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Efficacy of Intravenous Fluid on Prevention of Post-Operative Nausea and Vomiting at Ayder Referral Hospital Mekelle University, Northern Ethiopia

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Abstract

Background: From post-operative complications which can put stress on operated patients, nausea and vomiting have a higher percentage and patient can have serious complications like fluid and electrolyte disturbance and pulmonary aspiration. Although there are many anti-emetics drugs are available for the prevention of post-operated nausea and vomiting a benefit is observed on few of them.

Objective: The aim of this study was to assess the efficiency of intravenous fluid on prevention post-operative nausea and vomiting, Mekelle University Ayder Referral Hospital.

Methodology: Cohort study was carried out using probability sampling technique. Data was collected by the interviewer administered structured questioner and it was entered, cleaned and analyzed by Epi-Info version 7.0 and SPSS version 20. Proportion was used to describe the results and it was presented in the form of figure, table and texts.

Result: Incidence rate of post-operative nausea and vomiting in early, middle and late post-operative period in exposed group was 35.45 and 19.35, 29.03 and 6.45, 29.03 and 6.45 similarly it was 67.24 and 65.52, 68.97 and 46.55, 37.93 and 17.24 non-exposed group. Female patients took the higher incidence rate (67.67). Patients whose age groups range from 20-49 took 68.42% of the whole incidence rate of post-operative vomiting. Body mass index and type of anesthesia didn't put their influence on the incidence rate of post-operative nausea and vomiting.

Conclusion and recommendation: The incidence rate of post-operative nausea and vomiting and ant-emetic used in early and middle phase of post-operative period was highly associated with pre-operative administration of intravenous fluid in the bivariate analysis, so the anesthesia provider and the ward nurses should take the responsibility of doing it and Further studying mainly addresses on amount of bolus fluid that may significantly affect the incidence rate of post-operative nausea and vomiting are recommended.

Keywords: Post-operative nausea; Vomiting

Introduction

Postoperative Nausea and Vomiting (PONV) are two of the most common and unpleasant side effects following anesthesia and surgery. It defined as nausea and vomiting occurring with-in 24 hrs after surgery which affects between 20% and 30% of ASA I and II patients; the figure will increase to 70-80% for ASA III and above patients. PONV results in increased patient discomfort and dissatisfaction and in increased costs related to length of hospital stay. Serious medical complications such as pulmonary aspiration, although uncommon, are also associated with vomiting [1].

Patients often express fear about PONV when questioned before surgery. Its importance compared with other possible postoperative sequelae varies but is generally high. When questioned about issues of concern, 22% of 800 patients gave PONV the highest level of concern, compared with 34% for postoperative pain and 24% for waking up during surgery [2]. Anaesthesia has become remarkably safe, and while death and permanent damage have become rare occurrences, other sequelae of anaesthesia are gaining more importance. Postoperative nausea and vomiting still is the most troublesome adverse event encountered in the Post Anaesthesia Care Unit (PACU), despite advances in prevention and treatment [2].

Ambulatory surgery and anesthesia can offer a large number of advantages to patients, health care providers and hospitals. However, it is unfortunately associated with a number of unpleasant postoperative experiences such as pain, nausea, vomiting, dizziness and thirst it is not effective way. Short acting anesthetic agents have provided major advantages in the field of acute pain. However, despite the availability of new antiemetic agents, the incidence of other postoperative adverse effects, especially nausea and vomiting, has remained significantly unchanged [3].

Although there are many antiemetic medications available for PONV prophylaxis, a quantifiable benefit is observed only in a fraction of patients, and the use of some of these drugs may be costly and/or associated with adverse events such as headache, cardiac arrhythmia, or extrapyramidal symptoms [4,5].

It is a routine practice to keep patient fasting overnight before surgery; this combined with anesthetic and surgical losses results in state of transient and relative gut ischemia through mesenteric

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hypo perfusion, perioperative. Therefore Gut hypo perfusion has been identified as one of the many factors responsible for PONV. A number of risk factors have been identified for PONV; these include factors relating to the patient, anesthesia, surgical procedure, and postoperative factors [5,6].

Perioperative administration of a sufficient volume of intravenous fluids to correct the fasting hours' deficit may effectively prevent PONV, without the expense or the potential for side effects seen with pharmacological approaches. Replacement of assumed preoperative deficits, in addition to a generous substitution of unsubstantiated, increased, insensible perspiration and third space loss, plays an important role in the current perioperative fluid regimens. Perioperative fluid application has been a topic of debate in the past years. Therefore, the potential efficacy of intravenous fluid therapy in reducing PONV remains to be convincingly demonstrated [7-11].

Studies were conducted in different countries and most of them come up to a conclusion that administration of intravenous fluid has significant role on the prevention of post-operative nausea and vomiting. However, there is a conflict among the literature on the duration of the prevention. Some of the authors agree administration of intravenous fluid decrease PONV only in early post-operative period while the others agree on it can prevent the whole post-operative time [12-14]. Thus the significance of this study is to assess the efficacy of intravenous fluid on prevention of post-operative nausea and vomiting at Ayder Referral hospital Mekelle University Northern Ethiopia to support evidence based practice.

