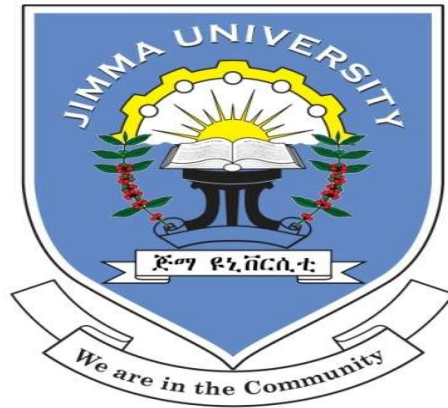


PREVALENCE,CAUSES AND MANAGEMENT OUT COME OF
SMALL INTESTINAL OBSTRUCTION IN NEKEMTE REFERRAL
HOSPITAL, OROMIA, WESTERN ETHIOPIA



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A THESIS RESULT TO BE SUBMITTED TO JIMMA UNIVERSITY INSTITUTE OF
HEALTH,MEDICAL FACULTY,CO-ORDINATING OFFICE OF INTEGRATED
EMERGENCY OBSTETRICS,GYNECOLOGY AND GENERAL SURGERY(IEOS); IN
PARTIAL FULFILLMENT OF DEGREE OF MASTERS IN INTEGRATED EMERGENCY
OBSTETRICS/GYNECOLOGY AND (SURGERY(IEOS).

OCTOBER,2017
JIMMA, ETHIOPIA

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October, 2017

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ABSTRACT

Background;-Small Intestinal obstruction is defined as any failure/ blockage of passage of small intestinal contents from proximal to distal segment. It is one of the most causes of acute abdomen. If not managed timely, the outcome will be grave. The causes of small intestinal obstruction vary from region to region, as well as from season to season. Knowing this variation in causes of intestinal obstruction helps us in selecting appropriate management. Most of the time, it is difficult to differentiate these causes clinically. So it is important to know some of the commonest causes in our area. But there is not enough research done in our country.

Objective: To assess causes and management outcome of small intestinal obstruction in Nekemte referral Hospital

Method:- A three years hospital based cross sectional study design was used from January 1, 2014 to December 30, 2016 and the data was collected from July 1-August 30,2017. The data were collected from medical records.The collected data were checked for any inconsistency coded and entered into SPSS version 20 for data processing and analysis.Descriptive, binary and multivariate logistic regression analyses were used.On binary logistic regression analysis a p-value ≤ 0.25 was used as a candidate for multivariate logistic regression analysis. Statistical significant association was tested at a p-value of < 0.05 .

Result:- The records of 161 patients with small intestinal obstruction were retrieved for analysis. One hundred five (65.2%) were males.The commonest cause of small bowel obstruction was adhesion in 57(35.4%) followed by small bowel volvulus in 40(24.8%) & intususception in 34(21.1 %) respectively.Resection and anastomosis being the commonest procedure done in 36% of patients.Thirty eight (23.6%) developed post-operative complications. The commonest postoperative complication was wound infection 17(44.7%). About 140(87%) patients improved and discharged and 21(13%) died.

Conclusion & recommendation :- Small intestinal obstruction is a commonly encountered surgical emergency.Its causes are variable in different parts of the world. In this study Adhession, small bowel volvulus & intususception were the leading causes of small bowel obstruction respectively. Laparatomy is the most common means of small intestinal obstruction management. Wound infection in the study area should be improved because it is the most common postoperative complication.This can be decreased by appropriate surgical technique and wound care with sterile techniques. Government and other concerned body should be involved on this by improving the sanitation of the hospital.

Key words:- Intestinal obstruction, causes, management outcome

Acknowledgement

Above all I thank God for this opportunity. My special thanks go to my advisors; Dr.Mahlet Tesfaye and Mr.Geremew Muleta for their professional and valuable comments throughout the development of my research paper.

My gratitude goes to Jimma University, College of public health and medical sciences, coordinator of Integrated Emergency Gyn/Obs and Surgery for giving me this opportunity to conduct this research . I am also indebted to the physicians and other staffs who were involved in the management of the patients in Nekemte referral hospital .

Last, I thank my friends ,brothers(Abebe Derbe,Nigus Molla,Kassa Getahun) and my sweetheart who have given their important inputs during the preparation of this paper.

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List of abbreviations and acronyms

AOR	Adjusted odds ratio
CBC	Complete Blood Count
CI	Confidence Interval
COR	Crude odds ratio
ETB	Ethiopian Birr
GUH	Gondar university hospital
Hgb	hemoglobin
IEOS	Integrated Emergency Obstetric and surgery
IOF	intra operativ finding
ISK	Iliosigmoid knotting
IO	Intestinal obstruction
MRC	Medical record card
NGT	Naso gastric tube
NRH	Nekemte referral hospital
SD	Standard deviation
SBO	Small bowel obstruction
SBV	Small bowel volvulus
SPSS	Statistical Package for Social Sciences

1. INTRODUCTION

1.1 .Background and justification

Small Intestinal obstruction is defined as failure/blockage of passage of small intestinal contents from proximal to distal segment. It is one of the most common conditions resulting in hospital admissions. The clinical features of small intestinal obstruction include abdominal pain; abdominal distention , vomiting and absolute constipation (1).

There are two types of small intestinal obstruction, dynamic (mechanical) and adynamic (paralytic ileus). In dynamic intestinal obstruction peristalsis works against the mechanical obstruction, while in adynamic intestinal obstruction peristalsis may be absent or it may be present in non propulsive form.(2) Unrelieved mechanical obstruction needs exploration.(3) Mechanical intestinal obstruction forms important part of pathologies that necessitate emergency surgical interventions in most parts of Asia, including India, Iran and Pakistan.(2,3)

The outcome of management of the condition may be a good indicator of how well a country's surgical services are doing. Small intestinal obstruction is one of the commonest abdominal surgical emergencies. When small intestinal obstruction is not relieved in time, the patient may die. Early diagnosis and prompt management are therefore mandatory. Several factors contribute to poor outcomes in the case of small intestinal obstruction. Some of these determinants may include poor health seeking behavior, ignorance and poverty. Poor clinical judgment is also one of the negative factors leading to poor prognosis in case of small intestinal obstruction (2, 3).

There is a wide geographical variation in the pattern of mechanical intestinal obstruction. In a study done in Sudan, adhesion ranked the highest. The most common predisposition to adhesive obstruction is violation of the peritoneal cavity and the majority of the cases followed laparotomy. It is possible that talc or starch of the surgical gloves in routine use in our environment played a role in adhesion formation in some of the patients (4).

Primary small bowel volvulus is one of the other common causes of small intestinal obstruction in parts of Africa. Primary small bowel *volvulus* was more during the rainy seasons, that is, through June to *October* (5, 6).

1.2 .Statement of the problem

Small Intestinal obstruction is a common and potentially dangerous surgical emergency associated with high morbidity and mortality if not managed appropriately. It is a global problem consuming many interims of surgical services. The prevalence and causes of small bowel obstruction (SBO) differs internationally & locally (2, 3, 5).But it is a serious general surgical emergency world wide, with considerable morbidity and mortality. The situation was considered to be worse in developing countries where health facilities were scarce and health education was lacking,and that many patients present late to hospitals after trials with local remedies were exhausted (6, 7).

