



(RESEARCH ARTICLE)



Post-Anesthetic respiratory complaints following endotracheal intubation among patients undergoing obstetrics and gynecology surgery at Muhimbili national hospital-Tanzania: A 2021 cross-sectional study.

Amina Abillah Omari ^{1,2,*}, Edwin Rwebugisa Lugazia ¹, Salehe Mrutu ¹ and Atala Jongo ¹

¹ Department of Anaesthesiology, School of Medicine, Muhimbili University of health and Allied Sciences. P. O. BOX 65001, Tanzania.

² Department of Anaesthesiology, Tumbi Reional Referral Hospital, Kibaha, Tanzania.

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Abstract

Background: Respiratory morbidities after general anesthesia have continued to be an area of concern for anesthesiologists, often as a result of endotracheal intubation. The study assessed post-anaesthetic respiratory complaints among obstetrics and gynecology patients at Muhimbili National Hospital, focusing on patient, surgical, and anesthesia factors. Addressing the magnitude and the associated factor will contribute to adopting the proper preventive strategies.

Methods: This was a 4 months cross-sectional study at MNH which analyzed Post-anaesthetic respiratory complaints following endotracheal intubation in patients undergoing obstetrics and gynecological surgeries who met the inclusion criteria using a structured questionnaire and observational checklist. Statistical significance was determined at a P-value of < 0.05.

Results: The prevalence of Post-anaesthetic respiratory complaints was 39.9%, There was a significant statistical difference in the severity of Cough ($p < 0.039$) and POST ($p < 0.01$) while Hoarseness of the voice had no significant statistical difference ($p < 0.093$). Patient's factors Age ($p < 0.03$), smoking history ($p < 0.004$), and ASA classification ($p < 0.033$) had a statistical association with presence of post-anesthetic respiratory complaints. Anaesthesia factors such as Size of ETT, number of attempts, use of dexamethasone and introducers, application of KY gel ($p < 0.000$) respectively, experience and qualification of anesthesia provider $p < 0.027$ with Urgency of the procedure ($p < 0.023$) being the only surgical factor that was significantly statistically associated with post anesthetic respiratory complaints.

Conclusion and Recommendation. Post-anaesthetic respiratory complaints in obstetrics and gynecology surgeries are common due to non-adherence to pre-induction and induction checklists. Further research is needed to explore preventive strategies and Also utilization of simulation laboratories to enhance practice and skills retention.

Keywords: Post-anaesthetic respiratory complaints; Endotracheal intubation; Cough; Sore throat

1 Introduction

General anesthesia is a reversible state of controlled unconsciousness, produced by a combination of different medications. Essential to successful general anaesthesia, is balanced hypnosis, analgesia, and optimal muscular relaxation thus with general anesthesia surgical procedures can be done on the patient without inflicting unbearable pain(1).

*Corresponding author: Amina Abillah Omari

Airway maintenance during anaesthesia is fundamental, Endotracheal (ETT) is used to secure the airway in which it provides intermittent positive pressure ventilation with reduced aspiration risk. Nearly every patient on general anaesthesia undergoes endotracheal intubation for a varying duration of surgery which can result in respiratory complaints postoperatively due to the possibility of injury to the mucosa of the airway or vocal cords following an inflammatory process due to airway manipulation effects of foreign objects like endotracheal tubes on the airway. The pharynx, larynx, and trachea are usually affected(2).

During intubation and airway manipulation there is an intrusion of the barrier mechanisms of the airway mucosa, The intrusion can also be due to inhalation of un-humidified anesthetic gases. This may lead to dryness of the mucosa, foreign body, trauma, and irritation of the airway which may present as complaints in the postoperative period. In the first 24hours after surgery post operative sore throat (POST), cough and hoarseness of the voice (HOV) are the commonest manifestations after endotracheal intubation(3).

In the current practice, Postoperative respiratory complaints have been categorized as the 8th main problem in clinical anaesthesiology and are one of the common complaints revealed by patients who underwent tracheal intubation(4). These account for varying incidences with POST varying from 21% - 65% and Hoarseness of voice (HOV) varying from 4% - 42%(2).

Many studies have revealed a sex difference in the magnitude of respiratory complaints following general anaesthesia with endotracheal intubation with females showing more susceptibility than males(3).