Methods

Study design, area and period

A cohort study was conducted among patients who were schedule for different operation from surgery, gynecology and orthopedics wards using structured interview questioner. A total of 89 patients were included from three wards in Ayder Referral Hospital Mekelle University, Northern Ethiopia. The study was conducted from May to July, 2013 Mekelle university Ayder Referral Hospital. There are five wards in Ayder Referral Hospital from these two wards namely the intensive care unit and medical ward was excluded from the sample; because patients are not admitted from these two wards to Operation Theater routinely. Study subjects were obtained proportional to the client flow from each ward to operation theatre in the morning of the surgery during data collection period.

Sampling

Sample size was calculated using Epi-info software version 7 for cohort study design on efficacy of intravenous fluid for the prevention of PONV in exposed and non-exposed groups was 4.6% and 30% respectively using information obtained from a published research article done by Kathy G et al. [14]. Assuming marginal error 0.05 and 10% non-respondent rate; accordingly, the estimated sample size was 89. From these patients 31 of them become from exposed group and 58 patients became non-exposed group. For the purpose of this study we defined early post-operative time as the time between from starting extubation to 2 hours if the patient operated under general anesthesia and starting last skin incision to 2 hours if the patient is operated under spinal anesthesia, middle post-operative time as the time between 2 hours to 8 hours and late post-operative time mean the time which is between 8-24 hours. And Exposed groups are those of patients who got additional amount of intravenous fluid on the top of maintenance, deficit and third space lose while non-exposed groups are patients who are not exposed for additional amount of fluid beside the maintenance, deficit and third space lose.

Data collection

Pre-tested structured questionnaire was prepared by reviewing previously done studies on the topic of efficacy of intravenous fluid on prevention of post-operative nausea and vomiting [1,15-17]. The questionnaire was first prepared in English and then translated into Amharic, then to Tigrigna which is the local language of the patient in the study area. The data were collected using structured interviewer administered questionnaire prepared to address demographic character of the patients, clinical factors which can affect the incidence rate of PONV and incidence rate of PONV in different phase. The questionnaires were administered to all patients whose age is greater or equal to 18 years, Eighteen year was selected because patient below this age is highly susceptible for post-operative nausea and vomiting according to most literatures, who were scheduled from wards during the data collection period, and who volunteered to participate in the study and those of who fulfilled the inclusion criteria were interviewed in the morning of the surgery and after surgery in the PACU and wards [4]. In addition, patients provided demographic information including age, gender, Body Mass Index (BMI), fasting time, anti-emetic used, smoking history, Last Menstrual Period (LMP), and ASA class. The questionnaire also contained questions which can affect the incidence of PONV such as blood loss, type of anesthesia, type of induction agents, and dose of reversal agents and mean systolic blood pressure change. And the questioner had also a part which was prepared to assess incidence rate of PONV, pain score, anti-pain and ant-emetic used in the different phase of post-operative time. The calculated fluid was given which is equivalent to maintenance fluid times NPO time on the top on fluid management for exposed groups by the one who is going to provide anesthesia while patients who were in non-exposed group were received only the normal fluid management and all fluid used were crystalloids.

Data quality control

Data were collected by two senior anesthetists after one day training was given about the objectives and procedures of the data collection by the investigators. Questionnaire was pre-tested was done on 5 % of the patients a week before the actual data collection time to assess clarity, understand ability, flow and consistency, and revised prior to the start of data collection. Data completeness and consistency was checked by the investigators. Data cleaning and editing took place; missed values were statistically handled to help address concerns.

Data analysis

Data were entered using Epi Info version 7 and exported to, and then analyzed using SPSS version 20. First, descriptive statistics were carried out to explore the socio-demographic characteristics of patients, and the results were summarized as frequencies and percentages between exposed and non-exposed group, binary and multiple logistic regressions were employed. Variables associated with incidence rate of PONV in bivariate analyses were included in the multiple logistic models and P-values less than 0.05 were considered to be statistically significant in all cases.

Ethical consideration

Ethical approval and clearance was taken from institutional review board of College of Health Sciences, Addis Ababa University. Mekelle University also gave permission to conduct the study to each operated

patients in the study area. After the purpose of the study was explained, a written informed consent was obtained from patients before data collection. Patients were informed that participating in the study was voluntary and that refusal to participate would not compromise the medical care or the surgical care. The right to withdraw from the study at any time was also assured. The interviews were conducted in a private room in the patient preparing room to ensure privacy. Coding was used to eliminate names and other personal identification of respondents throughout the study process to ensure participants confidentiality.

