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Patterns, treatment outcome and associated factors of surgically treated thyroid disease at public hospitals in Eastern Ethiopia: a retrospective cross-sectional study

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Abstract

Background Thyroid disease is a global health problem and the most common type of endocrine disorder next to diabetic mellitus, accounting for around 30–40% burden of the endocrine disorders.

Objective The objective of the study was to assess patterns, treatment outcome and associated factors of surgically treated thyroid disease at Public Hospitals in Eastern Ethiopia.

Methods The study was conducted among surgically treated patients for thyroid disorders using a retrospective cross-sectional study design by reviewing all patients' charts. A data abstraction sheet was used to collect relevant data, and the collected data was analyzed using SPSS version 26 software. Bi-variable and multivariable binary logistic regression was employed to assess the association between dependent and independent variables.

Results The study was conducted on 200 patients' medical records who had complete information. Out of this, 84.5% were female and 66.5% of patients' age was between 20 and 40 years. Toxic goiter was the most common thyroid disease which accounted for 49.5%. Hemorrhage and Hypocalcemia were the most common complications after surgery. Anterior neck swelling of greater than 15 years [(AOR: 52.892 CI=95% (6.087–459.5.68) (P-0.000)], Total/ near total thyroidectomy [(AOR: 20.139 CI=95% (4.059–99.931) P-0.000] were significantly associated with complicated post-operative course, while female sex [(AOR: 0.124 CI=95% (0.34–0.494) P- 0.003)] was associated with lower risk of developing post-operative complications.

Conclusion This study showed that 9.5% of operated patients with thyroid disease had complicated post-operative course. Long standing goiter and total/ near total thyroidectomy were significantly associated with complicated post-operative course.

Keywords Pattern, Treatment outcome, Thyroid disease, Eastern Ethiopia

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Introduction

Thyroid disease is a global health problem and the most common type of endocrine disorders next to diabetic mellitus, accounting for around 30–40% burden of endocrine disorder. Thyroid disorders have a wide range of causes, including benign and malignant thyroid tumors such as diffuse or nodular goiters and neoplasms, altered functional states such as hypothyroidism or hyperthyroidism, and thyroiditis [1, 2].

Benign thyroid conditions are still the most common cause of thyroid disease, as a result of iodine deficiency. Depending on the severity of iodine deficiency, goiter may appear in early childhood but usually peaks at about puberty or soon after that, and also affecting more females than males. Iodine supplementation has been shown to decrease the incidence of the benign goiters, and it can reduce the size of small sized early goiters [2–4].

Surgical intervention is one of the treatment protocols for thyroid disorders. The reasons for surgery for thyroid disorders include cosmetics for anterior neck swelling, confirmed or suspected malignant change, the presence of toxic signs and symptoms which includes palpitation, weight loss, heat intolerance, diarrhea, tremors, restlessness and irritability; and pressure symptoms like dysphagia, dyspnea, change in voice, and airway obstruction [5–7].

Even though significant efforts have been made to enhance iodine intake, notably by ionization of salt, almost one-third of the world's population still lives in iodine-deficient areas where the prevalence of goiter can reach 80% [8]. More than 200 million people worldwide suffer from endemic goiter, commonly referred to as simple colloid goiter which is particularly common in low- and middle-income nations [9]. Iodine deficiencies are the most common cause of thyroid disorders in Africa, with the incidence of endemic goiter ranging from 1 to 90% throughout the continent [10].

There have been limited studies on thyroid disease in Ethiopia, on treatment outcomes and associated factors, and most of them have been conducted in the country's central, southwest, and northwest region. Those studies demonstrate that thyroid swellings are frequent in Ethiopia, especially in the highland areas, with a prevalence of 18–30%, and the prevalence of thyroid cancer is lower than other areas of the world [1–3, 10, 11]. According to studies conducted in central and northwest Ethiopia, the rate of postoperative complications following thyroid surgery ranges from 8 to 18%, with hypocalcemia, laryngeal nerve damage, and airway blockages being the most commonly detected problems after surgery, and total thyroidectomy was significantly associated with these complications [2, 3, 11].

To the best of the authors' knowledge, no published research on thyroid illnesses was identified in the eastern part of Ethiopia. So, this study aimed to assess the patterns, treatment outcome and associated factors of surgically treated thyroid patients at public hospitals of in eastern Ethiopia.