Since the separation of the Obstetrics and Gynecology Specialty from the main surgical specialty there has been an increase in surgical interventions that are purely related to the reproductive tract of the females(4)(5). In Nigeria, Obstetric cases accounted for up to 55.1% of the surgeries conducted while 44.9% were gynecological cases with general anaesthesia used for most of the procedures performed accounting for 76.4%(4).

Surgical and anesthetic interventions can result in a negative effect on a patient's quality of life, and discomfort, with or without the presence of complications. It also contributes to poor recovery, increased hospital costs, and poor patient satisfaction(6).

Despite respiratory complaints being common following endotracheal intubation, particularly for obstetrics and gynecology patients, they are still considered relatively unimportant medically, although they add to the patient's postoperative discomfort and may lead to postoperative respiratory complications. However, there is insufficient data on the magnitude of this problem and its associated factors in our settings.

This study addresses the magnitude of post-anesthetic respiratory complaints following endotracheal intubation which represents a significant negative aspect of anaesthesia care. Therefore it will contribute to adopting the proper preventive strategies for the provision of quality anaesthesia care. Also awareness of the severity of respiratory complaints and the associated factors following endotracheal intubation among these patients helps in ensuring effective management of patients at risk.

2 Materials and methods

2.1 Study Design

This study employed a hospital-based cross-sectional analytical study design.

2.2 Study setting

This study was conducted at Muhimbili National Hospital, the hospital has a capacity of 1,500-bed facilities and attends 1,000 to 1,200 outpatients weekly, admitting 1,000 to 1,200 inpatients per week. It has 2700 employees of which 300 are doctors and specialists, 900 registered & enrolled nurses and the rest are supporting operations employees. MNH is organized into seven directorates; it has 25 departments and 106 units.

MNH as a national hospital serves as a tertiary and referral hospital for the city of Dar es salaam, the neighboring region, and the whole country due to the availability of super-specialized medical services. The hospital has a Maternity block that has seven wards including post-operative wards which has 4 units. The hospital under the maternity block has a theatre with four operating rooms where about 20 to 30 operative procedures for both emergencies and electives are performed each day, Also some gynecological procedures are done in the main theatre.

2.3 Study population

The study included all patients undergoing obstetrics and gynecological surgeries under general anesthesia with endotracheal intubation. Whereby; Inclusion criteria was Patients above 18years who consented to participation in the study, ASA I, II, and III including emergencies and Patients who are hospitalized for at least 24 hours during the postoperative period the Exclusion criteria used was Patients with upper respiratory tract infection or pre-existing history of sore throat, hoarseness of the voice, and cough, Unconscious or sedated patients, Patients on steroid therapy and patients who needed a nasogastric tube and Same-day surgery patients.

2.4 Sample size

A formula for calculating sample size for a cross-sectional study was used. A previous study done in early 2021 showed that the proportion of patients that had Respiratory complaints was 19.7% (26). Minimum sample size is 243, Assuming non-response is 10%, and then response rate, R is 90%. The final sample size was 270.

2.5 Sampling technique

The study employed consecutive sampling, On daily basis during the period of data collection patients in the operating room receiving area were selected based on the inclusion criteria listed, and the patients were asked for consent to participate in the study after an introduction and explanations of the study topic and its importance by the principal investigator or research assistant. The procedure was repeated daily until the estimated sample size was achieved.

2.6 Tools and data collection methods

The study employed a structured questionnaire and observational checklist as a data collection tool. Following recruitment and consent of the study, data collection was done on two occasions, the first occasion was in the theatre setting using an observational checklist and the first part of the structured questionnaire while then the second occasion was 24 hours post-operative in the wards using the second part of the structured questionnaire. The structured questionnaire had two parts, the first part comprised of the demographic information and the second part is adopted from a validated four scale grading system (12)(5), which comprises the presence of respiratory complaints and severity of respiratory complaints in which a score of 0 was termed as normal and 1 to 3 abnormal. The structured questionnaire was translated into Kiswahili, thus the Kiswahili version structured questionnaire was used to collect information from the patients. Also, some of the demographic information was recorded from the Patient's files such as the type of procedure, the urgency of the procedure, and ASA physical status. The observational checklist was adopted and modified from the blue card checklist which is used during airway management in pre-induction and induction of anaesthesia(28), it comprised of the surgical factors and anesthesia factors that were associated with post anaesthetic respiratory complaints which were filled while the anaesthesia providers were anesthetizing the patients as per their plan.