Results

Socio demographic characteristics

From the total eight nine patients, 36 (40.45%) were males and 53 (59.55%) were females. There were no base line difference between the two groups in terms of age, BMI and NPO hrs. The mean age in exposed group was 44.96 (22-65) while it was 42.68 (20-60) in non-exposed group. Similarly the NPO time and BMI was comparable, which were 10.61 (8-14) and 21.55 (16-29) in exposed group and 10.29 (7-14) and 21.33 (15-29) in non-exposed group respectively. Among eighty nine patients participated in this study, 30 (33.71%) patients had gynecological operation (vaginal hysterectomy, myomectomy, and abdominal hysterectomy), 19 (21.35%) orthopedics (bone biopsy, pin removal, and open reduction internal fixation) and 40 (44.94%) general surgical operations (inguinal herniorraphy, colostomy closure and epigastric hernia repair) (Table 1).

Clinical factors that affect incidence of PONV

Using standard rule of blood loss measurements, blood loss was recorded in both groups. Of eight nine patients, 21 (67.74%) and 37 (63.79%) patients loss<500 ml; 9 (29.03%) and 20 (34.48%) patients loss 500-1000 ml; 1 (3.23%) and 1 (1.72%) patient loss 1000-1500 ml of their blood in exposed and non-exposed groups respectively. And none of the patients bleed greater than 1500 ml. and systolic blood pressure change was also recorded and the mean change was comparable in both groups.

From total 89 patients 16 (51.61%) and 15 (48.39%) patients were operated under general and spinal anesthesia respectively in exposed group while 27 (46.55%) and 31 (53.45%) patients were operated under general and spinal anesthesia respectively in non-exposed group. And out of 16 patients who received general anesthesia in exposed group 7 (43.75%) patients were induced by ketamine and 9 (56.25%) patients received thiopental for induction. Similarly 12 (44.44%) patients got ketamine and 15 (55.56%) got thiopental as induction agent in non-exposed group. In both group anesthesia was maintained using inhalational agent by halothane. After the end of surgery before the extubation reversal agent is administered by the one who provide the anesthesia and the dose of the reversal agent is recorded and out of 16 patients who received general anesthesia in exposed group 4 (25%) took less than the recommended dose and 12 (75%) patients took the normal recommended dose in exposed group, similarly out of 27 patients who received general anesthesia 7 (25.93%) patients received reversal agent which was less than the recommended dose and 20 (74.07%) patients took the reversal agent which was the normal recommended dose in non-exposed group. Concerning the anesthesia and surgical time, 11 (35.48%) and 18 (31.03%) patient finished their operation and anesthesia within one hour while 20 (64. 52%) and 40 (68.97%) need one to two hours to complete their surgery and anesthesia in exposed and non-exposed group respectively (Table 2).

Incidence rate of PONV, pain score, anti-pain and anti-emetic used in early post-operative time

Using VAS 0 is considering as no nausea and 10 is considering as the worst imaginable nausea, nausea scale was recorded and 10 (32.26%) and 25 (43.10%) of the total patient had nausea scale of 1-3, 1 (3.23%) and 13 (22.41%) patients experienced nausea scale of 4-6 in exposed and non-exposed group respectively. And one patient from the non-exposed group had severed nausea with a nausea scale of 7-10 (Figure 1). From total 31 patients in exposed group, 11 (35.45%) of patients and 39 (67.24%) of 58 patients in non-exposed group experienced nausea in early post-operated period (Figure 2).

Starting from right after extubation for those who were operated under general anesthesia with endotracheal tube and end of surgery for those of who operated under spinal anesthesia number of vomits was recorded, from a total of 31 patients in exposed group 6 (19.35) patients vomit 1-3 times, whereas out of 58 patients in non-exposed group 28 (48.28%) patients experienced vomiting 1-3 times and 10 (17.24%) patients vomit 4-6 times in early post-operative time (Figure 3). Similar to that of nausea, number of vomit in early post-operative time was recorded in both exposed and non-exposed group; out of 31 patients in exposed group 6 (19.35%) patients experience vomiting whereas out of 58 patients in the non-exposed group 38 (65.52%) patients had vomiting in early post-operative period (Figure 4).

Using VAS, 0 is considering as no pain and 10 is considering as the worst imaginable pain, pain scale was recorded and patients were asked if they have pain or not, out of 31 patients in exposed group 13 (41.94%) patients had pain with a pain level of 1-3 on VAS and from all 58 patients assigned in non-exposed group 28 (48.28%) patients had pain with similar pain level (Figure 5). Anti-pain and ant-emetic was prescribed by the one who provide the anesthesia whenever the patient complain of severe pain and if he/she have vomiting frequently, anti-

Variables		Exposed group		Non-exposed group		P-value
		Frequency	Percent	Frequency	Percent	
Age (year)		44.96	22-65*	42.68	20-60*	0.874
Sex	Male	12	38.71	24	41.38	0.790
	Female	19	61.29	34	58.62	
Total		31	100	58	100	
BMI (kg/cm^2)		21.55	16-29**	21.33	15-29**	0.926
NPO time(hr.)		10.61	8-14***	10.29	7-14***	0.981
Type of operation	Gynaecological	12	38.71	18	31.03	0.642
	General surgery	12	38.71	28	48.28	
	Orthopaedics surgery	7	22.58	12	20.69	
Total		31	100	58	100	

*Age range **Body mass index range ***NPO time.