Methods and materials

Study design, area and period

A hospital-based retrospective cross-sectional study design was conducted at two public hospitals in Harar, eastern Ethiopia. Harar is the capital of the Harari Regional State, which is located 526 km east of Addis Ababa, the capital of Ethiopia. This study was conducted at two public hospitals in Harar city, namely Hiwot Fana Comprehensive Specialized University Hospital (HFCSH), which is owned by Haramaya University, serves as a teaching and referral hospital in eastern Ethiopia, and Jugol Regional General Hospital (JGH) which is owned by the regional government. HFCSH consists of 8 departments including the surgery department and also contains a radiology unit, a pathology unit, and an oncology center. Surgery ward accommodates 55 beds and five OR tables both for elective and emergency surgeries. Similarly, Jugol General Hospital has four primary departments, including a surgical department with 35 beds and two OR tables.

The year of patient admission for study participants was from February 1, 2019 – March 30, 2023. The data was collected from October 1, 2023 – October 30, 2023.

Source and study population

All patients operated for thyroid disease at HFCSH and JGH were the source population. All surgically treated thyroid disease patients who fulfilled inclusion criteria at HFCSH and JGH from February 1, 2019- February 30, 2023 G.C were considered as the study population.

Inclusion and exclusion criteria

All patients of surgically treated thyroid disease at HFCSH and JGH from February 1, 2019- February 30 2023 were included. All patients with incomplete or lost records were excluded from the study.

Clinical practice of thyroid surgery

Patients who visited for thyroid disorder to both hospitals either directly or by referral through the liaison office were first evaluated by surgery residents and general surgery specialists at the surgical referral clinic and investigated for CBC, blood group and Rh, Organ function, thyroid function test, thyroid ultrasound, and FNAC. Those patients who were fit for surgery should also be evaluated by an anesthesiologists at pre anesthesia clinic

and admitted to the surgical ward for surgery after preparing blood.

Those admitted patients were operated by general surgery specialists and sometimes simple nodular goiters could be operated by final -year general surgery residents under the direct assistance of general surgeons.

Surgery was done by a step -by -step technique through a collar incision and a sub-platysma flap raised both superiorly and inferiorly. Then the cervical fascia and strap muscles were opened midline vertically and retracted. The strap muscles were then dissected by sharp and/or blunt dissection off the underlying enlarged thyroid gland laterally, thus exposing the thyroid vessels and middle thyroid veins, superior, inferior thyroid vessels were ligated with suture materials, and divided sequentially. The parathyroid glands and recurrent thyroid nerves could be identified and preserved as much as possible. Then the ipsilateral thyroid gland removed for lobectomy. If subtotal or total thyroidectomy was going to be done the same procedure would be repeated on the contralateral side and some thyroid tissue about 8 gram should be reserved either unilaterally or bilaterally for subtotal thyroidectomy while all thyroid tissues could be removed in total thyroidectomy. After finishing the surgery hemostasis was confirmed and the fascia, platysma and Skin closed in layers [11].

Post -operatively patients were followed strictly for signs of airway obstruction, bleeding, hoarseness of voice, choking etc. on post-operative days until discharge. After the patients were discharged, they were appointed for follow-up and evaluated and investigated for the signs and symptoms of hypothyroidism and hypocalcemia and managed accordingly if complications were detected.

Sample size and sampling procedure

The sample size was calculated for each objective by using single population proportion formula below and 10% nonresponse rate was added to the calculated sample size.

$$n = \frac{Z^2 P (1 - P)}{d^2}$$

Where n=sample size,

Z=1.96 for the level of confidence of 95%.

P=proportion.

d=0.05.

For objective 1: we used the proportion of thyroid malignancy the study done at St Paul Hospital, Addis Ababa which was 15.9% [2]. With this the Calculated Sample size was 225.

For objective 2: we used the proportion of post-operative complications based on the study done in resource

limited areas which was 18.6% [11]. With this the calculated sample size was 256.

Since the total number of surgically treated thyroid disease patients in the study settings was less than the calculated sample size, all surgically treated thyroid disease patients were included in the study.