2.7 Data management and analysis

Filled checklist and questionnaires were coded and the quality of the data collected was checked to make sure that partially filled data were excluded from the study using Microsoft Office Excel 2013 which was secured by a password only known by the principal investigator. The database was then transferred to Statistical Package for Social Sciences (SPSS) version 26 for analysis.

Descriptive statistics were used to summarize demographic information and the prevalence of post-anesthetic respiratory complaints whereby graphs and charts were used. Comparison of the severity of the post-anesthetic respiratory complaints following endotracheal intubation among patients who underwent obstetrics surgery to those who underwent gynecology surgeries and the association between the independent variables (associated factors) and dependent variable (respiratory complaints) was done using cross-tabulation and Chi-square test was used to compare the proportions. P-value of < 0.05 was considered statistical significant.

2.8 Ethical considerations

Ethical clearance was sought from the Muhimbili University of Health and Allied Sciences' Research Ethics and Publication committee. Permission to undertake the study at MNH was obtained from the Research and Consultancy Unit under the Executive Director of the Hospital. Before the commencement of the study, consent was obtained from the participating patient.

3 Results

The study involved 268 patients who underwent obstetrics and gynecology surgical interventions under general anaesthesia with endotracheal intubation in the given study period with an equal number of participants in both obstetrics 134 (50%) and gynecology 134 (50%).

3.1 Demographic information

Most of the patients 117(43.7%) were between 25-34 years of age. 134(50%) participants were pregnant and 134 (50%) were non-pregnant. Majority of the patients had BMI between 25-29.9 which signifies overweight.

3.2 Prevalence of post-anaesthetic respiratory complaints

Among 268 patients who underwent obstetrics and gynecology surgery, 107 (39.9%) had post- anesthetic respiratory complaints following endotracheal intubation. The criteria for having respiratory complaints are having at least either mild cough, POST, or HOV 24 hours postoperative.

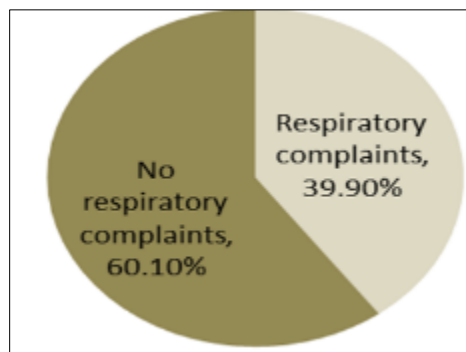


Figure 1 Prevalence of post-anesthetic respiratory complaints among patients who underwent obstetrics and gynecology

Post-anesthetic respiratory complaints among obstetrics patients were 58(54.2%) while in gynecology patients 49 (45.8%) had Post-anesthetic respiratory complaints.

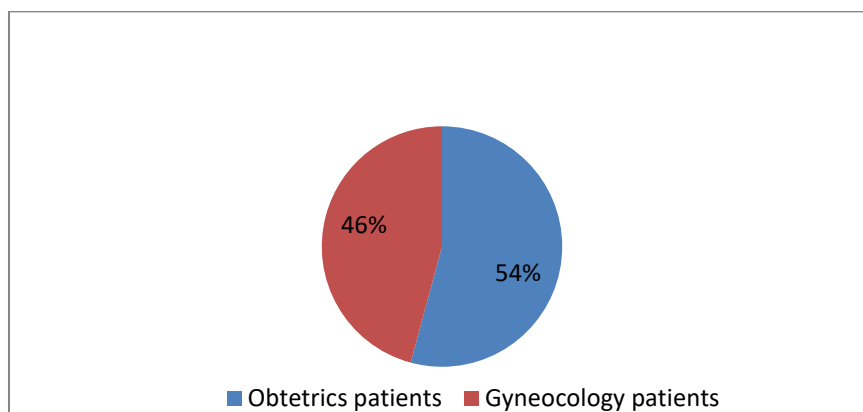


Figure 2 Prevalence of post-anesthetic respiratory complaints among patients who underwent obstetrics surgery against gynecology surgery

3.2.1 Prevalence of specific post-anesthetic respiratory complaints

POST accounted for 99 (51.4%) followed by cough 55 (35.57%) and HOV 29 (14.01%)