Table 1: Demographic status of operated patient at Ayder Referral hospital Mekelle University, Northern Ethiopia, 2013.

Variables	Exposed group		Non-exposed group		P-value
	Frequency	Percent	Frequency	Percent	
Amount of blood loss					
<500 ml	21	67.74	37	63.79	0.76
500-1000 ml	9	29.03	20	34.48	
1000-1500 ml	1	3.23	1	1.72	
>1500 ml	0	0	0	0	
Total	31	100	58	100	
Type of anaesthesia					0.33
General	16	51.61	27	46.55	
Spinal	15	48.39	31	53.45	
Total	31	100	58	100	
IV induction agent used					0.93
Ketamine	7	43.75	12	44.44	
Thiopental	9	56.25	15	55.56	
Total	16	100	27	100	
Dose of reversal agent used					
<the recommended dose	4	25	7	25.93	0.65
recommended dose	12	75	20	74.07	
>the recommended dose	0	0	0	0	
Total	16	100	27	100	
Duration of surgery<1 hour	11	35.48	18	31.03	0.88
1-2 hrs	20	64.52	40	68.97	
>2 hrs	0	0	0	0	
Total	31	100	58	100	
Duration of anaesthesia<1 hour	11	35.48	18	31.03	0.88
1-2 hrs	20	64.52	40	68.97	
>2 hrs	0	0	0	0	
Total	31	100	58	100	
Mean systolic blood pressure change	7.058	5-10%	8.11%	1-Jul	0.76

Table 2: Clinical factors which affect the incidence of post-operative nausea and vomiting, in Ayder referral hospital Mekelle, northern Ethiopia, 2013.

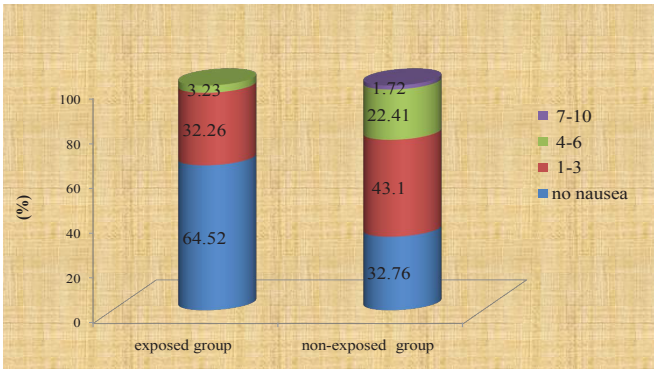

Figure 1: Nausea scale in exposed and non-exposed group in early post-operative time in Ayder referral hospital Mekelle, northern Ethiopia, 2013.

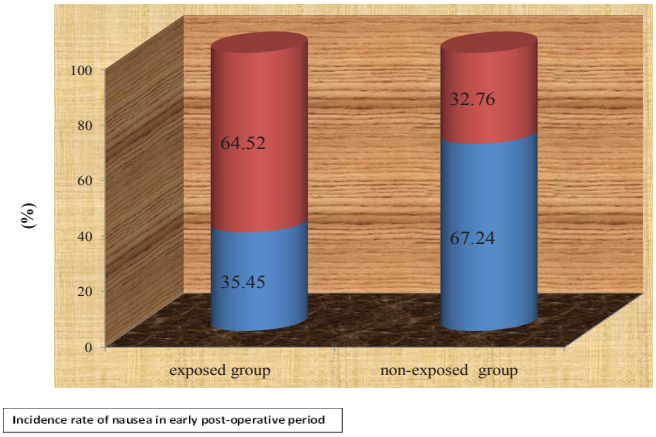

Figure 2: Incidence of nausea in early post-operative period in post anesthesia care unit Ayder referral hospital Mekelle, northern Ethiopia, 2013.

pain and ant-emetic used was recorded stated that, from all 31 patients grouped in exposed group 5 (16.13%) patients took anti-pain and 1 (3.23%) patient need anti-emetic to overcome the vomiting and out of 58 patients who were assigned to the non-exposed group 28(48.28%) patients needed anti-pain and 21(36.21) patients need anti-emetic to control the vomiting (Figure 6).

