



Assessment of Knowledge, Attitude, and Practice Regarding Enhanced Recovery After Surgery Colorectal Protocols Among Selected Healthcare Professionals at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia (2024)

Training programme in General surgery. Thesis to be submitted to the school of medicine and health sciences, department of surgery for partial fulfillment of the requirements of speciality

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Statement of declaration

I hearby state that this research is my own original work as a partial fulfillment of the requirement for the speciality certificate training in General surgery. I have made no ethical breaches and all sources for this paper are acknowledged and references sited.

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Acronyms and Abbreviations

ERAS: enhanced recovery after surgery

TASH/TAH: tikur anbesa specialized hospital

ZMH: zewditu memorial hospital

R3: 3rd year resident

R4: 4th year resident

Postop: post operative

LMIC: low-middle income countries

HMI: high income countries

LOS: length of hospital stay

MBP: mechanical bowel preparation

Research project submission form

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Abstract

Background: Enhanced Recovery After Surgery (ERAS) colorectal protocol has demonstrated significant benefits in improving surgical outcomes and reducing complications. However, there is limited data on the awareness, attitude, and practice of ERAS among healthcare professionals in Ethiopia.

Objective: To evaluate the knowledge, attitude, and practice (KAP) of healthcare providers regarding ERAS colorectal protocols at Tikur Anbessa Specialized Hospital (TASH) and Zewditu Memorial Hospital (ZMH).

Methods: A descriptive cross-sectional study was conducted among 112 healthcare professionals. Data were collected using a structured questionnaire and analyzed using SPSS. Logistic regression was employed to identify factors associated with good KAP.

Results: Among participants, 78.6% demonstrated good knowledge, 82.1% had a positive attitude, but only 50.8% adhered to good practices. Nurses and professionals aged 31–35 years exhibited lower practice adherence. Lack of resources (34.9%) and insufficient training (30.9%) were the primary barriers to ERAS implementation. Logistic regression revealed that gender, years of experience, and hospital affiliation significantly influenced knowledge and practice.

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1. Introduction

1.1 Background

In recent years, the focus in the surgical field has been on improving patient outcomes and reducing postoperative complications. In this context, Enhanced Recovery After Surgery (ERAS) protocols, first introduced in 2005, emerged as a promising multidisciplinary approach aimed at optimizing perioperative care and expediting the recovery process for patients undergoing surgery.

In colorectal surgery, traditional perioperative care pathways often involve prolonged fasting, bowel preparation, and limited mobility. ERAS colorectal protocol, on the other hand, advocate for a patient-centered approach to improve surgical outcomes.

The core principles of ERAS encompass various aspects of the perioperative journey, including preoperative, intraoperative, and postoperative care. **Preoperative components** emphasize patient education, nutritional & chronic illness optimization, limited bowel preparation and avoidance of prolonged fasting. **Intraoperative elements** focus on minimizing surgical stress through minimally invasive techniques, limiting the use of drains, multimodal opioid sparing pain management, maintaining normothermia, and short acting anesthetic agents for general anesthesia. **Postoperative** care within ERAS emphasizes early mobilization, post op nausea& vomiting management, optimal pain management, and a rapid return to oral nutrition.

1.2 Statement of the Problem

Despite the globally growing recognition of ERAS colorectal protocols as effective in improving perioperative outcomes in colorectal surgery, there is limited understanding of the extent to which these protocols are applied in Ethiopia. Furthermore, there is a lack of knowledge regarding the level of awareness, and attitudes of healthcare professionals toward ERAS colorectal protocols, which may contribute to inconsistencies in their implementation. Specifically, within the context of TASH and ZMH in Addis Ababa, Ethiopia, there is insufficient information regarding the level of KAP of healthcare professionals toward ERAS colorectal protocols. This gap in both practice and professional understanding may hinder efforts toward the potential full adoption of the ERAS colorectal protocol in these hospitals.

1.3. Significance of the study

This study is essential to understanding the current level of knowledge, attitude, and practice regarding ERAS colorectal protocol among selected healthcare providers in TASH and ZMH. Identifying the barriers of ERAS implementation will provide valuable insights into how to increase the extent of application of this protocol thereby improving perioperative care and outcomes in colorectal surgery at TASH and ZMH. The findings of this research are expected to inform future initiatives aimed at improving ERAS adoption in Ethiopia.

2. Literature review

ERAS is an evidence-based perioperative care protocol designed to mitigate the physiological and psychological stress of surgery. Its objectives include achieving faster functional recovery, reducing postoperative complications, and facilitating earlier hospital discharge, thereby lowering overall hospital costs (1,2,3). ERAS protocols involve interventions across the preoperative, intraoperative, and postoperative periods.

ERAS protocols recommend MBP only for individuals undergoing low anterior resection. This is based on the understanding that routine MBP may not contribute significantly to reducing complications, such as anastomotic leakage or wound infection, in most colorectal surgeries. (3) A systematic review done by K.F.Guanega et al (2003), regarding the effectiveness of the use of mechanical bowel preparation before elective colorectal surgery in reducing the incidence of postoperative complications concluded that the results failed to support the hypothesis that bowel preparation reduces anastomotic leak rates and other complications. (4)

Similarly, a randomized prospective trial on mechanical bowel preparation versus no preparation before colorectal surgery, carried out by Saha AK et al (2014), showed that there was no statistically significant difference between the two groups, suggesting that the omission of MBP does not impair healing of colonic anastomosis, neither increases the risk of leakage. (5)

Traditionally, peritoneal and pelvic drains have been commonly used in surgeries to evacuate or prevent blood or serous collections and to prevent or detect anastomotic leakage. However, findings from various meta-analyses have not shown any significant benefit in leaving a drain for both colonic and rectal surgeries. (6,7,8). Therefore ERAS suggests that routine drainage may not contribute significantly to improved outcomes and may not be necessary in many cases. The decision to use drains should be based on individual patient factors, the types of surgery performed and the surgeon's judgement.