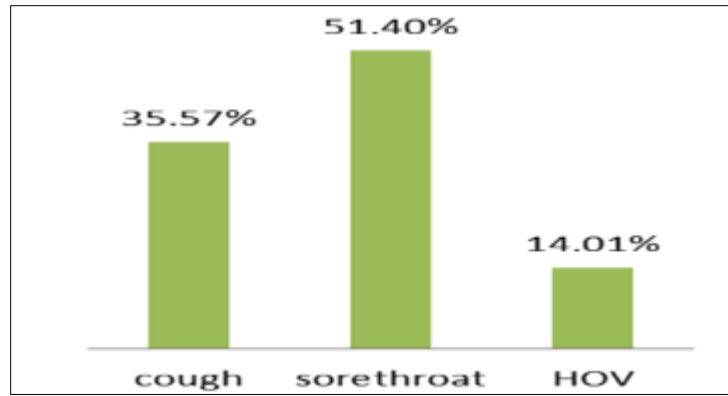


Figure 3 Prevalence of specific post-anesthetic respiratory complaints

3.1.1 *The severity of the post-anaesthetic respiratory complaints*

Overall there was a difference in the severity of cough and sore throat with a p-value of 0.039 and 0.010 respectively which is less than 0.05 while HOV had no difference in severity with a p-value of 0.093 which is above 0.05.

Table 1 Severity of the post-anaesthetic respiratory complaints

Type of the procedure	Severity of Respiratory Complaints				p-value
	Cough				
	No	Mild	Moderate	Severe	
Obstetrics	94(70.1%)	21(15.7%)	18(13.4%)	1(0.7%)	0.039
Gynecology	111(82.8%)	8(6.0%)	13(9.7%)	2(1.5%)	
	Sore throat				
Obstetrics	89 (66.4%)	10 (7.5%)	26 (19.4%)	9 (6.7%)	0.01
Gynecology	90 (67.2%)	18 (13.4%)	26 (19.4%)	0 (0.0%)	
	Hoarseness of the voice				
Obstetrics	114 (85.1%)	17(12.7%)	3 (2.2%)		0.093
Gynecology	125 (93.3%)	8 (6.0%)	1 (0.7%)		

3.2 **Factors associated with post-anesthetic respiratory Complaints.**

3.2.1 *Patient factors associated with post-anesthetic respiratory Complaints*

Overall Age, history of cigarette smoking, and ASA classification had an association with post anesthetic respiratory complaints with a p-value of (0.03,0.004,0.033 respectively) which is less than 0.05 while pregnancy status and BMI had no association with post-anesthetic respiratory complaints p-value (0.34,0.251 respectively) which is more than 0.05

Table 2 Patient factors associated with post-anesthetic respiratory Complaints

Variable	Categories	Presence of post anesthetic respiratory complaints		p-value
		Present	Absent	
Age	18-24	12(52.2%)	11(47/8%)	0.03
	25-34	35(29.9%)	89(70.1%)	
	35-44	34(45.9%)	40(54.1%)	

	45-54	11(47.8%)	12(52.2%)	
	55+	15(48.4%)	15(48.4%)	
Pregnancy status	Yes	58(43.3%)	76(56.7%)	0.34
	No	49(36.6%)	84(62.7%)	
History of smoking cigarettes	Yes	18(75%)	6(25%)	0.004
	No	88(36.2%)	154(63.4%)	
ASA Classification	ASA I	10(21.7%)	36(78.3%)	0.033
	ASA II	59(40.4%)	86(58.9%)	
	ASA III	38(50.0%)	38(50.0%)	
BMI	<18.5	1(25.0%)	3(75.0%)	0.251
	18.5-24.9	27(37.0%)	46(63.0%)	
	25-29.9	65(44.2%)	82(55.8%)	
	30+	14(31.8%)	29(65.9%)	

3.2.2 Anesthesia factors associated with post-anesthetic respiratory Complaints

Overall size of ETT ($p < 0.000$), number of attempts ($p < 0.000$), use of dexamethasone ($p < 0.000$), application of KY gel ($p < 0.000$), years of experience ($p < 0.027$), qualification of anesthesia health provider ($p < 0.000$), use of introducers ($p < 0.000$), and use of throat pack ($p < 0.000$), were significantly associated with the presence of post-anaesthetic respiratory complaints while Use of suxamethonium showed no association with post-anaesthetic respiratory complaints with ($p < 0.353$) which is more than 0.05