Incidence rate of PONV, pain score, anti-pain and anti-emetic used in middle post-operative time

Bivariate analysis in the binary logistic regression model showed that the incidence rate of nausea and bolus intravenous fluid administration was significantly associated in which incidence rate of nausea in non-exposed group, which were not exposed to preoperative bolus of fluid, was 2 times more likely to happen when compared to patients in exposed group, those who were exposed to pre-operative bolus intravenous fluid administration (RR=2.38 [95% CI 55.46, 80.46]). Number of vomit was also statically associated with the pre-operative fluid administration of the patient ($p<0.05$). Regarding to anti-emetic used patients assigned in the non-exposed group were 9 times more antiemetic used than patients those who were assigned in the exposed group (RR=9.07 [95% CI 18.09, 42.73]). From all 31

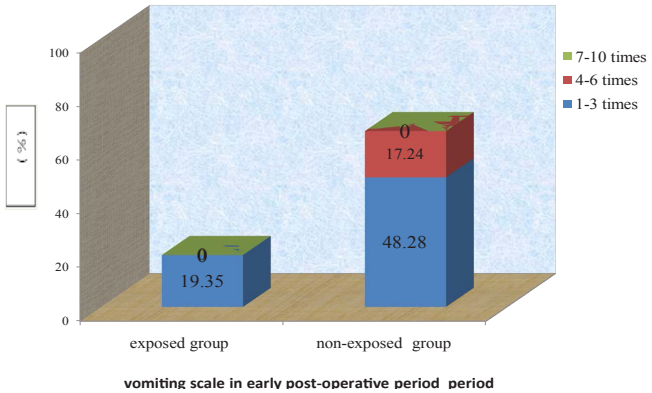

Figure 3: Incidence of early post-operative vomiting in Ayder referral hospital Mekelle northern Ethiopia.2013.

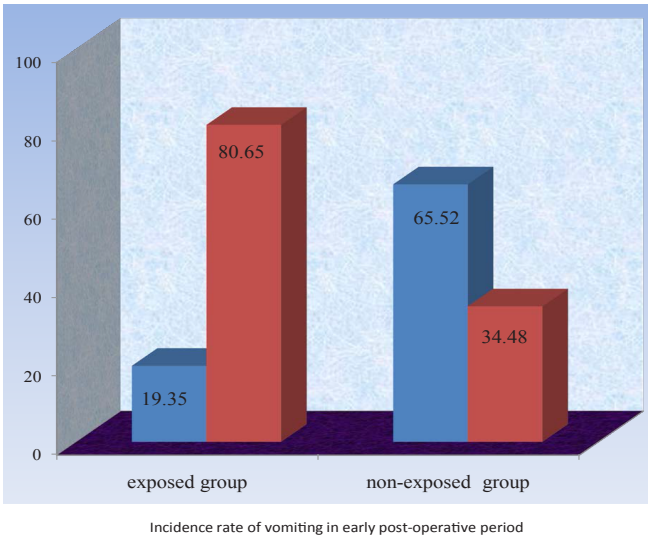

Figure 4: Incidence of vomiting in early post-operative time in Ayder referral hospital Mekelle, northern Ethiopia 2013.

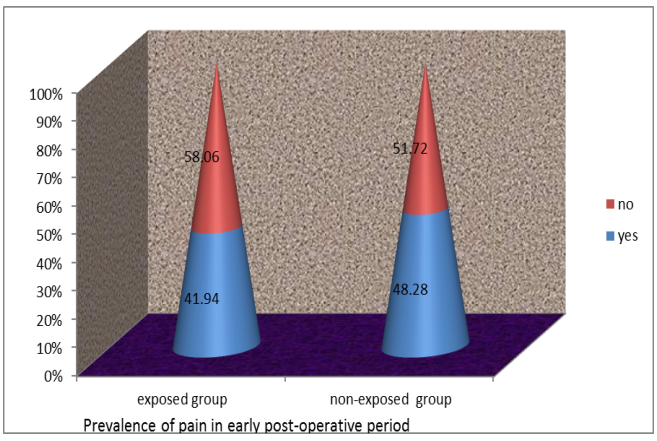

Figure 5: Prevalence of pain in early post-operative period in Ayder Referral Hospital Mekelle, Northern Ethiopia 2013.

patients 61 (51.61) from expose group and 39 (67.24) patients from non-exposed group experienced different level of pain and concerning

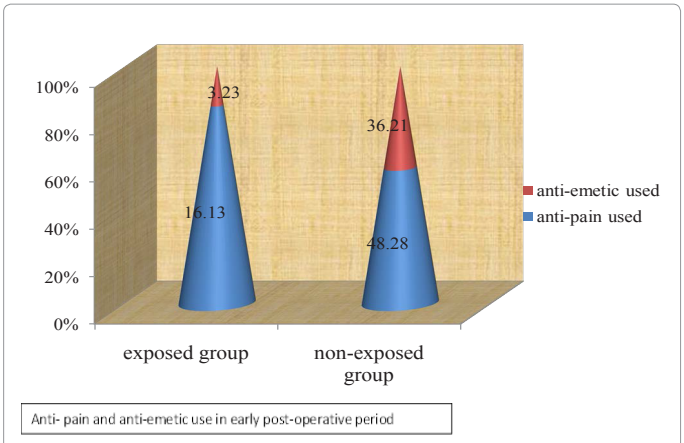

Figure 6: Anti-pain and ant-emetics used in early post-operative period in Ayder referral hospital Mekelle northern Ethiopia, 2013.

to the frequency of the pain among the group it was not statically significant ($p>0.05$). Despite the prevalence of pain in both groups is similar, the anti-pain used to treat the pain had a big discrepancy and it was statically significant ($p<0.05$) (Table 3).