Early oral feeding has been shown to be safely tolerated by up to 90% of patients within 24 h postoperatively(9). Hence, ERAS protocols recommend early enteral feeding initiation. Results from

a meta-analysis of RCTs by Shu XL et al(2016) show that early enteral nutrition within 12-24hrs for patients with digestive tract surgery improves the nutritional status, promotes the functional recovery of digestive system and reduces the risk of postoperative complications. In addition, oral feeding as early as 4hrs has been shown to be safe. (10)

Numerous studies have investigated the impact of ERAS protocols on colorectal surgery outcomes. A Randomized controlled trial done in Norway by Forsmo et al published in 2016, which included 154 patients in the ERAS care group and 153 patients in the standard care group, demonstrated a significantly shorter total hospital stay (THS) among patients treated with ERAS care compared to those receiving standard care after colorectal surgery. Specifically, patients in the ERAS group had a median THS of 5 days (range: 2 – 50), whereas those in the standard care group had a median THS of 8 days (range: 2 – 48), with a p-value of 0.001. Additionally, the study revealed no significant differences between the two treatment groups regarding mortality, major or minor morbidity, reoperations, or readmissions. (11)

In a meta-analysis by Zhuang CL et al 2013 that included thirteen studies and a total of 1,910 patients, ERAS programs were compared to traditional care for patients undergoing colorectal surgery. The analysis revealed that ERAS programs were associated with significant benefits compared to traditional care, including decreased primary hospital stay, total hospital stay and general complications(including cardiac, respiratory, thromboembolic, urinary tract, and other nonsurgical complications). However, no significant differences were found for readmission rates, surgical complications, and mortality. (12)

Similarly, in recent prospective study in South Africa conducted by R Oodit et al examining 457 patients undergoing colorectal surgery (2015 – 2019), a median hospital stay of 5 days was recorded, with 44% experiencing complications. Notably, higher intraoperative compliance was associated with shorter hospital stays ($\beta = 0.987$) and reduced complications (OR 0.457). Furthermore, laparoscopic surgery was found to predict shorter stays ($\exp[\beta] = 0.667$) and fewer complications. These findings underscore the critical role of intraoperative compliance and surgical approach in optimizing post-operative outcomes for colorectal surgery patients. (13)

In addition, a recent systematic review by Turaga et al (2023) demonstrated a consistent trend across multiple studies regarding various outcome measures. Regarding Length of Hospital Stay, data from 17 studies revealed a significant reduction in hospital stay duration with the implementation of ERAS protocols. The pooled analysis indicated a mean difference of -1.64 days between ERAS and control groups, suggesting a substantial decrease in hospitalization time (95% CI -2.21 to -1.08, $p < 0.00001$). Similarly, Postoperative complications were notably reduced with ERAS protocols, as reported in 18 studies. The pooled analysis demonstrated an odds ratio of 0.57, signifying a significant decrease in complications among patients undergoing ERAS compared to traditional care (95% CI 0.46 to 0.71, $p < 0.00001$). Moreover, ERAS protocols facilitated quicker recovery milestones. Time to First Bowel Movement was notably reduced in seventeen studies, with a pooled analysis revealing a mean difference of -0.74 days, indicating faster recovery in this aspect with ERAS (95% CI -1.03 to -0.45, $p < 0.00001$). Furthermore, Time to First Mobilization and Time to First Oral Intake were expedited with ERAS protocols, as evidenced by eleven and twelve studies, respectively. Pooled analyses indicated mean differences of -0.55 days and -0.62 days, respectively, highlighting accelerated recovery in these domains with ERAS ($p < 0.0001$ for mobilization, $p = 0.0003$ for oral intake). (14)

To assess the global applicability of ERAS, Slim et al. conducted a systematic review and meta-analysis in 2023, comparing the utilization and efficacy of ERAS colorectal protocols in both high-income countries (HIC) and middle-to-low-income countries (LMIC). The study revealed significant variability in the structure, implementation, and outcomes of ERAS between HICs and LMICs. Notably, lack of certain less affordable elements, such as multimodal non-opioid analgesia,

transverse abdominis plane block, and minimally invasive surgery, were identified as contributing factors to a prolonged length of hospital stay (LOS) in LMICs, with a reported median LOS of 9 days (IQR 7-13) in LMICs compared to 5 days (IQR 4-7) in HICs. Despite resource constraints, the analysis found no discernible difference in complications and mortality rates following the application of ERAS in HICs and LMICs. This suggests that, even in settings with limited resources, ERAS can be effectively implemented without compromising patient safety. The study underscores the importance of tailoring ERAS protocols to the specific economic and healthcare contexts of different regions while highlighting key elements that can be adapted to ensure successful outcomes globally. (15)

However, despite these positive trends, and the indication that ERAS can safely be applied in LMICs, a comprehensive understanding of the application and effect of ERAS colorectal protocol in Ethiopia is notably absent in the literature.