When normal luminal flow of intestinal contents is interrupted, the intestine proximal to the obstruction begins to dilate as intestinal secretions are prevented from passing distally (4). This has a number of consequences that depend, in part, upon the site and the degree of obstruction. The diagnosis and treatment modalities reflect a lot of local factors and peculiarities (facilities available and the propensities of the managing teams)(6,7)

The pattern of the disease changes from time to time and needs periodic studies to evaluate the causes and prevalence of the disease. The causes of SBO are several and their relative incidence varies in different populations & between countries.It has also shown variation over the decades (7). Several factors are described to be responsible for these differences. Socioeconomic factors and diet have mostly been incriminated to be responsible for the observed difference. The knowledge of patterns and causes of small intestinal obstruction in a country as well as in different parts of the country has significant value in fast diagnosis and on timely surgical intervention ,which results in good outcome of the patient.

2.LITRATURE REVIEW

2.1. Literature Review

At least 20% of the patients, who present to hospital with acute abdomen, are thought to have intestinal obstructions. It is the leading cause of acute abdomen in several African countries. It is thought to be rare in the USA and Western Europe while it is common in Pakistan and other tropical countries. (8).

SBO is one of the commonest abdominal surgical emergencies. It is usually classified as dynamic (mechanical)& adynamic(paralytic ilieus).Mechanical obstruction is, where peristalsis works against an obstructing agent like adhesions, volvulus, intussusceptions, inflammatory stricture (8 , 9).

There is a wide geographical variation in the pattern of mechanical intestinal obstruction.In a study done in Nigeria, adhesion ranked to be the highest etiology, underscores the changing pattern (10). In another study conducted in Nigeria,most cases of adhesive obstruction were managed conservatively initialy, but only 15% of cases responded to such treatment one study done in Nigeria. Causes of intestinal obstruction in Nigeria is changing, and the increasing prevalence of adhesion complicating abdominal operations may be a factor(11).

Primary small bowel volvulus is one of the commonest causes of small intestinal obstruction in parts of Africa. Some authors have reported that its occurrence has some seasonal variations . Similarly in study done in our set up small bowel volvulus was found to be the commonest cause of small intestinal obstruction(12).

Definive diagnosis is based only on the intra-operative findings, for its clinical presentation is the same as that of other causes of small bowel obstruction (13). In a study done in Gonder,Ethiopia it was found to be more common in young adult male farmer with a mean age of 34 years,'(range 16-65). Mortality rate was found to be 13.3%. Sepsis was found to be the most frequent cause of death (12). It is rare cause of small bowel obstruction in Europe and America .It is associated with ingestion of high-bulk vegetable diets, especially after prolonged interval of fasting. The abrupt transit of a large bulky meal into the proximal jejunum causes the resultant heavier segment of the bowel to migrate into the left lower quadrant because of the absence of resistance in the pelvis. The empty loops of distal jejunum and ileum are therefore forced in a clockwise rotation into the right

lower quadrant predisposing to torsion of the mesentery. The typical patient of primary small bowel volvulus is a young adult male, who is muscular, a farmer from a rural area whose diet is mainly cereal and high fiber. Among the predisposing factors to primary small bowel volvulus are the presence of long mobile mesentery and a short mesenteric base, which makes the bowel loop susceptible to twisting. The secondary type of small bowel volvulus has predisposing lesions like anatomic malformations and malrotations, bands and postoperative adhesions (12, 13).

Ascariasis is known to be a cause of intestinal obstruction particularly in children. *Ascaris lumbricoides* is a worldwide small bowel infestation with particular high prevalence in warm tropical climates, especially in low socio-economic communities with poor hygiene and inadequate sewage disposal. All age groups are affected. Adult worms reside in the small bowel and are known to cause malnutrition, stunting and mental retardation as well as anemia. In some cases, the worms congregate and cause bowel obstruction with or without volvulus, bowel necrosis, peritonitis and death if treatment is further delayed or inappropriate. In one study done in Kenya, about 11.9%(69/582) of laparotomy was done for *Ascaris lumbricoides*. It is still major cause of pediatric surgical complications requiring laparotomy for treatment. There is need for public health activities to control nematode infestation including sanitation and waste disposal, health education and regular de worming in the under five and school going (children(14)

In study done in Sudan the causes of small intestinal obstruction are strangulated external hernias (27.7%),intestinal adhesions (21%), intussusceptions (12%) (16). similarly a study done in some African countries including Ethiopia, strangulated external hernia is leading cause of small intestinal obstruction (16, 17).

Open surgery seems to increase the risk of SBO at least four times compared with laparoscopy. Other factors such as age, previous abdominal surgery, and co-morbidity are also of importance (18,19,20)

Small bowel metastases arising from hematogenous seeding of primary tumours are rare, but in some study small bowel metastases arising from primary lung cancer occur in over 10% of patients who underwent autopsy. (15).

2.2. Significance of the study

Small intestinal obstruction is one of the surgical emergency cases that cause major morbidity & mortality especially if not managed early and appropriately. In our country Ethiopia, where early diagnosis and intervention is lacking, it is important to know the magnitude, common causes and outcome of SBO. This will help to improve our approach to patients presenting with SBO to decrease & if possible to prevent occurrence of complications. In Ethiopia early diagnosis and intervention is not readily performed in all setups, due to reasons like lack of human resources, diagnostic facilities, inadequate transportation facilities & etc. This is further confounded by the, low awareness of the community to seek health care early, which contributes to increased risk of peri-operative complications and poor outcomes.

This study will provide baseline information about the magnitude and causes of SBO and its management outcome in our country. It will help in decreasing morbidity and mortality of patients by early detection of SBO, and early initiation of resuscitation and definitive management on time before complications occur. Operating on patients after complications have occurred is associated with poor prognosis.

The result of this study will be used as epidemiological and clinical input that will serve as an aid for policy makers to design proper strategies. It also helps as references for those who want to undertake research on small intestinal obstruction.