Incidence rate of PONV, pain score, anti-pain and anti-emetic used in late post-operative time

Patients were requested to respond for pain and nausea on VAS and number of vomit was counted in late post-operative period, from all 89 patients; 31 assigned in exposed and 58 in non-exposed group, 9 (29.03%) and 22 (37.93%) patients had nausea with nausea scale of 1-3, 11 (36.67%) and 19 (32.76%) patients were complain of pain with a pain scale of 1-3 and 2 (6.45%) and 10 (17.24%) of patients had vomiting one to three times in exposed and non-exposed group respectively (Figure 7). Patients were asked if they have nausea and pain, and number of vomit was counted in PACU and wards. Of all 31 patients in exposed group 9 (29.03%) patients had nausea, 2 (6.45%) patients had vomiting, 11 (35.48%) patients were complain of pain, 9 (29.03%) took anti-pain and no patient was subjected to take anti-emetic. Similarly from 58 patients in non-exposed group 22 (37.93%) patients experience nausea 10 (17.24) patients had vomiting, 19 (32.76%) patients was complain of pain, 10 (17.24%) patients were subjected for anti-pain and 4 (6.91%) for anti-emetic treatment (Figure 8).

Bivariate analysis in the binary logistic regression model showed that the incidence rate of PONV and age group of 20-49 yrs was significantly associated in which incidence of PONV was 2 times more likely to happen when compared to patients whose age group was greater than 49 yrs (RR=2.06 [95% CI 49.47, 84.33]). Type of anesthesia was not statically associated with the incidence rate of post-operative nausea and vomiting ($p<0.05$). Regarding to sex, female patients experienced vomiting two times more frequently than male patients but it was not statically significant [RR=2.09 (95% CI 47.05, 82.68)] (Table 4).

Discussion

Demographic factors

Due to hormonal and genetic factors the incidence rate of post-operative nausea and vomiting is high in female patients [13]. The incidence rate of post-operative nausea and vomiting in this study in female patients was 66.67% (p value=0.40) and which is not statically significant. This finding was similar as compared to the other study

Variables	Exposed group	95% CI	Non-exposed group	95% CI	RR	P -value
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)		
Incidence rate of nausea						
Yes	9 (29.03)	14.22, 48.04	40 (68.97)	55.46, 80.46	2.38	0.00049
No	22 (70.97)	51.96, 85.78	18 (31.03)	19.54, 44.54		
Total	31 (100)		58 (100)			
Incidence rate of vomiting						
Yes	2 (6.45)	4.26, 12.12	27 (46.55)	33.34, 60.13	7.22	0.000475
No	29 (93.55)	74.04, 97.39	31 (53.45)	39.87, 66.66		
Total	31 (100)		58 (100)			
Pain						
Yes	16 (51.61)	33.06, 69.85	39 (67.24)	53.66, 78.99		0.12
No	15 (48.39)	30.15, 66.94	19 (32.76)	21.01, 46.34		
Total	31 (100)		58 (100)			
Anti-pain used						
Yes	8 (25.81)	11.86, 44.61	28 (48.28)	34.95, 61.78		0.045
No	23 (74.19)	55.39, 88.14	30 (51.72)	38.22, 65.05		
Total	31 (100)		58 (100)			
Anti-emetic usage						
Yes	1 (3.23)	0.08, 16.70	17 (29.31)	18.09, 42.73	9.07	0.0149
No	30 (96.77)	83.30, 99.92	41 (70.69)	57.27, 81.91		
Total	31 (100)		58 (100)			

Table 3: Incidence rates of post-operative nausea, vomiting, pain and anti-pain and anti-emetic used middle post-operative period in Ayder referral hospital Mekelle, northern Ethiopia, 2013.

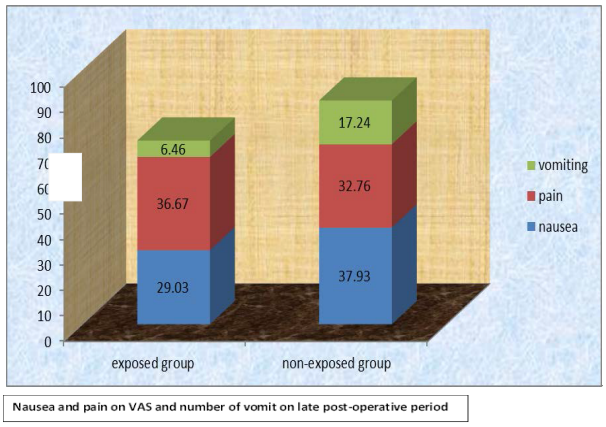

Figure 7: Pain and nausea on VAS and number of vomiting on late post-operative period in Ayder Referral Hospital Mekelle, northern Ethiopia, 2013.