A relatively recent study by Getu Ashagre (2021) assessed the knowledge, attitude, and practice (KAP) of the ERAS protocol among healthcare professionals at TASH. The study found that while most anesthesiologists and surgeons had good knowledge (90.7%) and positive attitudes (85% and 83%, respectively) towards ERAS, nurses showed lower levels of knowledge (21%) and attitude (15%). Practice adherence was also lower among nurses (36%) compared to anesthesiologists (70%) and surgeons (58%). The study recommended targeted training for nurses and those with over five years of experience, as well as a multidisciplinary approach to enhance ERAS implementation. (16)

The present study aims to build upon these insights by assessing how the KAP levels have evolved over the past three years. Specifically, this research will investigate whether there has been an increase in ERAS colorectal-related practices among healthcare professionals, and whether the KAP levels have improved since Ashagre's study. Furthermore, the study will explore the KAP levels in ZMH to provide a broader perspective on the implementation of ERAS colorectal protocol across different settings.

3. Objectives of the Study

General Objective:

- To evaluate the knowledge, attitude, and practices (KAP) of healthcare providers regarding ERAS colorectal protocol at TASH and ZMH.

Specific Objectives:

- Assess the baseline knowledge on ERAS colorectal protocol among colorectal surgeons, colorectal fellows, general surgeons, general surgery residents, anesthesiologists, anesthesiology residents, anesthesiologists and nurses involved in the management of colorectal patients in TASH and ZMH
- Evaluate the attitudes of the above mentioned healthcare providers toward the adoption of ERAS protocols in colorectal surgery
- Analyze the current practices of these healthcare providers related to ERAS colorectal protocol
- Identify barriers to the implementation of ERAS colorectal protocol in TASH and ZMH

4. Methods and materials

4.1 Study Area and Period:

The study is conducted at TASH and ZMH in Addis Ababa, Ethiopia, between September 2024 and November 2024

4.2 Study Design:

A descriptive cross-sectional survey design is used, which allows for the collection of data at a single point in time to assess the KAP of healthcare providers involved in management of colorectal surgery patients at TASH and ZMH

4.3. Source population

All colorectal surgeons, colorectal fellows, general surgeons, general surgery residents, anesthesiologists, anesthesiology residents, anesthetists and nurses working at TASH and ZMH general surgery wards, OR and ICU

4.4 Study Population:

The study targets general surgeons, colorectal fellows, senior general surgery and anesthesiology residents, anesthesiologists, colorectal surgeons, anaesthetists and nurses involved in colorectal surgeries at TASH and ZMH during the study period

4.5 Study unit and study tool

Healthcare personnel and structured questionnaire

4.6 Sample Size:

The total number of healthcare providers eligible for participation is 141 (24 senior general surgery residents, 23 senior anesthesiology residents, 8 general surgeons, 5 colorectal fellows, 10 anesthesiologists, 5 colorectal surgeons, 28 anesthetists and 38 nurses). Sample size calculated using formula for finite population of 141 people with 95% confidence level and 5% margin of error is approximately 104. This sample size is expected to provide sufficient data for analysis, considering the target population.

$$n = \frac{N \cdot Z^2 \cdot p \cdot (1-p)}{E^2 \cdot (N-1) + Z^2 \cdot p \cdot (1-p)}$$

Where:

- n = required sample size
- N = population size (141)
- Z = Z-value (for 95% confidence, Z=1.96)
- p = estimated population proportion (50%)
- E = margin of error (5% or 0.05)

$$n = \frac{141 \cdot (1.96)^2 \cdot 0.5 \cdot (1-0.5)}{(0.05)^2 \cdot (141-1) + (1.96)^2 \cdot 0.5 \cdot (1-0.5)}$$

4.7 Sampling Technique:

Consensus method is used and questionnaire sent to all eligible health care providers who are available during the study period.

4.8 Data Collection:

Data is collected using a structured questionnaire made on google forms that includes socio-demographic variables and questions to assess knowledge, attitude, and practice regarding ERAS colorectal protocol. The questionnaire was distributed to the selected healthcare providers via telegram, and responses were collected anonymously to ensure confidentiality.

4.9 Data Entry and Analysis:

Data was transformed to excel from google forms then analyzed using SPSS version 30. Descriptive statistics is used to summarize the sample characteristics. Frequencies and percentages are calculated for categorical variables. Logistic regression is used to assess the association

between good knowledge, attitude, practice and participants' work experience, professional status, gender, age and hospital affiliation.

4.10 Ethical Considerations

Ethical approval is obtained from the department of general surgery, school of medicine, addis ababa university

4.11 Eligibility criteria

Inclusion criteria: All colorectal surgeons, colorectal fellows, general surgeons, anesthesiologists, anesthetists, nurses, R3 anesthesiology residents, R3&4 general surgery residents who work in the management of colorectal patients at TASH and ZMH during the study period

Exclusion criteria: professionals who are not directly involved in colorectal surgery or perioperative care & those that have not filled the questionnaire

4.12 Study variables

4.12.1 Dependent variables

Knowledge, attitude and practice of ERAS colorectal protocol

4.12.2 Independent variables

- Age
- Gender
- Professional status
- Years of experience
- Hospital affiliation

4.13 Operational definitions

Good knowledge: answers above 75% of the knowledge questions

Good attitude: answers above 75% of the attitude questions

Good practice: answers above 75% of the practice questions

Poor knowledge/attitude/practice: below 75% of the respective questions

4.14 Result dissemination

The study result will be submitted to the department of surgery, school of medicine, Addis ababa university.

