoperative nausea and vomiting. Journal of clinical nursing, 19(13-14), 1865-1872.

Teshome, D., Fenta, E. & Hailu, S. (2020). Preoperative prevention and postoperative management of nausea and vomiting in resource limited setting: a systematic review and guideline. International Journal of Surgery Open, 27, 10-17.

Wayne, G. (2023). Nausea & Vomiting Nursing Care Plan and Management https://nurseslabs.com/nausea.

Woodward, S. (2022). Increased Knowledge and Decreased Incidence on Postoperative Nausea and Vomiting (PONV) Among CRNA Providers (Doctoral dissertation, Kent State University).

Yetneberk, T., Fentie, Y., Yimer, H., Belayneh, T. & Tarekegn, A. (2020). Knowledge and practice of postoperative nausea, vomiting management, and predictors of knowledge among health professionals in referral hospitals of northwest Ethiopia, 2019.