2.3. Conceptual framework

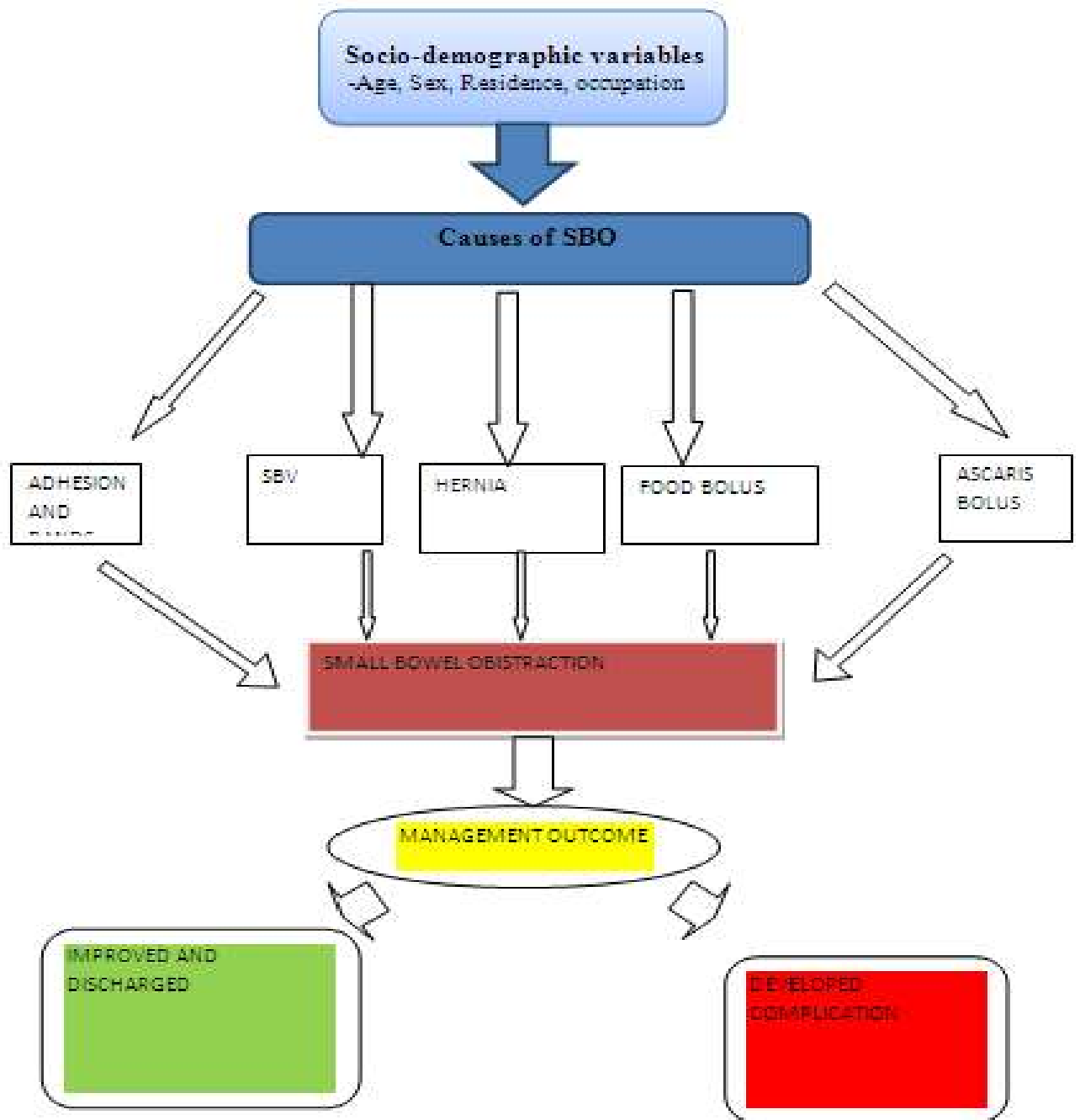


Figure 1: conceptual framework on management out come of patients with SBO

3.OBJECTIVES OF THE STUDY

3.1 General objective

- ✓ To determine prevalence, causes and management outcome of small intestinal obstruction in Nekemte referral Hospital.

3.2 Specific objectives

- ✓ To determine the prevalence of small intestinal obstruction among patients admitted to surgical ward in Nekemte referral Hospital.
- ✓ To identify common causes of the small bowel obstruction in Nekemte referral Hospital.
- ✓ To assess the common intra operative procedure done to relieve the obstruction of small intestinal obstruction in Nekemte referral Hospital.
- ✓ To assess management outcome of small intestinal obstruction in Nekemte referral Hospital.
- ✓ To identify some risk factors for postop complications

4.METHODS & MATERIALS

4.1. Study area and period

The study conducted at Nekemte referral Hospital ,Oromia regional state,western Ethiopia,east Wollega zone, Nekemte town, which is 333 kilometers from Addis Ababa. The Zone has 298 health posts, 61 Health Centers ,two primary hospitals& Nekemte referral Hospital.These are owned and run by the Government . There are also 207 private clinics . The total population of the east wollega Zone is 1,501,084.

The Hospital is the only referral hospital for the Zone. It was established in 1923 E.C. It has 204 beds. The total number of staff in the hospital is 408.Out of these 120 of them are health professionals including specialists, General practitioners, Health officers, Nurses, Lab technicians and pharmacists.

This study was conducted in Nekemte referral Hospital from January 1,2014 - December 30, 2016. The data collection period was from July 1-August 30/2017.

4.2. Study design

- Hospital based retrospective cross sectional study design was used.

4.3. Population

4.3.1. Source population

- The source populations were all patients who came to Nekemte referral Hospital.

4.3.2.Study population

- All Patients admitted with a diagnosis of small intestinal obstruction at Nekemte referral Hospital.

4.4. Inclusion and Exclusion criteria

Inclusion criteria

- Patients who were clinically diagnosed with SBO and managed conservatively without operation
- Patients who were clinically diagnosed with SBO and managed operatively
- Patients who died after presenting with clinical diagnosis of small intestinal obstruction with out surgery
- Mechanical & non (mechanical(adynamic) intestinal obstruction

Exclusion Criteria

- Incompletely documented charts
- Patients whose charts were lost

4.5. Sample size

All patients admitted to surgical ward of Nekemte referral Hospital with the diagnosis of small intestinal obstruction and treated from January 1, 2014 to December 30, 2016 were included without sampling.

4.6. Measurements and study variables

4.6.1. Data Collection instrument

The check list was developed by English language for gathering information such as age, sex, duration of presentation, admission diagnosis, intra operative finding, intra operative procedure done, ,causes of SBO, postoperative complications and management outcome of patients.

4.6.2. Study variables

4.6.2.1. Dependent variables:

- Management outcome (Final outcome after hospital stay)
- Post op complications

4.6.2.2. Independent variables:

- Age, Sex, Residence, Occupation
- Duration of illness
- Diagnosis at admission
- Post operative diagnosis
- Causes of SBO
- Complication before operation
- Previous history of intestinal obstruction
- Methods of patient management
- Intraoperative finding
- Intra operative Procedure done
- Duration of hospital stay

4.7. Data collection methods

For data collection three clinical nurses were trained outside of Nekemte referral Hospital staffs. The Principal investigator gave training for data collectors on how to fill the prepared checklist, the importance of data quality and the relevance of the study. One first degree holder health officer supervised the daily activity, consistency and completeness of the checklist and gave appropriate support during the data collection process. The Principal Investigator checked the daily activities of data collectors and supervisor. Patients that were admitted to surgical ward of Nekemte referral Hospital with the diagnosis of SBO and treated were initially identified from admission log-books of surgical wards and operation theater of Nekemte referral Hospital from which chart number of patients obtained. Then charts of the patients retrieved from card room. Relevant information was collected from these charts.

4.8. Data processing, analysis, interpretation and presentation

After data collected, it was coded, entered and cleaned using computer software SPSS windows version 20 & analyzed using descriptive statistics like Percentages, mean and standard for elementary data analysis. Data presented by frequency tables and figures. Association between management outcome of SBO and independent variables checked by using binary and multivariate logistic regression. On binary logistic regression a p-value ≤ 0.25 was used as a candidate for

multivariate logistic regression analysis. Statistical significant association was tested at a p-value of < 0.05 .

4.8.1. Data quality management

The prepared checklists in English were assessed and commented by research advisors. The facilitators and Supervisor were trained for two days. In order to avoid interpersonal variation between data collectors, data was collected by the same data collectors throughout the study period. Regular daily supervision was conducted for checking the consistency and completeness of the filled out checklists by the principal investigator. The filled checklists were counter checked for their completeness and consistency on every step of data collection. Before starting data analysis, completeness was rechecked again.