5. Results:

5.1 Descriptive Analysis

Of the 141 eligible participants who were asked to fill out the questionnaire, 112 successfully responded which met calculated sample size requirement. A descriptive summary of the participants' characteristics and their combined scores of knowledge, attitude, and practice has been presented in Table 1. The distribution of the scores is left skewed (Figure 1), with more participants lying above the mean. Hence, median and interquartile range (IQR) were used as summary statistics.

Table 1: Description of participant characteristics along with summary statistics of combined and separate scores. All participants were found to have good attitude

Characteristics (Independent Variables)	Frequency count (n)	Frequency Percentage(%)	Good Knowledge (percentage)	Good Practice (percentage)	Good Attitude (percentage)
Age Group (Years)					
25-30	34	30.4	30 (34.09%)	22 (38.60%)	29 (31.52%)
31-35	59	52.7	43 (48.86%)	21 (36.84%)	48 (52.17%)
36+	19	15	15 (17.05%)	14 (24.56%)	15 (16.30%)
Gender					
Male	64	57.1	48 (54.55%)	34 (59.65%)	52 (56.52%)
Female	48	42.9	40 (45.45%)	23 (40.35%)	40 (43.48%)
Educational Status					
Colorectal Surgeon & Fellow	8	7.2	6 (6.82%)	5 (8.77%)	7 (7.61%)
General Surgeon	7	6.3	7 (7.95%)	6 (10.53%)	5 (5.43%)
Anaesthesiologist	8	7.1	8 (9.09%)	6 (10.53%)	6 (6.52%)
Anaesthetist	16	14.3	11 (12.50%)	9 (15.79%)	15 (16.30%)
Surgery Resident	24	21.4	22 (25.00%)	9 (15.79%)	23 (25.00%)
Anaesthesiology Resident	20	17.9	16 (18.18%)	10 (17.54%)	15 (16.30%)
Nurse	29	25.9	18 (20.45%)	12 (21.05%)	21 (22.83%)
Years Of Experience					
1-2	4	3.6	3 (3.41%)	3 (5.26%)	3 (3.26%)

3-4	58	51.8	50 (56.82%)	27 (47.37%)	51 (55.43%)
5-8	38	33.9	28 (31.82%)	19 (33.33%)	30 (32.61%)
More Than 8	12	10.7	7 (7.95%)	8 (14.04%)	8 (8.70%)
Hospital Affiliation					
Tikur Anbesa Specialized Hospital	40	35.7	34 (38.64%)	21 (36.84%)	33 (35.87%)
Zewditu Memorial Hospital	41	36.6	27 (30.68%)	23 (40.35%)	30 (32.61%)
Both	31	27.7	27 (30.68%)	13 (22.81%)	29 (31.52%)
Total Participants	112	100	88 (100%)	57 (100%)	92 (100%)

The majority of participants (52.7%, n = 59) are aged 31-35, with fewer participants in the older age groups (14.3% in 36-40 and 2.7% above 41). Male participants (57.1%, n = 64) are slightly more than female (42.9%, n = 48) and Nurses (25.9%, n = 29) and surgery residents (21.4%, n = 24) make up the largest groups, followed by anaesthesiologists (17.9%, n = 20). Most participants have 3-4 years of experience (51.8%, n = 58), followed by those with 5-8 years (33.9%, n = 38). 35.7% (n = 40) of the participants practice at Tikur Anbesa specialized hospital only and 36.6% (n = 41) practice at Zewditu memorial hospital, while 27.7% (n = 31) work at both hospitals.

Table 2: frequency of perceived possible barriers to ERAS colorectal implementation

Barriers to Eras colorectal protocol implementation	Frequency (n)	% of responses	% of cases
Lack of resources	97	34.9%	86.6%
Insufficient training	86	30.9%	76.8%
Perceived risk of complications	55	19.8%	49.1%
Resistance from colleagues	40	14.4%	35.7%
Other	-	-	-
Total	278	100%	248.2%

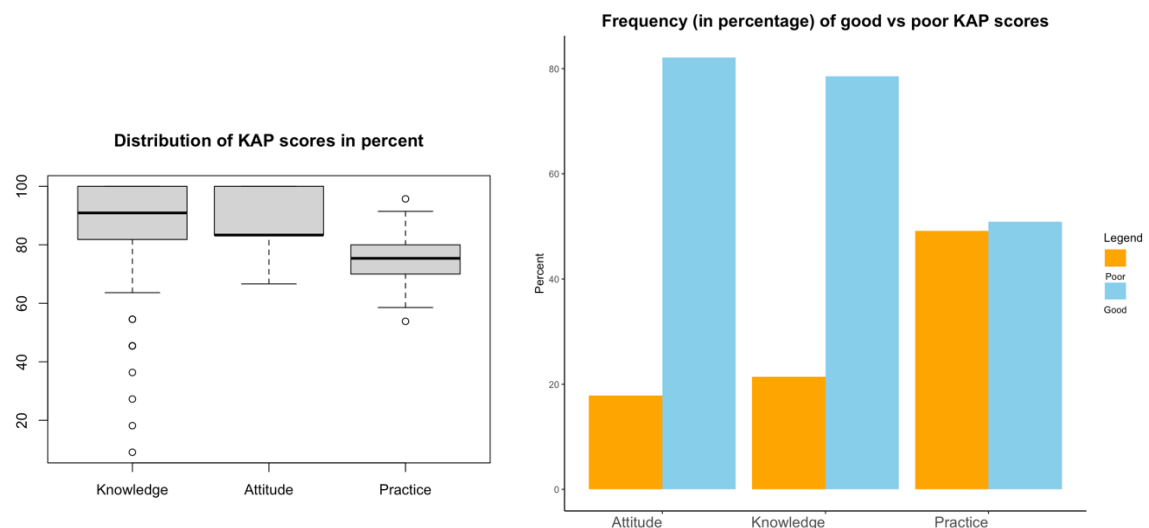


Figure 1: Left: Box plot showing distribution of knowledge, attitude and practice across participants, Right: Frequency in percent of poor vs good KAP scores of participants