Table 3 Anesthesia factors associated with post-anesthetic respiratory Complaints

Variable	Categories	Presence of post anesthetic respiratory complaints		p-value
		Present	Absent	
Years of experience of anesthesia provider	<1 year	33(47.8%)	35(50.7%)	0.027
	1-2 years	46(46.0%)	54(54.0%)	
	>2 years	27(27.6%)	71(72.4%)	
Qualification of anesthesia provider	Nurse anaesthetist student	35(57.4%)	26(42.6%)	0.000
	Nurse anaesthetist	53(49.5%)	53(49.5%)	
	Registraa	9(18.4%)	40(81.6%)	
	Resident	4(25.0%)	12(75.0%)	
	Anaesthesiologist	6(17.1%)	29(82.9%)	
Size of ETT	6.0	2(16.7%)	10(83.3%)	0.000
	6.5	62(30.8%)	139(69.2%)	
	7.0	38(77.6%)	10(20.4%)	
	7.5	4(80.0%)	1(20.0%)	
	>7.5	1(100.0%)	0(0.0%)	
Number of attempts of intubation	1	29(16.6%)	145(82.9%)	0.000

	2	61(80.3%)	15(19.7%)	
	3	17(100%)	0(0.0%)	
Use of suxaamethonium	Yes	96(41.6%)	134(58.0%)	0.353
	No	11(29.7%)	26(70.3%)	
Use of dexamethasone	Yes	42(21.8%)	150(77.7%)	0.000
	No	65(87.8%)	9(12.2%)	
Application of KY GEL to the distal end of the ETT	Yes	35(21.5%)	127(77.9%)	0.000
	No	72(68.6%)	33(31.4%)	
Use of stylet introducer	Yes	94(67.1%)	46(32.6%)	0.000
	No	13(10.2%)	114(89.1%)	
Use of boulgie	Yes	13(100%)	0(0.0%)	0.000
	No	94(36.9%)	160(62.7%)	
Use of oralpharyngeal airway	Yes	39(25.0%)	116(74.4%)	0.000
	No	68(60.7%)	44(39.3%)	
Use of throat pack	Yes	70(61.4%)	44(38.6%)	0.000
	No	37(24%)	116(75.3%)	

3.2.3 Surgical factors associated with post-anesthetic respiratory Complaints.

For the surgical factors associated with post-anesthetic respiratory complaints urgency of the procedure was associated with post-anesthetic respiratory complaints p-value of 0.023 which is less than 0.05

Table 4 Surgical factors associated with post-anesthetic respiratory Complaints

Variable	Categories	Presence of post anesthetic respiratory complaints		p-value
		Present	Absent	
Type of procedure	Obstetrics	58(43.3%)	76(56.7%)	0.34
	Gyneocology	49(36.6%)	84(62.7%)	
Urgency of the procedure	Elective	47(32.6%)	96(66.7%)	0.023
	Emergency	60(48.4%)	64(51.6%)	
Surgical positioning	Supine	102(40.5%)	149(59.1%)	0.734
	Lithotomy	5(31.3%)	11(68.8%)	
Duration of surgery	<1 hour	40(34.5%)	76(65.5%)	0.167
	1-2 hours	49(41.9%)	67(57.3%)	
	>2hours	18(56.3%)	14(43.8%)	

4 Discussion

4.1 Prevalence of post anaesthetic respiratory complaints

Respiratory complaints after general anesthesia include many widely diverse symptoms, which have for several decades remained an area of interest and concern for anesthesiologists. Sore throat, hoarseness of the voice, and cough are usually transitory complaints that are quite common. The study showed a 39.9% prevalence of post-anesthetic respiratory complaints, Patients who underwent obstetrics surgery had a higher prevalence of 54.2% while those who underwent gynecology surgery accounted for 45.8%. A higher prevalence was noted in similar studies which showed a prevalence of 75.2% of post-anesthetic respiratory complaints, where prevalence in obstetrics patients was higher at 88.4% while gynecology patients at 58.9% (3) and another study that noted a 5-day post operative prevalence as high as 100% in obstetrics (28), the higher prevalence seen in obstetrics patients is due to capillary engorgement as they have a fairly soft airway which is also oedematous thus it increases susceptibility to injuries.