4.9. Ethical consideration

Ethical approval of the research proposal was obtained from the ethical review committee of Jimma University. A formal letter was written from the department of Integrated Emergency Obstetrics/Gynecology and surgery to the hospital administrator's office. The Hospital medical director permitted to conduct the study, the data was collected by review of the registration books using structured checklists. The filled checklists will be destroyed, some years after the study has finished. Until that, it will be kept carefully in the hand of the principal investigator.

4.10. Operational definitions

Intestinal obstruction: Intestinal obstruction is defined as failure of passage of intestinal contents.

Dynamic Intestinal obstruction: Obstruction caused by a physical barrier to the intestine internally or externally. It is also called as mechanical IO.

Adynamic intestinal obstruction: Intestinal obstruction caused by paralysis of the intestinal lumen.

Wound dehiscence: Is fascial disruption.

Non operative management: Management of patients with NGT suction, maintenance IV fluids & NPO.

Outcome of patient: Is condition of the patient upon discharge from the hospital.

4.11. Dissemination of results

The result of the study will be presented to Jimma university community as part of Master's in IEOS thesis defense; and it will be disseminated to Jimma University College of public health and medical science, department of Integrated Emergency Obstetrics/Gynecology and surgery. The result of the study will be disseminated to the study site and other concerned bodies. Further attempt will be made to publish it on national and international scientific journals.

5.Results

5.1.Sociodemographic characterstics

A total of 228 patients were admitted and managed for bowel obstruction from January 1/2014 to December 30/2016 and of whom 161 (70.7%) were SBO with 40 (24.8%) of them were aged 45-54 & another 40 (24.8 %) were aged 15-24 and with a mean age of 27.2 (sd±19.2) & the minimum age was 04 months & the maximum was 76 years and 104 (64.6 %) ,59 (36.6 %),43 (26.7%),109 (67.7 %) were males,illiterates,farmers & from rural area respectively.

Table 1: Socio-demographic characteristics of patients managed for small bowel obstruction in Nekemte referral hospital from January1, 2014 –December 30, 2016

variables	Frequency	percent	
Age	< 5 years	26	16.1
	5-14	24	14.9
	15-24	40	24.8
	25-34	11	6.8
	35-44	8	5.0
	45-54	40	24.8
	>=55	12	7.5
	Total	161	100.0
Sex	male	104	64.6
	female	57	35.4
	Total	161	100.0
Educational status	illitrate	59	36.6
	1-8	37	23.0

	9-12	14	8.7
	college & above	21	13.0
	others(pre school children)	30	18.6
	Total	161	100.0
Occupation	farmer	43	26.7
	merchant	7	4.3
	employee	18	11.2
	student	31	19.3
	house wife	32	19.9
	others(pre school children.....)	30	18.6
	Total	161	100.0
Residence	rural	109	67.7
	urban	52	32.3
	Total	161	100.0
Distance from hospital	<50 km	97	60.2
	>=50 km	64	39.8
	Total	161	100.0

5.2.General condition of the patient

Patients who were managed in a study period were 106 (65.8%) who came within 24 hours of manifestation, 119 (73.9 %) of the patients were with hct of >36% ,90 (55.9%) of them came with referral, 61 (37.9%) had previous abdominal operation & 56 (34.8%) of them were with pre operative complication; generalized peritonitis 44 (28.8%) being the commonest .

Table 2: Table 2: General condition of patients managed for small bowel obstruction in Nekemte referral hospital from January 1,2014 –December 30, 2016

variables		Frequency	Percent
duration of illness in hours before arrival	<24 hours	106	65.8
	>=24 hours	55	34.2
	Total	161	100.0
what was the Hct of the patient	>=36%	119	73.9
	<36%	23	14.3
	not determined	19	11.8
	Total	161	100.0
did the patient come with refferal	Yes	90	55.9
	No	71	44.1
	total	161	100.0
did the patient had previous abdominal operation	Yes	61	37.9
	No	100	62.1
	total	161	100.0
If yes to Q204,what was the previous indication for operation	SBO	12	7.5
	trauma	7	4.3
	LBO	9	5.6
	others(c/s,appendicitis ,perforated pud.....)	33	20.5
	Total	61	37.9
when was the previious operation	6 weeks-6 months	15	9.3
	> 6 months	46	28.6

	Total	61	37.9
Did the pt had preop complication	Yes	56	34.8
	No	105	65.2
	total	161	100.0

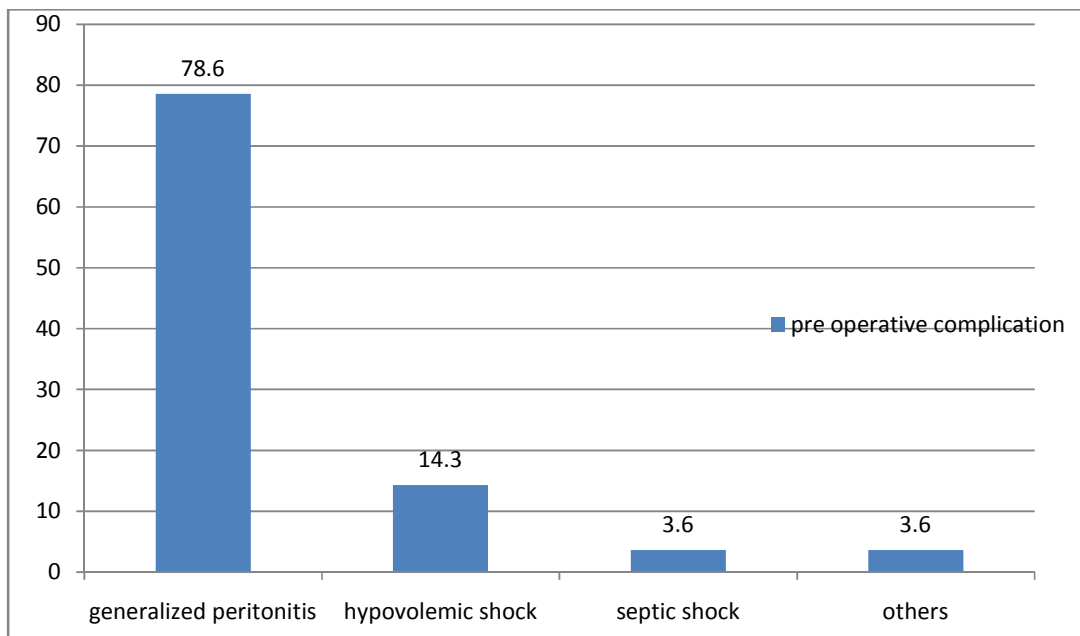


Figure 2: complications occurred pre operatively in patients admitted with a diagnosis of small bowel obstruction in Nekemte referral hospital since January 2014 to December 2016

5.3. Causes and management approaches of small bowel obstruction

In cases managed during the study period dynamic bowel obstruction 157 (97.5%) was the leading cause and adhesion, SBV, intususception 57 (37.3%), 40 (26.1%) & 34 (22.2%) being the

commonest intra operative findings respectively with resection and anastomosis 58 (37.9%) being the commonest procedure done to alleviate the obstruction.