Data collection procedure

A data collection checklist was prepared by reviewing different literatures [2, 11, 12]. An extraction format that contains study variables of interest was prepared in the English language to extract relevant information about age, sex, residence, clinical presentation, duration of the disease, diagnosis on admission, any post op complication recorded, and outcome at discharge. Data sources were operation room log books, patients' record books, and patients' charts. Patients' medical records documented on the respective log books & charts were collected. Fifteen nurses took the data collection process. All data collection activities were supervised by two surgical residents, and principal investigators.

Patients that were admitted to the surgical ward of HFCSH and JGH with a diagnosis of thyroid disease from February 1, 2019- March 30, 2023 was initially be identified from the admission log-books of surgical ward and operation theater registry of HFCSH and JGH. Using the medical record numbers as a reference, study participants were identified, and relevant information were extracted.

Data quality control

Before starting the data collection, the data collection checklist was pretested and training was given for the data collectors and supervisors to make it easy for them to understand. To ensure the quality of data, the collected data was cross- checked by supervisors every day then provide feedback and made necessary corrections throughout the data collection period. Finally, the completeness, accuracy, and clarity of the collected data was checked carefully by supervisors and principal investigators.

Any errors, ambiguity, and incompleteness encountered were addressed as early as possible before data entry.

Operational definitions

In this study, treatment outcome could be complicated or uncomplicated post-operative course.

Complicated Post-Operative Course - the patient's state following the procedure if they experience any of the following complications: bleeding, laryngeal nerve injury, airway obstruction, hospital- acquired infection, seroma, DVT or death prior to hospital discharge; or late post-thyroidectomy complications: hypothyroidism,

hypocalcemia, and abnormalities in voice during follow-up [11].

Uncomplicated Post-Operative Course- The state of the patient following the procedure, if any early postoperative complications (such as bleeding, laryngeal nerve injury, airway obstruction, hospital acquired infection, seroma, DVT or death before hospital discharge) are avoided, as well as if any of the late post-thyroidectomy complications (such as hypothyroidism, hypocalcemia, and voice abnormalities during follow-up) do not occur during follow-up [11].

History of Toxic Symptoms- In this study the presence of toxic symptoms were assessed based on the previous history of symptoms of thyrotoxicosis, not exactly at the time of presentation for Surgery.

Methods of data processing and analysis

The collected data was checked for completeness and cleaned before entry into the computer. Then the data extraction sheet was coded and entered into Epi data version 7.2 by a data clerk. Then the data was exported to Statistical Package for Social Science (SPSS) version 26 for further data cleaning and analysis. Data was analyzed with descriptive analysis such as frequencies and percentage. For measuring the strength of the association between the outcome and independent variables, the Crude Odd Ratio (COR) and Adjusted Odd Ratio (AOR) along with a 95% Confidence interval (CI) was calculated by using a binary and multivariable logistic regression model, respectively. All variables with the p value of <0.25 was further analyzed with multivariable logistic regression analysis to control for confounders. The Association was considered significant at 95% confidence interval and p -value set at less than 5%.

Table 1 Sociodemographic Characteristics of Study participants at Public Hospital in Harar City, Easter Ethiopia, from February 1, 2019 – February 30, 2023

Characteristics	Frequency (N= 200), and Percentage (%)
Sex	
Male	31(15.5)
Female	169(84.5)
Age (years)	
<20 year	8(4.0)
20-40years	133(66.5)
41–60 years	48(24.0)
61-80years	11(5.5)
Residence	
Urban	98(49)
Rural	102(51)
Marital Status	
Married	181(90.5)
Single	14(7.0)
Divorced	3(1.5)
Widowed	2(1.0)

Results

Sociodemographic characteristics of study participants

In this study, 220 patient's medical records were reviewed. Of these 20 patients' medical records were excluded because they were incomplete and 200 patient's medical records were analyzed. From this, the majority of the patients were female (84.5%). More than half of the study participants were under the age category of 20–40 years (66.5%). Half of the participants were lived in rural area (51.0%) (Table 1).