Out of the three complaints POST was most common followed by cough HOV being the least at with most of the patients presenting with more than one complaint, Moderate POST accounted for 24.3% followed by moderate cough at 11.2% with severe HOV being absent, these findings are somehow in contrast to a study in India that showed a higher prevalence in POST 56% as opposed to cough 51% and HOV 54% (2) and another study showed the prevalence of POST 40% while there were no complaints of cough and HOV at 24 hours post-operative (29).

A study in Ethiopia illustrated that majority of the patients 90.4% developed POST following General anesthesia with endotracheal intubation (30). However, the higher prevalence in this study was because it was done among adult patients both male and female undergoing surgery with no specification on the type of surgery. A higher prevalence of POST was also shown in a study in Kenya in which 61.9% of the patient-reported POST (16). However, the study calculated the prevalence of POST from complaints noted at 6 hours postoperative and involving the adult population undergoing different types of surgeries thereby resulting in a higher prevalence. It is to be noted that POST still has the highest prevalence in all these studies as seen in this current study.

4.2 Comparison of Severity of post-anaesthetic respiratory complaints

Regarding the severity of sore throat when compared between patients who underwent obstetrics surgeries to those who underwent gynecology surgery there was a statistical significance, in which no to the mild sore throat was seen more in gynecology patients (67.2%, 13.4%,) than obstetrics patients (66.4%, 7.5%) respectively while moderate to the severe sore throat was seen more in obstetrics patients (19.4%, 6.7%) than gynecology patients (26.0%, 0.0%) respectively. The findings are indistinguishable from a study conducted in Nigeria that showed an increased incidence and severity in POST obstetrics patients compared to gynecology patients (3). A contrasting prospective, randomized, double-blind clinical trial showed that at 24 hours there was no significant difference in the severity of POST among patients given prophylactic and post-intubation dexamethasone (18). However, this study was comparing the severity of POST to prophylactic and post-intubation dexamethasone and not the type of procedure and this could have contributed to the different findings.

The study showed When the severity of cough was compared between obstetrics and gynecology patients, no to mild cough was seen more in gynecology patients (82.8%, 6.0%,) than in obstetrics patients (70.1%, 15.7%) respectively while moderate to severe cough was seen more in obstetrics patients (13.4%, 0.7%) than gynecology patients (9.7%, 1.5%) respectively, these findings were statistically significant, this is similar to a study done in Nigeria that showed an increased incidence and severity in cough obstetrics patients compared to gynecology patients (3). Contrast findings from another author who found no difference in comparison of the severity of cough in 4 groups (control, betamethasone, dexamethasone, and ketamine) (15). The difference in findings is may be attributed to the author comparing the severity of the cough to several medications not the type of procedure.

In this study there was no statistical significance in the severity of HOV when compared between obstetrics and gynecology patients, in which no to mild HOV was seen more in gynecology patients than obstetrics patients while moderate sore throat was seen more in obstetrics patients than gynecology patients, severe Hoarseness of the voice was not seen in both groups of patients. The findings are contrasting with findings from Nigeria that showed a statistical significance in the severity of HOV in obstetrics patients compared to gynecology patients (3). Another author found no difference in comparison in the severity of HOV in 4 groups (control, betamethasone, dexamethasone, and ketamine) (15). Despite this study having similar findings to our study, the author was comparing the severity of HOV to several medications not the type of procedure.

4.3 Factors associated with post-anaesthetic respiratory Complaints

The study found several factors that are associated with post-anaesthetic respiratory complaints following endotracheal intubation among obstetrics and gynecology patients at Muhimbili National Hospital. These factors were divided into patient, anaesthesia, and surgical factors.

4.3.1 Patient factors

Several patient factors have been associated with the presence of post-anaesthetic respiratory complaints that is Age, history of cigarette smoking and ASA classification, pregnancy status, and BMI (7,14,21,25,31). This study found that Age, history of cigarette smoking, and ASA classification had an association with post-anaesthetic respiratory complaints and showed no significant association with BMI and pregnancy status. Conflicting findings are seen in a study that showed no association between age, history of cigarette smoking, and ASA classification with the presence of post-anaesthetic respiratory complaints (17).

Conflicting findings are also shown by several authors who showed that the prevalence of POST and HOV was strongly related to obesity and ASA classification (14) but another author showed that obese patients did not necessarily develop respiratory complaints hence BMI was not an independent factor for the presence of post-anaesthetic respiratory complaints (28) the later is similar to this study were BMI was had no significant association with the presence of post-anaesthetic respiratory complaints.