Table 3: Causes and management approaches of patients managed for small bowel obstruction in Nekemte referral hospital from January 1, 2014 – December 30, 2016

variables		Frequency	Percent
type of intestinal obstruction	Dynamic	157	97.5
	Adynamic	4	2.5
	Total	161	100.0
pre operative anticipated cause of obstruction	hernia	6	3.7
	adhesion	61	37.9
	volvulus	47	29.2
	intussusception	34	21.1
	others(unspecified SBO,ISK,mesentric ischemia.....)	13	8.1
	Total	161	100.0
Mode of patient management	Laparotomy	153	95.0
	Conservative	8	5.0
	Total	161	100.0
If managed by laparotomy what was the intra operative finding	adhesion	57	35.4
	viable SBV	29	18.0
	Gangrenous SBV	11	6.8
	Intussusception	34	21.1

herniated small bowel	7	4.3
ascaris bolus	2	1.2
others	13	8.1
Total	153	95.0

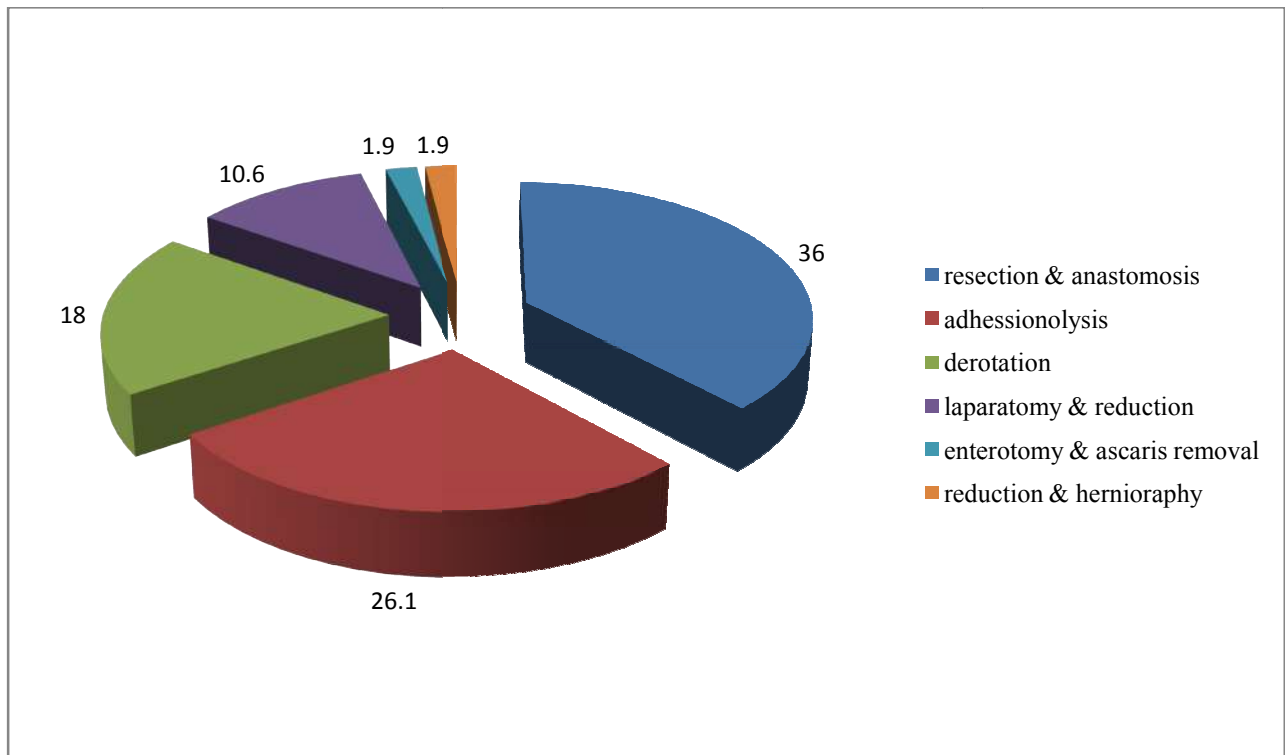


Figure 3: Intraoperative procedure done to relieve causes of small bowel obstruction in Nekemte referral hospital since January 2014 to December 2016

5.4. Management outcome

From a total of operated cases 38/153(23.6 %) developed post operative complication with SSI 18/38(47.4 %) being the most common complication,96(59.6 %) stayed in the hospital for less than seven days & 140/161(87 %) were improved and discharged.

Table 4: Management outcome of patients managed for small bowel obstruction in Nekemte referral hospital from January 1, 2014 –December 30, 2016

variables	Frequency	Percent	
Did the patient developed post op complication	yes	38	23.6
	no	115	71.4
	Total	153	95.0
duration of hospital stay in days	<= 7 days	96	59.6
	>7 days	65	40.4
	Total	161	100.0
Outcome	Improved & discharged(favourable outcome)	140	87.0
	Died(unfavourable outcome)	21	13.0
	Total	161	100.0

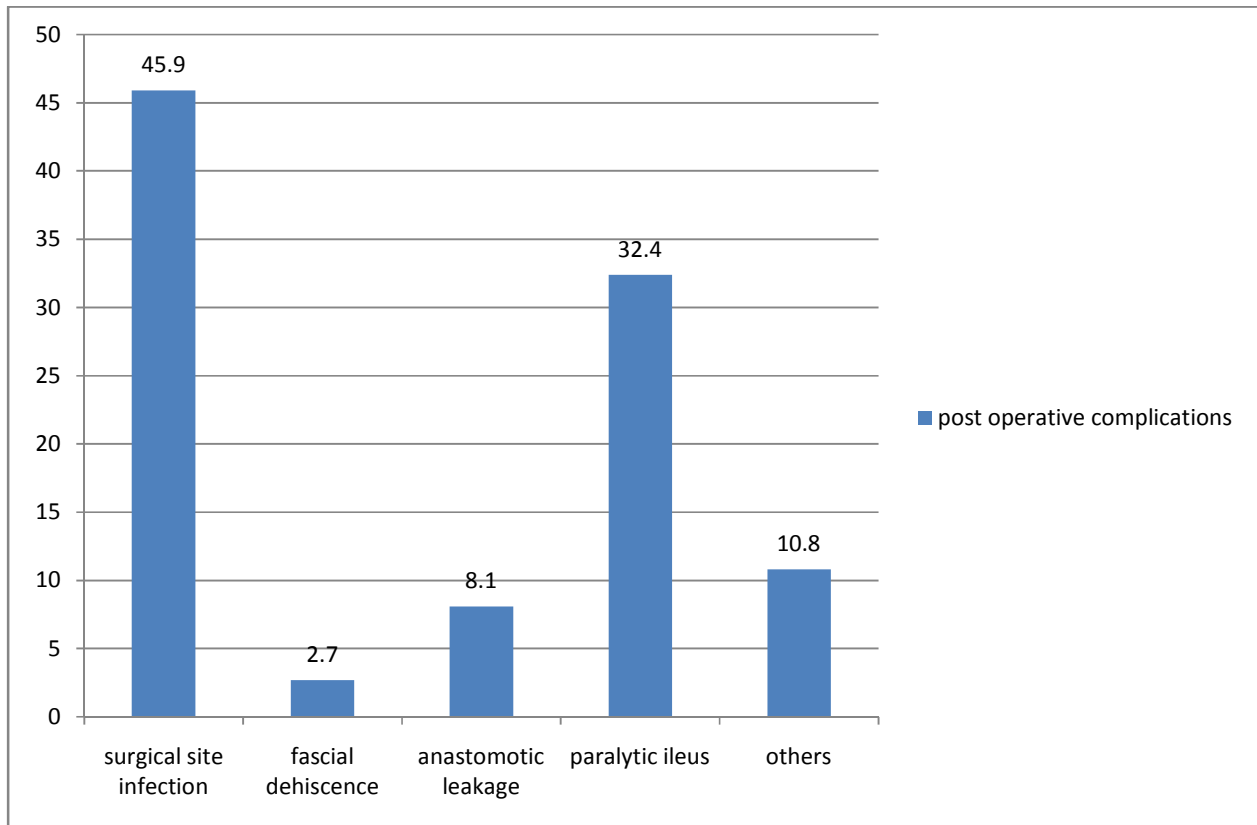


Figure 4: post operative Complications developed in patients managed for small bowel obstruction in Nekemte referral hospital since January 2014 to December 2016.