Looking at the scores of participants on knowledge, attitude and practice separately, 82.1% (n=92) of participants were found to have good attitude towards ERAS colorectal protocol. Almost all (98.2%)

participants reported as being either 'very familiar'(49.1%) or 'somewhat familiar'(49.1%), which suggests a high level of awareness and engagement with the ERAS protocol among the sample population and indicates its growing recognition and importance in colorectal surgical care. However, a lower percentage of participants, 78.6% (n=88), were found to demonstrate good knowledge. On the other hand, good practice was reported by 50.8% (n = 57) of respondents. Figure 2 shows plots that summarize the distribution of scores of knowledge and practice for each subcategory of our independent variables.

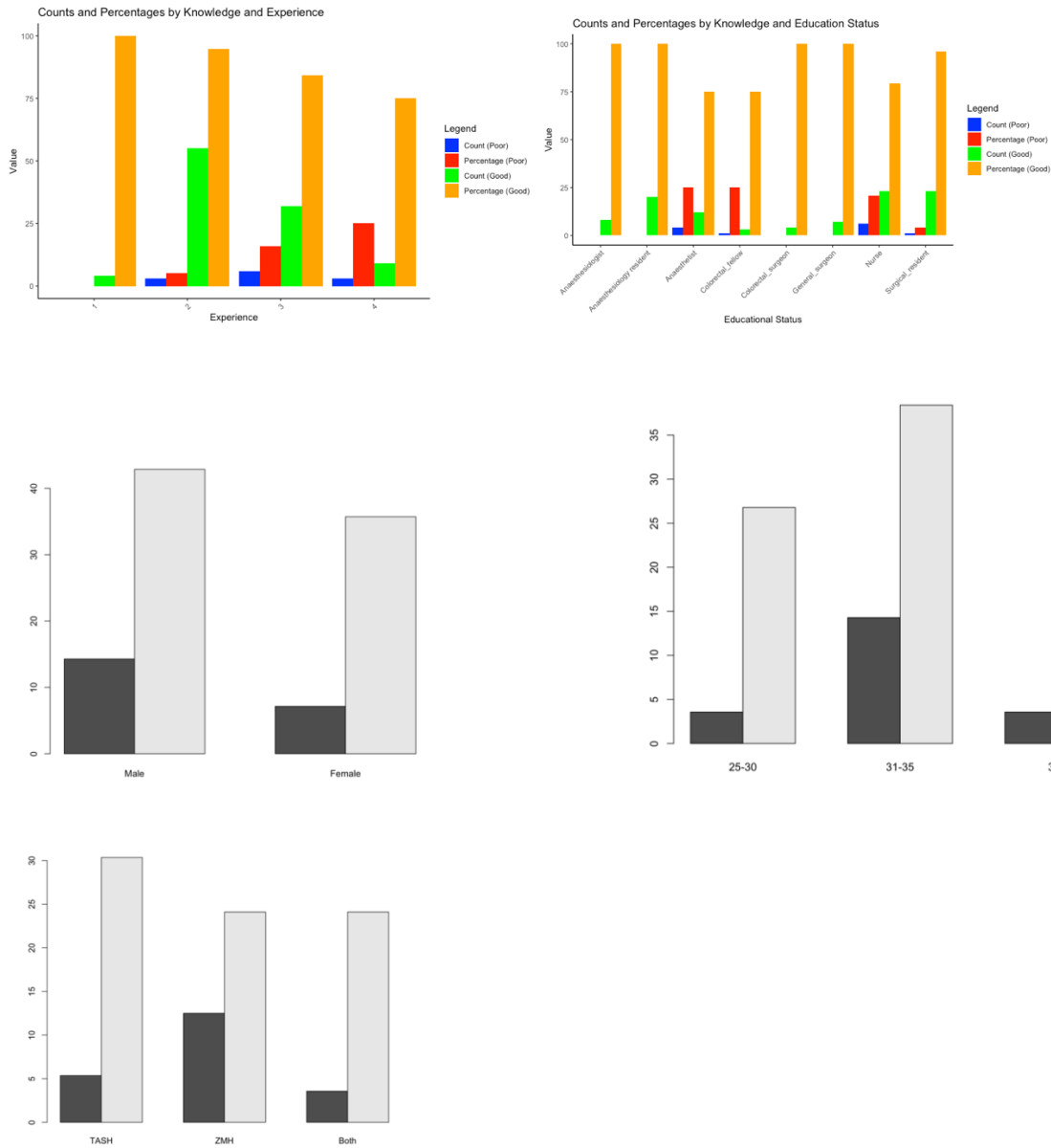


Figure 2: Summary of distribution of scores in each subcategory of independent variables

5.2 Association and Regression Analysis

In order to find out if there is any association between the independent variables and the KAP scores, Chi-square tests were done. (Table 3) For knowledge and attitude, no significant associations were found. For practice, significant relationships were observed with age ($p = 0.002$).