Pregnancy status had no statistical significant association with the presence of post-anaesthetic respiratory complaints in this study which is similar to a study that noted the presence of post-anaesthetic respiratory complaints regardless of the pregnancy status (28). In another study pregnancy was an exclusion criterion for participation in the study (32).

4.3.2 Anaesthesia factors

Several studies showed that a higher incidence of post-anaesthetic respiratory complaints was statistically associated with increasing ETT size (3,9,14,22,30). This was similar to this study which showed a significant statistical association between the Size of ETT and the presence of post-anaesthetic respiratory complaints, This is because with the increase in diameter of the ETT there is also an increase in tightness with the mucosa of the trachea, and this can result in direct trauma to the tracheal mucosa and possibly bring about these post anaesthetic respiratory complaints.

Whether or not the Qualification and years of experience of anesthesia providers can be statistically associated with post-anaesthetic respiratory complaints has shown different outcomes in several studies (7,33,34). This study illustrates a statistical association between Qualification and years of experience of anesthesia providers with post-anaesthetic respiratory complaints. It was noted that most of the advanced airway management was performed by junior anesthesia health care providers whose techniques are yet to reach perfection leading to traumatic intubations and perhaps the cause of post-anesthetic respiratory complaints.

The number of attempts of intubation showed a significant statistical association with post-anaesthetic respiratory complaints, these findings are similar to several studies that showed an increase in the incidence of POST with multiple attempts of intubation thus showing a statistical association (21,28,31). This is different from the two studies that showed no significant association between the number of attempts of intubation and post-anaesthetic respiratory complaints (10,30). However, the multiple attempts of intubation can cause direct trauma to the larynx and there is the possibility of developing these respiratory complaints in the post-operative period.

The study has shown that there is a significant statistical association between the Use of dexamethasone and the absence of post-anaesthetic respiratory complaints in which most of the patients who were given Intravenous dexamethasone 8mg stat as a premedication did not present with respiratory complaints postoperatively. This finding is similar to a study that showed Intravenous dexamethasone administration decreased the incidence of sore throat as well as hoarseness and cough after surgery (19). However, in contrast to these findings, a more recent study supported that the use of intravenous dexamethasone decreases the incidence of POST but was not statistically significant in decreasing the incidence of HOV (20). These findings may be because dexamethasone can decrease edema in the airway after traumatic intubation with its anti-inflammatory effects thus suggesting that dexamethasone has a considerable prophylactic benefit and also the presence of isolated HOV through multiple mechanisms that can change voice quality such as larger surface area of the cuff in contact with the airway mucosa, dehydration, use of narcotics, and position of cuff after intubation (20).

The study revealed a remarkable statistical association between the Application of KY gel to the distal end of the ETT and the presence of post-anaesthetic respiratory complaints this is similar to a study that revealed that application of KY gel reduced the incidence of POST, HOV, as well as cough (8). However, these findings were different from another study that showed no statistical association between the occurrence of post-anaesthetic respiratory complaints with the application of KY gel as the incidence of the complaints was quite similar between those who KY gel was applied and those who KY gel was not applied (10,16).

The study showed that the use of introducers (stylet introducer, bougie) was statistically associated with the presence of post-anaesthetic respiratory complaints contrasting findings were seen in a study in which there was no statistical association between the use of introducers and the presence of post-anaesthetic respiratory complaints (16). However, the use of introducers was used as an exclusion criterion by some authors (20) the assumption being its use can reduce the occurrence of POST and HOV as it reduces traumatic laryngoscopy.

The study found that the use of throat packs is statistically associated with the presence of post-anaesthetic respiratory complaints this finding is similar to one study that showed a statistical association between the use of throat packs and the presence of post-anaesthetic respiratory complaints (10). While others stated no statistical association between the use of throat packs, and the presence of respiratory complaints (16,30).it should be noted that the use of throat packs is not routine practice in our settings, it was adopted in the COVID-19 era.