5.5. Factors associated with management outcome of intestinal obstruction

In the following table twenty two variables were analyzed using binary logistic regression. Out of these age, sex, educational status, duration of illness, hematocrit level, previous history of abdominal operation, pre operative complication, type of obstruction, intraoperative findings and length of hospital stay are candidates for multivariate analysis.

Table 5: Factors associated with management outcomes of small intestinal obstructions in Nekemte referral hospital from January 1, 2014 –December 30, 2016

Variables		Management outcomes		P-value	COR(95%CI)
		Favorable	Unfavorable		
Age	<5 years	24	2	.003**	.060(0.009-0.375)
	5-14 years	18	6	.056**	.238(0.055-1.039)
	15-24 years	39	1	.001**	.018(0.002-0.181)
	25-34 years	9	2	.060**	.159(0.023-1.077)
	35-44 years	7	1	.061**	.102(0.009-1.113)
	45-55 years	38	2	.000**	.038(0.006-0.234)
	> 55 years	5	7		
Sex	Male	100	4	.000**	.094(0.030-0.297)
	Female	40	17		
Educational status	Illiterate	48	11	.878	.917(0.302-2.778)
	1-8	34	3	.168**	.353(0.080-1.552)
	9-12	13	1	.298	.308(0.033-2.839)
	College & above	21	0	.998	.000
	Other(preschool children)	24	6		
Occupation	Farmer	37	6	.495	.649(0.187-2.248)
	Merchant	7	0	.999	.000
	Employee	18	0	.998	.000
	Student	27	4	.457	.593(0.149-2.354)

	House wife	27	5	.653	.741(0.200-2.740)
	Others	24	6		
Residence	Rural	93	16	.376	1.617(0.558-4.685)
	Urban	47	5		
Distance in km from hospital	< 50 km	86	11	.431	0.691(0.275-1.736)
	>= 50 km	54	10		
Duration of illness before presentation	< 24 hours	103	3	0.000**	0.060(0.017-0.215)
	>= 24 hours	37	18		
Hematocrit	>= 36 %	111	8	.189**	.384(0.092-1.601)
	< 36 %	13	10	.062**	4.103(0.931-18.082)
	Not determined	16	3		
Did the patient come with referral	Yes	79	11	0.728	.849(0.339-2.130)
	No	61	10		
Did the patient has previous abdominal operation	Yes	55	4	.082**	2.750(0.879-8.605)
	No	85	17		
If yes to the above question, what was the previous indication	SBO	10	1	.732	1.550(0.127-18.959)
	Trauma	6	0	.999	.000
	LBO	8	01	.607	1.937(0.155-24.156)
	Others	31	2		
When was the	< 6 weeks	0	0		

operation	6 weeks -6 months	13	1	.951	1.077(0.103-11.260)
	>6 months	42	3		
Did the patient develop pre operative complication	Yes	38	17	.000**	11.408(3.608-36.061)
	No	102	4		
If yes to the above question, what was the complication	Generalized peritonitis	32	12	.999	605804844.092
	Hypovolemic shock	4	4	.999	1211609688.185
	Septic shock	0	2	.999	29681542100.000
	Others	2	0		
Type of SBO	Dynamic	138	19	.054**	.138(0.018-1.036)
	Adynamic	2	2		
Pre operative anticipated causes of SBO	Hernia	5	1	.943	1.100(0.080-15.153)
	Adhesion	57	4	.304	.386(0.063-2.373)
	SBV	39	8	.889	1.128(0.209-6.101)
	Intususception	28	6	.854	1.179(0.206-6.753)
	others	11	2		
Mode of patient management	Laparatomy	132	21	.999	77454298.821
	conservative	8	0		
Intra operative	Adhesion	53	4	.100	.252(0.049-1.300)

finding	Viable SBV	28	1	.079**	.119(0.011-1.281)
	Gangrenous SBV	6	5	.253	2.778(0.481-16.034)
	Intususception	28	6	.673	.714(0.150-3.408)
	Herniated small bowel	5	2	.787	1.333(0.165-10.743)
	Ascaris bolus	2	0	.999	.000
	Others	10	3		
Procedure done	Resection& anastomosis	41	17	1.000	669828190.850
	Adhesionolysis	40	2	1.000	80773399.485
	Derotation	28	1	1.000	57695285.346
	Laparotomy & reduction	16	1	1.000	100966749.356
	Reduction& herniorraphy	3	0	1.000	1.000
	Enterotomy&worm removal	3	0	1.000	1.000
	others	1	0		
	total	132	21		
Duration of hospital stay	<= 7 days	94	2	.000**	19.413(4.336-86.925)
	> 7 days	46	19		

**-candidates for multiple logistic regression

5.6. Predictors of management outcome of small bowel obstruction

Numerous associations were found to be significant in the bivariate analysis. Therefore, a multivariate approach was applied to determine which factors best explained and predict management outcome of patients

The outcome of the final multiple logistic regression model indicated that educational status, hematocrit level, previous history of abdominal operation, type of obstruction, intraoperative finding & length of hospital stay were dropped from the final model. In this analysis age ranges between 45-54 has significant statistical association with management outcome of patients (AOR=0.001, 95%CI: 0.000-0.290, p-value=0.016), the minimum & maximum age was 04 months & 76 years with mean age of 27.2 years (sd±19.2) and also sex has significant statistical association with management outcome of patients (AOR=0.037, 95%CI:0.001-1.454, p-value=0.048). Female patients had higher 96.3 % poor management outcome as compared to male patients.

Duration of illness before surgical intervention has significant statistical association with management outcome of patients (AOR=0.069, 95%CI: 0.004-1.217, p-value=0.036). Patients who presented within 24 hours duration of illness are 92.1% less likely to develop unfavorable outcome as compared with patients who presented after 24 hours and pre operative complication has also statistically significant association with management outcome of patients (AOR=0.099, 95%CI: 0.013-0.782, p-value=0.028), indicating that Those patients who were with pre operative complication had 90.1% poor management outcome as compared to those without complication.