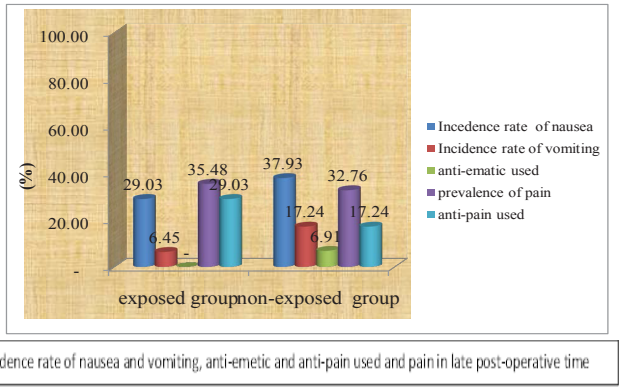

Figure 8: Incidence of nausea, pain and vomiting and ant-pain and ant-emetic used in late post-operative period in Ayder referral hospital Mekelle, northern Ethiopia, 2013.

		Exposed group		Non-exposed group		RR	P value
		Frequency (%)	95% CI	Frequency (%)	95% CI		
Incidence rate of PONV	Sex						
	M	6 (33.33)	21.35, 42.57	15 (36.47)	29.39, 48.87	2.09	0.4
	F	18 (66.67)	47.05, 82.68	25 (63.53)	50.47, 81.09		
	Age Grouped						
	20-49	14 (68.42)	49.47, 84.33	29 (59.28)	41.36, 79.14	2.06	0.04
	>49	6 (31.58)	24.01, 43.47	13 (40.72)	28.36, 57.58		
	Type of anaesthesia						
	General	11 (48.39)	32.54, 60.14	18 (47.37)	34.03, 59.57	0.99	0.47
	Spinal	12 (51.61)	39.35, 70.20	20 (52.63)	36.14, 64.07		

Table 4: Association between type of anesthesia, sex, age-grouped and incidence rate of PONV in Ayder referral hospital Mekelle, northern Ethiopia, 2013.

done in Korle Bu one of teaching hospital found in Ghana in which the incidence rate of post-operative vomiting was 73.6% and it was not statically significant with a p value=0.235 [8].

Obesity increases the risk of PONV. Its effect may be partly explained by difficult in managing the air way in over weight individuals and greater risk of introduction of air in to the stomach and they may have an increased residual gastric volume and they are liable to have more gastro oesophageal reflex. Further, increased body fat serves as a larger reservoir for lipid soluble emetogenic anaesthetic agents. A body mass index of more than 30 in patients had been associated with increase in PONV. This may be due to an increased intra-abdominal pressure and the pharmacokinetic effects of lipophilic anaesthetic agents having prolonged half-lives in these patients. An increased BMI may increase the incidence of PONV in patients with other independent risk factors [10].

The incidence rate of vomiting and nausea in this study however didn't show statically significant difference concerning the BMI of the patients (p value=0.44) as compare to the research done in developed countries in USA and Canada which was stated that 10% increment incidence of vomiting in every 5 increased in BMI after 30 kg/cm^2 [10,14-16]. The lower incidence rate of vomiting in this study could be explained by most of the patients was not obese in which the maximum BMI was 29 kg/cm^2 and the mean BMI was 21.55 when compare to the mean BMI was 34.62 in the USA and Canada patients.

Age grouped analysis of post-operative nausea and vomiting in this study shows the maximum number of patients who experienced vomiting in each phase of post-operative period was in the age group of 20-49 years which is 68.42% and it is statically significant (p=0.04). This finding was come in agreement with study done in Ghana 71.85% (p=0.007) of all patients who had post-operative nausea and vomiting were with in age group of 20-49 years [8].

Anaesthetic factors

The incidence rate of post-operative nausea and vomiting in this study is 48.39% on patients who were operated under general anaesthesia and which is not statically significant (p=0.47). The finding of this study was not consistent with a research done in Ghana which shows that from all patients who experienced post-operative nausea and vomiting 60.72% them were operated under general anaesthesia. The possible reason for this inconsistence could be described by 55.65% of the patients were induced with thiopental which reduce the incidence rate of post-operative nausea and vomiting by three times when it compared to ketamine and Etomidate which were the anaesthetic agents in that study [8]. And 25.93% of patients took the reversal agent which is less than the recommended dose whereas all patients took calculated dose of the reversal agents in the reference study. And anticholinesterases which increase the incidence rate by 10% are known anaesthetic agents from which cause post-operative nausea and vomiting [8].