The use of the oral pharyngeal airway is also statistically associated with the presence of post-anaesthetic respiratory complaints this is a similar finding with other authors showed a significant statistical association between the use of oral pharyngeal airway and the presence of respiratory complaints postoperatively (10). While others stated no significant association between the use of the oral pharyngeal airway and the presence of respiratory complaints (16,30).it was noted from the study findings that a vast number of patients had an oral pharyngeal airway inserted but they did not develop post-anaesthetic respiratory complaints as opposed to a smaller number that presented with post-anaesthetic respiratory complaints this is perhaps due to incorrect sizing and incorrect insertion technique of the adjunct that can result in trauma thus correct use of the adjunct does not result in post-anaesthetic respiratory complaints.

The study showed that there was no significant association between the Use of suxamethonium and the presence of post-anaesthetic respiratory complaints this finding is different from a study that was comparing incidence and severity of POST and HOV among patients who used suxamethonium and those who used rocuronium during intubation in which the study showed an increase incidence with the use of suxamethonium as opposed to rocuronium (32). Also, Another study found that there was an association between the use of suxamethonium and the presence of post-anaesthetic respiratory complaints in which a higher incidence was seen in patients who used suxamethonium as opposed to cis atracurium during intubation with fasciculation being proposed as the main cause (35).

4.3.3 *Surgical factors*

In this study type of procedure that is being obstetrics or gynecology had no statistical association with post- anaesthetic respiratory complaints which contrasts with findings from another similar study which showed that type of procedure had a statistical association with post- anaesthetic respiratory complaints this is because obstetric patients have relatively soft and oedematous airway which increase susceptibility to these intubation-induced airway injuries (3).Contrasting findings may be due to the precautions taken to minimize trauma to the airway structures from laryngoscopy in both obstetrics and gynecology patients.

In the study Urgency of the procedure had a statistical association with the presence of post-anaesthetic respiratory complaints, this may be because most emergency cases are performed at night and attended by nurse anaesthetist students with minimal supervision by nurse anesthetist and junior residents thus increasing traumatic intubations in these patients, but these findings are different from other studies that showed no statistical difference between elective and emergency procedures with regards to the presence of post-anaesthetic respiratory complaints (28,36).

From the study findings Duration of surgery was not statistically associated with the presence of post-anaesthetic respiratory complaints this is supported by other similar studies (16,17,26) with several contrasting studies (7,14,28,34,36) that showed a statistical association between the Duration of surgery and the presence of post-anaesthetic respiratory complaints.

Surgical positioning is mentioned as a factor that is statistically associated with the presence of post-anaesthetic respiratory complaints by various authors (7,14,28,34,36), the findings differ from the findings from this study in which

there was no statistical association between Surgical positioning with the presence of post-anaesthetic respiratory complaints, this was supported by another study that showed no statistical association between and Surgical positioning post-anaesthetic respiratory (16,17).

4.4 Study limitations

The findings obtained from this study are not universal thus it does not reflect the whole population as it is a cross-sectional study it could only provide a snapshot of the current post-anaesthetic respiratory complaints.

Also, The study might not be representative of all surgical procedures done at MNH with regards to the post anesthetic respiratory complaints as it assessed only patients undergoing obstetrics and gynecology surgeries.

The study only assessed these post-anesthetic respiratory complaints at 24 hours as opposed to other similar studies that followed up patients from 0 hours up to 5 days.

The study did not assess cuff pressure as an anaesthesia factor associated with post-anaesthetic respiratory complaints due to the lack of a manometer.

5 Conclusion

Post-anaesthetic respiratory complaints are prevalent, particularly among obstetrics patients, leading to discomfort and diminished quality of care. A significant number of anaesthesia providers do not consistently follow pre-induction and induction checklists, which correlates with a variety of anaesthesia-related factors linked to these complaints. Further research involving larger and diverse populations is essential to identify additional factors influencing respiratory issues and to develop effective preventive strategies regionally and nationally. Training facilities for anaesthesia providers should leverage simulation laboratories for practice improvement and implement on-the-job simulation training and supportive supervision for qualified providers to enhance skills retention.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors'.

Statement of informed consent

All data used in this study observed the ethical principle of informed consent, whereby the respondents declared their willingness to participate in the study after clear explanation on what the study was all about, no respondent was forced at any point to give information without their consent.

Authors' contributions

AAO AND ERL participated in the study conception and study design, AAO, SM, AJ were responsible for data collection and analysis. AAO presented the dissertation report and wrote the initial manuscript which was reviewed and revised by ERL ,SM and AJ. All authors read and approved the manuscript.

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