Table 6: Factors associated with management outcomes of small intestinal obstructions in Nekemte referral hospital from January 1, 2014 –December 30, 2016

variables		Favourable	Unfavourable	COR(95% CI)	p-value	AOR(95 % cI)
Age	<5 years	24	2	.060(0.009-0.375)	.999	.000
	5-14 years	18	6	.238(0.055-1.039)	.159	.007(0.000-7.022)
	15-24 years	39	1	.018(0.002-0.181)	.108	.015(0.000-2.519)
	25-34 years	9	2	.159(0.023-1.077)	.090*	.003(0.000-2.509)
	35-44 years	7	1	.102(0.009-1.113)	.999	.000
	45-55 years	38	2	.038(0.006-0.234)	.016*	.001(0.000-0.290)
	> 55 years	5	7			
Sex	Male	100	4	.094(0.030-0.297)	.048*	.037(0.001-1.454)
	Female	40	17			
Education al status	Illiterate	48	11	.917(0.302-2.778)	.999	.000
	1-8	34	3	.353(0.080-1.552)	.999	.000
	9-12	13	1	.308(0.033-2.839)	.999	.000
	College & above	21	0	.000	.998	.000
	(preschool children)	24	6			
Duration of illness before presentation	< 24 hours	103	3	0.060(0.017-0.215)	.036*	.069(0.004-1.217)
	>= 24 hours	37	18			

Hct	>= 36 %	111	8	.384(0.092-1.601)	.240	.114(0.003-4.273)
	< 36 %	13	10	4.103(0.931-18.082)	.210	12.540(0.240-656.448)
	Not determined	16	3			
Did the patient had previous operation	Yes	57	4	.343(0.110-1.071)	1.000	18667.854
	No	83	17			
Did the patient had pre operative complication	Yes	38	18	16.105(4.488-57.795)	.028*	0.099(0.013-0.782)
	No	102	3			
Type of obstruction	Dynamic	138	19	.138(0.018-1.036)	.999	.000
	Adynamic	2	2			
IOF	Adhesion	53	4	.252(0.049-1.300)	1.000	.002
	Viable SBV	28	1	.119(0.011-1.281)	.312	40.970(0.031-54956.604)
	Gangrenous SBV	6	5	2.778(0.481-16.03)	.170	199.574(0.104-384303.590)
	Intususception	28	6	.714(0.150-3.408)	.236	67.801(0.064-71912.716)
	Herniated small bowel	5	2	1.333(0.165-10.74)	.187	196.450(0.078-497028.117)
	Ascaris bolus	2	0	.000	1.000	.000
	Others	10	3			
Hospital stay	<= 7 days	94	2	.052(0.012-0.231)	.463	.254(0.007-9.884)
	> 7 days	46	19			

NB- *statistically significant

6.DISCUSSION

Acute bowel obstruction presents as a frequently encountered emergency in hospitals throughout the world, accounting for a great proportion of emergency room visits. This poses a challenge to the surgical trainee. Its treatment requires careful pre-operative preparation, good surgical judgement and technique and post-operative care which are often very demanding(3,4). This hospital based study has tried to address prevalence of causes and management outcome of intestinal obstruction in Nekemte referral hospital. Accordingly, some of the common causes and its management outcome in the hospital were identified with their Prevalences.

In this study small intestinal obstruction was common at both extremes of age; in the age group <14 years 50(31%) and >45 years 52(32.3%), another peak incidence was observed in the age group of 15-24 years 40(24.8%), the age ranged from 04 months to 76 years of age and with mean age of 27.2 years(standard deviation \pm 19.2).Age range from 45-54 had significant statistical association with management outcome of patients(AOR=0.001,CI:0.000-0.290,P-value=0.016).This is consistent with study conducted in Larkana (1).

The study shows small intestinal obstruction is more prevalent in males; 105 (65.2%) than females; 56 (34.8%) and with male to female ratio of 1.9:1.This is comparable with other studies (1,3,7, 13,19, 20).Sex had a statistical significant association with management outcome of patients(AOR=0.037,CI:0.001-1.454,P-value=0.048).Females are with 96.3 % higher mortality rates as compared to males.

When we see the educational status & occupation of the patients majority of them were illiterates 59(36.6%),those who learned one to eight 37(23 %),college and above 21(13%) & farmers 43 (26.7 %),house wives 32(19.9%) and 31 (19.3 %) were students and which is similar with a study done in GUH and gonder region,north western Ethiopia(7,12).

More than two thirds 109(67.7%) of patients with small intestinal obstructions were from rural and 1/3 was from urban residence,which is consistent with a study done in Sudan, GUH & Nigeria (4,7,8) respectively.

About 80 years ago, Mr. Hamilton Bailey used to say: “*The sun should not both rise and set on unrelieved case of intestinal obstruction*”. With early diagnosis and prompt appropriate management, most of patients suffering from intestinal obstruction can be saved. The situation is quite very different most of the time. Some patients come after subjecting themselves to relatively long periods of observation. They usually present to us when they really feel very sick(3).In this study 106(65.8 %) of patients presented within 24 hours duration of illness while 55(34.2%) presented after 24 hours but study in Rwanda shows 78.1% presented after 24 hours while 21.9% presented within 24 hours.Delayed presentation and/or surgical intervention frequently results in relatively poor surgical outcome and/or longer hospital stay. Reasons for delay may include poverty, long distance to care centers, poor infrastructure and health seeking

behavior(3,5,7). In this study Duration of illness before surgical intervention has significant statistical association with management outcome of patients (AOR=0.069, 95%CI:0.004-1.217, p-value=0.036). Patients who presented within 24 hours duration of illness are 93.1% less likely to develop unfavorable outcome as compared with patients who presented after 24 hours.

This study also showed majority of the cases 119(73.9 %) were with hematocrit of ≥ 36 % & majority of patients 90 (55.9 %) were with referral but most of the poor outcomes were with hematocrit level of < 36 % 10(6.2 %) as compared to hematocrit level ≥ 36 % 8(4.9 %) which is consistent with a study done in GUH(7).

This study also shows mechanical small intestinal obstruction as the most common small bowel obstruction which was about 157(97.5%) whereas adynamic obstruction was 4(2.5%) which is consistent with most of study conducted in Africa (1,2,18) but study in Pakistan shows paralytic ileus accounted 39.6%(2).

According to this study the common causes of small bowel obstruction were mostly due to intestinal adhesions in 57(35.4%) followed by small bowel volvulus in 40(24.8%) ,intussusception in 34(21.1%), obstructed/strangulated hernia in 6(4.3%), ascaris bolus in 2(1.2%) and others like ileosigmoid knotting, intestinal TB,mesenteric ischemia & foreign body in 13(8.1 %) cases which is consistent with studies done in Pakistan and Nigeria with prevalence of adhesion 94(41 %) & 44 % respectively(5,11) & the study is in contrary with study conducted in Western Sudan which shows obstructed/strangulated hernia(35.6%),Adhesion(18.2%),SBV (6%) and intussusception(2%)(4).The study conducted in Rwanda shows the three leading causes of obstruction included hernias (31.4%), intussusception (21%) & adhesions(17.1%) in this series . Hernias are a leading cause of obstruction in most African centers which may be caused by the paucity of surgical services in the region (3) & it is also contrary to a study done in Iraq with hernia(38 %),adhesion (25 %),neoplasm (15.2%),volvulus (8.6%) & intussusception (5.4%) of prevalence but in this study adhesion is the most common cause of SBO with the previous indication of SBO in 7.5 %,trauma in 4.3 % ,LBO in 5.6 % & others like appendicitis,caserean delivery ,perforated peptic ulcer disease in 20.5 % and this may be due to nowadays more abdominal operations are being performed and therefore the incidence of post operative adhesion is increasing.At the same time more and more patients having their hernias repaired electively and are therefore in little danger of subsequent obstruction (19) .