Effect of intravenous fluid

Early post-operative period: The incidence rate of post-operative nausea in this study in early post-operative period account 35.45% and 67.24% in the exposed and non-exposed group respectively. And it was statically significant (p=0.004). The result of this study was similar to study done in Ireland; from all patients 26.03% of nauseated patients in early post-operative nausea period found on patients who were infused low amount of pre-operative fluid when compare to 2.9% incidence rate of nausea on high dose of pre-operative fluid [11]. Similar study was done in Saudi Arabia shows that 20% of patients had early post-operative nausea on control group when compare to 5% of patients who took exposed to high dose of intravenous fluid [12]. The high incidence rate of nausea in this study could be explained by the induction agent used for anaesthesia in the reference study was propofol which is a known anti-emetic agent from all IV induction agents and the amount of fluid administration was high when compare to this study.

The result of early post-operative vomiting in this study was 19.35% and 65.52% in exposed and non-exposed group respectively and it is highly associated (p<0.05) with the amount of pre-operative bolus intravenous fluid administration. The finding of this study is come agreement with the others developed countries, incidence of early-post-operative vomiting in high and low amount of fluid administered group in Canada found 5% and 22% and similar result was also found in Ireland, it was 27% and 60% in exposed and non-exposed groups [11,13]. Anti-emetic used to overcome the vomiting in this study in early post-operative period was 3.23% in exposed group and 36.21% in non-exposed group. It was similar with study done in Canada which was 2.6% and 22.12% in high and low volume of pre-operative bolus amount of fluid administered group respectively [13]. But the finding of anti-emetic used in this study was show a big difference with a study done in Saudi Arabia which was 25% and 70% in exposed and non-exposed group respectively [12]. The possible reason for this big variation could be explained by opioids was given in Saudi Arabian patients for post-operative pain control and opioid are a known emetogenic agents.

Middle post-operative period: In the binary logistic regression model, association test was done to identify the efficacy of intravenous fluid on middle post-operative nausea. In this study, the factor that was independently and significantly associated with incidence of middle post-operative nausea, vomiting and anti-emetic used was administration of bolus pre-operative intravenous fluid. The result of this study showed that incidence of nausea in the middle post-operative period was significantly associated with administration of bolus per-operative intravenous fluid. Patients who were not took pre-operative fluid nauseated 2 times greater than of who were exposed to pre-operative fluid [RR=2.38(95%CI=55.46,80.46)]. This was consistent with a study USA [4].

As to the association factors with exposure to fluid status, the binary logistic model showed that vomiting incidence is closely related to the amount of intravenous fluid exposed. Patients who were not exposed to pre-operative bolus fluid had vomiting 7 times more than that of patients who gained bolus of intravenous fluid [RR=7.22(95%CI=33.34-60.13)]. This finding was in conformity with the result in USA [6]. The possible reason for the high association in this study could be the prevalence and severity of pain in the non-exposed group was greater than the exposed group. Similarly anti-emetic used in this study was highly associated with the exposure status of pre-operative bolus intravenous fluid. Patients who were not exposed to intravenous fluid was subjected for anti-emetic agents 9 times more than those patients who were not took pre-operative intravenous fluid [RR=9.07(95%CI 18.07,42.7)].

Late post-operative period: The incidence rate of post-operative nausea in this study in late post-operative period account 29.03 and 37.93% in the exposed and non-exposed group respectively. And it was not statically significant (p=0.30). The result of this study was inconsistent to the study done in Ireland; from all patients 32.04% of nauseated patients in late post-operative nausea period found on patients who were infused low amount of pre-operative fluid when compare to 4.4% incidence rate of nausea on high dose of pre-operative fluid [11]. The high incidence rate of nausea in this study on exposed group could be explained by the type of infused fluid was crystalloid and it has short half-life.

The result late post-operative vomiting in this study was 6.45% and 17.24% in exposed and non-exposed group respectively and it is not statically significant (p>0.05). The finding of this study is come agreement with the others developed countries, incidence of late post-operative vomiting in high and low amount of fluid administered group in Ireland found 4.4% and 29.36% (18). Anti-emetic was not used in this study in late post-operative period in exposed group and 6.91% of patients were subjected to anti-emetic in control group. It was similar with study done in Ireland which was 1.47% and 4.29% in high and low volume of pre-operative bolus amount of fluid administered group respectively [11].

Conclusion

This study revealed that the effect of intravenous fluid on post-operative nausea, vomiting and anti-emetic used was similar as compared to other settings, despite the increase incidence rate. Effect of intravenous fluid on post-operative nausea, vomiting and anti-emetic used was assessed. The incidence rate of PONV and anti-emetic used in early and middle phase of post-operative period was highly associated with pre-operative administration of intravenous fluid in the bivariate analysis. Due to the short half-life of the administered fluid, the incidence rate of PONV in the late post-operative time didn't show significant difference among the exposed and non-exposed group. The incidence rate of PONV concerning to sex was not statically significant. While being young age had significance effect of the incidence of PONV. And body mass index of the patient had not any significant role for the incidence rate of PONV. Anaesthetic type and different anaesthetic agents used for the operation didn't showed significant influence on the incidence rate of PONV at each phase.

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