Table 3: chi-square analysis of independent vs dependent variables

Dependent variable	Independent variable	Pearson chi square (X ²)	Degree of freedom (df)	P-value
Knowledge	Age	3.022	2	0.221
	Gender	0.69	1	0.406
	Professional status	12.228	6	0.057
	Years of experience	5.49	3	0.139
	Hospital affiliation	6.259	2	0.043
Practice	Age	12.071	2	0.002
	Gender	0.126	1	0.723
	Professional status	8.651	6	0.194
	Years of experience	2.574	3	0.462
	Hospital affiliation	1.481	2	0.477
Attitude	Age	0.387	2	0.824
	Gender	0.001	1	0.972
	Educational status	8.086	6	0.232
	Years of experience	3.688	3	0.297
	Hospital affiliation	5.003	2	0.082

A logistic regression analysis was conducted (Table 4) to examine the influence of age, gender, years of experience, educational status, and hospital affiliation on knowledge. The results showed that age (B = 1.109, p = 0.145) had no significant effect. However, gender (B = 2.146, p = 0.016) was significantly associated with knowledge, with a positive relationship (Exp(B) = 8.549), indicating that being of a particular gender increased the likelihood of knowledge. Years of experience (B = -1.887, p = 0.022) and educational status (B = -0.851, p = 0.006) were both negatively associated with knowledge, suggesting that more years of experience and higher educational status decreased the likelihood of knowledge. Hospital affiliation (B = -1.674, p = 0.071) had a marginally significant negative effect (Exp(B) = 0.188), indicating a weak but negative influence. The constant (B = 10.870, p = 0.004) was highly significant, indicating a strong baseline effect (Exp(B) = 52,569.406).

Table 4: Multivariate Logistic Regression for Knowledge

Variable	Coefficient	S.E.	Wald	df*	AOR (95% CI)	Sig. (p-value)
Gender						
Female	2.717	1.033	6.925	1	15.141 (2.001–114.589)	0.008 **
Experience						
3-4 yrs	0.991	2.002	0.245	1	2.694 (0.053–136.384)	0.621
5-8 yrs	-0.212	1.959	0.012	1	0.809 (0.017–37.640)	0.914
>8 yrs	-1.815	2.385	0.579	1	0.163 (0.002–17.446)	0.447
Hospital Affiliation						
ZMH	-1.765	1.116	2.501	1	0.171 (0.019–1.526)	0.114
Both TASH & ZMH	-17.25	11707.325	0	1	0	0.999
Age Group (years)						
31-35	-1.589	1.011	2.472	1	0.204 (0.028–1.480)	0.116

36 and above	0.56	1.753	0.102	1	1.751 (0.056–54.383)	0.749
Professional Status						
Colorectal surgeons & fellows	-16.513	12239.073	0	1	0	0.999
General surgery residents	-16.728	12239.073	0	1	0	0.999
Anaesthesiologists	-12.845	20801.035	0	1	0	1
Anaesthesiology residents	-34.822	16936.821	0	1	0	0.998
Anaesthetists	-33.881	16936.821	0	1	0	0.998
Nurses	-35.553	16936.82	0	1	0	0.998
Intercept	36.075	16936.82	0	1	4.65E+15	0.998

Constants: Gender(male), experience (1-2yrs), hospital affiliation (TASH), professional status (general surgeon)

As shown on table 5, only hospital affiliation (ZMH) was found to have a statistically significant effect on attitude, healthcare providers practicing at ZMH were 10X more likely to have negative attitude regarding ERAS colorectal protocol ($p=0.028$, $AOR=0.107$). Other variables, including gender ($AOR = 1.508$, $p = 0.575$), years of experience (3-4 years: $AOR = 2.55$, $p = 0.596$; 5-8 years: $AOR = 0.603$, $p = 0.745$; >8 years: $AOR = 0.082$, $p = 0.204$), age group (31-35 years: $AOR = 1.693$, $p = 0.502$; 36+ years: $AOR = 8.29$, $p = 0.162$), and professional status (e.g., colorectal surgeons: $AOR = 0.745$, $p = 0.918$; anaesthesiologists: $AOR = 0.573$, $p = 0.716$) did not show significant associations with attitude.

Table 5: Multivariable Logistic Regression for attitude

Variable	B	S.E.	Wald	df	Sig. (p-value)	AOR	95% C.I. for AOR (Lower–Upper)
Gender							
Female	0.411	0.733	0.314	1	0.575	1.508	0.359–6.336
Years of Experience							
3-4 yrs experience	0.936	1.766	0.281	1	0.596	2.55	0.080–81.212
5-8 yrs experience	-0.506	1.555	0.106	1	0.745	0.603	0.029–12.708
>8 yrs experience	-2.496	1.967	1.61	1	0.204	0.082	0.002–3.895
Hospital Affiliation							
ZMH	-2.234	1.02	4.799	1	0.028 *	0.107	0.015–0.790
Both TASH & ZMH	0.12	2.612	0.002	1	0.963	1.127	0.007–188.659
Age Group							
31-35 yrs of age	0.527	0.784	0.451	1	0.502	1.693	0.364–7.880
36+ yrs of age	2.115	1.513	1.953	1	0.162	8.29	0.427–160.944
Professional Status							
Colorectal surgeons & fellows	-0.294	2.858	0.011	1	0.918	0.745	0.003–201.879
General surgery residents	-0.538	2.845	0.036	1	0.85	0.584	0.002–154.037
Anaesthesiologists	-0.557	1.529	0.133	1	0.716	0.573	0.029–11.468
Anaesthesiology residents	-2.48	1.834	1.829	1	0.176	0.084	0.002–3.048
Anaesthetists	2.512	1.666	2.275	1	0.132	12.331	0.471–322.680