Laparotomy was the most common method of small intestinal obstruction management in this study 153(95%) & 8(5%)improved by conservative management.The outcome of laparotomy may be affected by different factors. Some of these factors may include the cause of obstruction, duration of illness, age, presence of peritonitis and complication detection time.

There are no studies in Ethiopia and other countries which describe the common finding of intestinal obstruction intraoperatively. In Nekemte referral hospital the most common intraoperative findings were Adhesion & bands 57(35.4%) followed by SBV (viable 29 & gangreneous 11) 24.8% and intussusception 34(21.1%).

The most commonly done intraoperative procedure was resection and anastomosis in 36% for gangreneous small bowel, 26.1 % adhesionolysis & band release, 18 % derotation & decompression for viable SBV, 10.6% manual reduction for intussusception, 1.9% each enterotomy & worm removal & reduction & herniorrhaphy which is in contrary to studies done in Gonder with derotation and decompression performed in 71(71.4%)& resection and anastomosis in 27(27.6%)(13) and in a study conducted in Larkana 21.6 % ileostomy, 8.3 % adhesionolysis, 16% resection & anastomosis(1).

This study shows Post operative complication developed in 38(23.6%) of totally operated patients where as 115(76.4%) were without any complications. The most commonly occurred postoperative complications were wound infection 17(45.9%)& most of the post op complications were with cases who present late, those who were with pre operative complications & with hematocrit level of less than thirty six percent & which is consistent with a study conducted in Tanzania in 38.8 % and in contrary to studies done in Larkana, Pakistan, GUH and Gondar with prevalence of 15.83%, 15%, 20.6% & 16.3% respectively(1,5,7,13).

In this study majority of the patients 96(59.6 %) stayed in the hospital for less than or equal to seven days and 65(40.4%) of the patients stayed for more than seven days. But mortality were higher in those who stayed more than seven days in 29.2 % of cases whereas it was 2 % for those who stayed lower.

One hundred forty (87%) patients improved and discharged after they got service in the hospital whereas 21(13%) died after operated and the result is comparable with studies done in Nigeria 14%(11), Gondar 13.3%(13), Sudan 15.7%(16)& Tanzania 14.3%(20) but a Study done in Larkana, Pakistan and Iraq show overall mortality rate of 6.6%, 3.49% & 4.3% respectively (1,5,19). This difference in mortality rate may be associated with late duration of patients' illness to hospital due to lack of awareness about the burden and impacts of the problem. The reason for higher mortality rate in Nekemte referral hospital may be due to late presentation of patients, pre operative complications and inadequate preoperative resuscitation which can decrease mortality rate.

Limitation of the study

Some information on the patients chart was incompletely documented and some hand writings were difficult to interpret. The study was relatively time consuming for getting charts. The lost or missed charts were excluded during the study period.

7. CONCLUSION AND RECOMMENDATION

7.1. Conclusion

Small intestinal obstruction is a commonly encountered surgical emergency. It can affect subjects of any age. It is more prevalent in males than females. Its causes are variable in different parts of the world. Adhesion, small bowel volvulus & intussusception were the leading causes of small bowel obstruction respectively. Laparotomy is the most common means of intestinal obstruction management. Bowel resection and anastomosis is the commonest intra operative procedure done. The most commonly encountered postoperative complications were wound infection.

7.2. Recommendation

Bowel resection and anastomosis should be decreased as much as possible because it is mostly associated with postoperative complication. This can be achieved by appropriate early diagnosis and intervention before intestine develops gangrene.

Wound infection in the study area should be improved because it is the most common postoperative complication in the area. This can be decreased by appropriate surgical technique and wound care with sterile techniques. Government and other concerned body should be involved on this by improving the sanitation of the hospital.

Peoples should be advised to seek health care service on time before complication occurs if they have symptoms of intestinal obstruction because late cases are very fatal. This can be achieved by increasing public awareness on intestinal obstruction by giving them health education.

Further research with prospective study should be conducted in the study area because this study is retrospective study and difficult to generalize to the whole population due to limitations of secondary data.

Record keeping in the hospital must be improved because some hand writings were not readable and some charts were lost.

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ANNEX 1: CHECKLISTS

Checklists for data collection on the retrospective cross sectional study of prevalence, causes and management outcome of small intestinal obstruction among patients admitted with a diagnosis of SBO at Nekemte referral Hospital.

Card No. _____ Code: _____

PART I: Socio-demographic characteristics

No.	Questions	Categories
NO	QUESTIONS	
1	Age	
2	Sex	1.Male 2.Female
3	Educational status	1.Illiterate 2.1-8 3.9-12 4.College and above 5.Others
4	Occupation	1.Farmer 2.Merchant 3.Employee 4.Student 5.house wife 6.Others

5	Residence	1.Rural 2.Urban 3.Not mentioned
6	Distance from hospital in km	

PART II: General Condition of the patient

No.	Questions	Categories
1	Duration of illness in hours before arrival	
2	What was the Hct of the patient?	
3	Did the patient come with referral	1. Yes 2. No
4	Did the patient have previous history of abdominal operation?	1.Yes 2 No
5	If question above is yes, A) What was indication for previous operation?	1 Small bowel obstructions 2. Trauma 3.Large bowel obstructing 4. Other specify
	B) When was the previous operation	1. < 6wks 2. 6wk – 6 month 3. > 6 month
6	Did the patient develop complication before operation?	1. Yes 2. No
	If the above question is yes, what was the complication?	1. Generalized peritonitis 2. Hypovolomic shock 3. Septic shock 4. Other specify

Part III: causes of obstruction and management

No	Question	Category
1	Type of intestinal obstruction	1.Dynamic intestinal obstruction 2.Adynamic intestinal obstruction
2	Pre operatively anticipated Causes of obstruction	1. Hernia 2. Ascaris bolus 3. Adhesion 4. Volvulus 5. Other
2	What was mode of patient management?	1.Laparotomy 2.Conservative
3	If managed by operation (laparotomy) what was an Intra operative finding?	1. Adhesion 2. Small bowel volvulus(viable) 3. Gangrenous SBV 4. Intussusception 5) Others(specify)_____
4	If operated what Procedure was done Intraoperatively?	1.Resection and .anastomosis 2.Adhessionolysis 3.Derotation(untwisting) 4.Iliostomy 5.Laparotomy &reduction 6.Others(specify)_____

Part IV: Outcome of the patient

No	Question	Category
1	Post op complication developed?	1.Yes 2.No
2	If question above is yes, what postoperative complication developed?	1.Surgical site infection-superficial/deep 2.Facial dehiscence 3.Anastomotic leakage 4.Paralytic ileus 5.Others(specify)_____
3	Duration of patient stay in hospital in days	
4	Outcome of the patient	1.Improved and discharged (favorable outcome) 2.Discharged the same 3.Referred 4.Died (unfavorable outcome)

DECLARATION

I the undersigned,declared that this thesis is my original work,has not been presented for a degree in this or any other university and that all sourcesofr materials used for the thesis have been fully acknowledged.

Declared by:Berhanu Getahun

Date:_____ Signature:_____

This thesis has been declared forfinal submission with my approval internal examiner and university advisors

Name of internal examiner:-----

Date -----signature-----

Name of the first advisor: Dr Mahilet Tesfaye(MD,Cardiothoracic surgeon,Assistant professor of surgery)

Date:_____ Signature:_____

Name of the second advisor:Mr. Geremew Muleta(MSc,Assistant professor of biostatstics)

Date:_____ Signature:_____