Nurses	0.23	1.326	0.03	1	0.862	1.259	0.094–16.925
Constant	2.117	1.901	1.24	1	0.265	8.306	

Constants: Gender(male), experience (1-2yrs), hospital affiliation (TASH), professional status (general surgeon)

On the logistic regression for practice (table 6), age group (31-35 years) and professional status (nurses) were the only variables with statistically significant associations. Nurses had 19X lower odds of good practice (AOR = 0.052, 95% CI: 0.003–0.817, p = 0.035), and individuals aged 31-35 years had 5X lower odds of good practice compared to other age groups (AOR = 0.188, 95% CI: 0.062–0.570, p = 0.003). Other variables, including gender, years of experience, hospital affiliation, and professional status, were not significant predictors.

Table 7: reported barriers to ERAS colorectal protocol application

Perceived barriers to ERAS colorectal protocol implementation	Frequency (n)	% of response	% of cases
Lack of resources	97	34.9%	86.6%
Insufficient training	86	30.9%	76.8%
Perceived risk of complications	55	19.8%	49.1%
Resistance from colleagues	40	14.4%	35.7%
other	-	-	-
Total	278	100%	248.2

Table 6: Multivariable binary Logistic Regression for Practice

Variable	B	S.E.	Wald	df	AOR (95% CI)	Sig. (p-value)
Gender						
Female	0.292	0.512	0.324	1	1.339 (0.490–3.655)	0.569
Years of Experience						
3-4 yrs experience	-1.375	1.482	0.86	1	0.253 (0.014–4.620)	0.354
5-8 yrs experience	-0.915	1.378	0.441	1	0.401 (0.027–5.963)	0.507
>8 yrs experience	-0.424	1.637	0.067	1	0.654 (0.026–16.188)	0.795
Hospital Affiliation						
ZMH	0.367	0.808	0.206	1	1.443 (0.296–7.032)	0.65
Both TASH & ZMH	-2.748	1.781	2.379	1	0.064 (0.002–2.103)	0.123

Age Group						
31-35 yrs of age	-1.671	0.566	8.724	1	0.188 (0.062–0.570)	0.003 **
36+ yrs of age	-0.563	0.983	0.328	1	0.57 (0.083–3.908)	0.567
Professional Status						
Colorectal surgeons & fellows	1.354	2.069	0.428	1	3.872 (0.067–223.317)	0.513
General surgery residents	0.519	1.995	0.068	1	1.68 (0.034–83.786)	0.795
Anaesthesiologists	-0.423	1.559	0.074	1	0.655 (0.031–13.914)	0.786
Anaesthesiology residents	-1.15	1.62	0.504	1	0.317 (0.013–7.583)	0.478
Anaesthetists	-1.933	1.376	1.973	1	0.145 (0.010–2.147)	0.16
Nurses	-2.952	1.403	4.426	1	0.052 (0.003-0.817)	0.035 *
Constant	3.677	1.753	4.399	1	39.544	0.569

Constants: Gender(male), experience (1-2yrs), hospital affiliation (TASH), professional status (general surgeon)

As shown on table 7, the most commonly cited barrier was lack of resources (34.9%), followed by insufficient training (30.9%). Other notable barriers included perceived risk of complications (19.8%) and resistance from colleagues (14.4%). No data was provided for "other" barriers. The total number of responses was 278, with the cumulative percentage exceeding 100% due to multiple responses per case.

6. Discussion

This study assessed the knowledge, attitude, and practice (KAP) regarding Enhanced Recovery After Surgery (ERAS) colorectal protocols among selected healthcare professionals at Tikur Anbessa Specialized Hospital (TASH) and Zewditu Memorial Hospital (ZMH).

The majority of participants (78.6%) demonstrated good knowledge of ERAS colorectal protocol, with awareness being particularly high among anesthesiologists and colorectal surgeons.

An overwhelmingly positive attitude was observed, with 82.1% of respondents expressing a favorable disposition toward ERAS protocols. The findings align with global trends where healthcare professionals recognize ERAS as a means to improve surgical outcomes. Notably, practitioners at ZMH were significantly less likely to have a positive attitude compared to their counterparts at TASH, indicating potential institutional differences in exposure to or training on ERAS principles.

While 50.8% of respondents reported adherence to good practices, this figure remains suboptimal compared to knowledge and attitude levels. Nurses and professionals aged 31–35 years exhibited significantly lower practice adherence, with resource constraints (34.9%) and insufficient training (30.9%) cited as the most common barriers. The low practice level of nurses noted in this study is consistent with the unpublished Getu Ashagres' 2021 study, however the opposite is noted for age groups 31-35. The mentioned barriers are consistent with trends observed in low- and middle-income countries. This finding underscores the need for enhanced institutional support, including resource allocation and structured training programs.

7. Strengths and Limitations of the study

This study has tried to assess the current knowledge, attitude and practice regarding ERAS colorectal protocol in TASH and ZMH. Its findings give insight to the current magnitude of acceptance and practice of the protocol. It has limitations that should be taken into account when analyzing the findings. One limitation is **measurement bias**, as the study relied on self-reported responses, which could lead to subjective assessments of knowledge, attitudes, and practices (KAP). **Non-response bias** is another issue, as those who did not complete the questionnaire may differ in important ways from those who did, potentially affecting the results. While the sample size was adequate for detecting general trends, certain **subcategories** had smaller sample sizes, which made it difficult to draw reliable conclusions from these groups. Additionally, the **cross-sectional nature** of the study only offers a snapshot of KAP at a single point in time, without capturing changes over time or the long-term effects of any interventions. The research also focused on data from **specific hospitals** (TASH and ZMH), which may limit the broader applicability of the findings to other healthcare facilities in Ethiopia. Lastly, the study did not account for **unmeasured variables** such as workload or exposure to ERAS training, which could have confounded the results.

8. Conclusion

This study highlights the current state of knowledge, attitude, and practice regarding ERAS colorectal protocols among healthcare professionals at TASH and ZMH. The findings indicate high levels of knowledge and positive attitudes but reveal gaps in practice adherence. Identified barriers such as insufficient training and resource constraints underscore the need for tailored interventions to enhance ERAS implementation. Addressing these challenges through structured training programs, improved resource allocation, and institutional support can significantly improve perioperative outcomes in colorectal surgery.

9. Recommendations

TASH and ZMH should develop and implement ERAS protocols for colorectal and other surgeries to enhance the quality of care and promote better clinical practices. Additionally, quality improvement initiatives focused on evaluating the implementation of ERAS should be planned and executed to ensure effective adoption. Further research is needed to identify the underlying causes of suboptimal ERAS practice, with an emphasis on understanding barriers to its full implementation. Randomized controlled trials (RCTs) should also be considered to generate context-specific evidence on the benefits of ERAS in our healthcare settings so that health care providers become more eager to practice this protocols in light of the local evidences.

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Annex

KAP questionnaire for ERAS colorectal protocol

age	25-30 31-35 >36
Gender	F M
Years of experience/exposure in colorectal surgery	1-2yrs 3-4yrs 5-8yrs >8yrs
profession	General surgeon Colorectal surgeon Colorectal fellow Surgery resident anesthesiologist Anesthesiology resident Anesthetist nurse
Hospital affiliation	Tikur anbesa specialized hospital Zewditu memorial hospital both
Knowledge questions:	
How familiar are you with the specific components of ERAS colorectal protocol	Very familiar Somewhat familiar Not familiar
Which of the following are key components of ERAS colorectal protocol (select all that apply)	Preoperative counseling Nutritional optimization Limited bowel preparation Epidural and regional blocks for pain management

	Minimally invasive surgery Goal directed fluid therapy Avoidance of routine use of drains and tubes Early mobilization and early enteral feeding initiation I do not know					
Atleast how long before elective surgery should smoking be stopped	4weeks 2 weeks 1 week No need to stop I do not know					
Acording to Eras colorectal protocol, is mechanical bowel preparation recomended for all colorectal surgeries	Yes No, only for some rectal surgeries I do not know					
What is the recommended preop fasting period for solids&clear fluids	Atleast 6hrs for solids& atleast 2hrs for clear fluids 6hrs for both 8hrs for both 12hrs for both I do not know					
Attitude questions:						
How important do you believe ERAS protocols are in improving patient outcomes in colorectal surgery	Very important Somewhat important Not important					
Implementing all components of ERAS colorectal protol is feasible in TASH &ZMH, if objective barriers are lifted	Yes, it is No, but some components could be implemented at both or one of the hospitals No, it is not feasible to implement any of the components					
Practice questions:						
Preoperative patient education and	always	often	sometimes	rarely	never	Not

counseling (disease&procedure description&the process&outcome)							involved
Optimization of chronic illnesses before surgery							
Optimization of nutritional status (preoperative nutritional supplement, if needed)							
Intraoperative temperature monitoring&hypothermia prevention							
Goal directed fluid therapy to maintain euvolemia							
Use of any form of neuromuscular monitoring during anesthesia (electro/kine/accelero/compressomyography)							
Intravenous prophylactic antibiotic administration within 60min before incision							
Administration of Thoracic epidural analgesia or abdominal trunk block in colorectal surgeries							
Use of minimally invasive surgical techniques							
Avoidance of routine abdominal drains and nasogastric tubes							
Post operative nausea and vomiting prophylaxis							
Early mobilization of patients postop							
Use of mechanical thromboprophylaxis atleast until patient starts mobilization (compression/pneumatic stockings)							
Use of heparin for thromboprophylaxis in selected patients like old, malignancy, post chemoradiation							
Use of multimodal pain management strategies sparing opioids							
Routine urethral catheterization&removal on 1 st -3rd							

postop day based on anticipated risk of urinary retention						
Early enteral feeding initiation 4hrs after surgery (atleast clear liquids)						
Early enteral feeding initiation on 1 st post op day with low residue diet						
What are the perceived barriers to implementing ERAS protocols effectively in our hospital (select all that apply)	Lack of resources (e.g. equipment, staffing) Resistance from colleagues Insufficient training on ERAS protocols Perceived increased risk of complications Other(please specify)					
How do you think ERAS protocols could be improved or adapted to better suit our hospitals' need (select all that apply)	Provide more structured guidelines and protocols specific to our hospitals Increase awareness and education among healthcare providers about ERAS protocol benefits Enhance logistic support and resources for implementing ERAS Tailor ERAS protocols to better align with local patient demographics& condition Other(please specify)					
Any additional comments or suggestions related to the implementation of ERAS protocols in colorectal surgery at TASH and/or ZMH?						