Clinical conditions of surgically treated thyroid disease

In this study, out of 200 study participants, 194 (98%) were presents to the hospital with the complaint of anterior neck swelling. The duration of the illness ranged from 1 to 30 years. Around 104 participant's duration of neck swelling was less than 6 years. From the associated symptoms, history of toxic symptoms, pressure symptoms, and change in voice were resulted in 99 (49.5%), 43(21.5%), and 24(12%) of the cases, respectively. Around 22(11%) patients had co-morbid diseases from which hypertension was the commonest which accounts for 45.45%. Based on the ultrasound finding report, multinodular goiter 115(57.5%) was the common thyroid disorder followed by solitary thyroid nodule 55 (27.5%) and retrosternal extension was identified in 10(5%) patients (Table 2).

From 200 study participants, the pattern of surgically treated thyroid diseases by considering both clinical and histopathologic evidences in descending order of frequency showed: Toxic Goiter 99(49.5%), Simple Colloid Goiter 52(26%), Follicular Cell Neoplasm 14(7%), Papillary Thyroid Carcinoma 11(5.5%), Hurtle cell Neoplasm 6 (3%), Hyperplastic Adenomas 7(3.5%), Thyroid Gland Infection 6(3%) and Others (Thyroid Cyst and Hashimoto's thyroiditis 5(2.5%). On the other hand, the top three indications for thyroidectomy were for toxic symptoms 93 (46.5%), patient preference for cosmetic reasons 56 (28%) and malignancy 38(19%) (Table 3).

The most frequently performed surgical procedures done were lobectomy (41.5%), followed by subtotal thyroidectomy 42(21%) and then lobectomy and isthmusectomy (17%). Out of the total study participants, around 4 patients have undergone recurrent thyroid surgery and these were total thyroidectomy with lymph node dissection which accounts 1% (for follicular and hurthle cell neoplasia) and others were lobectomy and subtotal thyroidectomy (for nodular and multinodular goiter) with each account 1(0.5%) (Table 3).

Treatment outcome and associated factors of surgically treated thyroid diseases

This study showed that about 181(90.5%) of operated patients with thyroid disease had uncomplicated

Table 2 Clinical presentation of patients operated for goiter at public hospitals in Harar city, Eastern Ethiopia from February 1, 2019 – February 30, 2023

Characteristics	Frequency (%)
Anterior Neck Swelling	
Yes	194(98.0)
No	6(2.0)
Duration of anterior neck swelling in years	
≤ 5 years	104(53.6)
5 to 10 years	60(30.9)
11 to 15 years	23(11.9)
Greater than 15 years	7(3.6)
Associated symptoms	
History of Toxic symptoms	99(49.5)
Pressure symptoms	43(21.5)
Change in Voice	24(12.0)
Comorbidities	
Hypertension	10(45.45)
Cardiac Disease	6(27.27)
RVI	3(13.63)
Renal Disease	2(0.9)
Pulmonary diseases	1(0.45)
Anterior Neck U/S Findings	
Multinodular Goiter	115(57.5)
Solitary thyroid Nodule	55(27.5)
MNG with Retrosternal extension	10(5.0)
MNG with Calcification and risk for Malignancy	5(2.5)
Thyroid Abscess	6(3.0)
Diffuse Goiter	5(2.5%)
Others (aberrant thyroid tissue and cervical LAP)	4(2%)

post-operative course, while 19(9.5%) had complicated post-operative course. Hypocalcemia and hemorrhage are the most common postoperative complications identified among total operated patients each account 5(2.5%) followed by hospital acquired infection 3(1.5%), hypothyroidism 2(1%), surgical site infection 2(1%), and DVT 1(0.5) and seroma 1(0.5%) (Table 4).

By applying Bi-variable binary logistic regression analysis model, gender, duration of the anterior neck swelling,

Table 3 Pattern of the thyroid disease, indications for thyroidectomy and type of surgery done among patients operated for thyroid disease at HFCSUH and JGH from February 1, 2019 – February 30, 2023

Characteristics	Frequency	Percentage (%)
Pattern of the thyroid disease		
Toxic goiter	99	49.5
Simple Goiter	52	26
Follicular cell Neoplasm	14	7
Papillary Thyroid Carcinoma	11	5.5
Hurtle cell Neoplasm	6	3
Hyperplastic Adenomas	7	3.5
Pyogenic thyroid infections	6	3
Others(Thyroid Cyst and Hashimoto's thyroiditis)	5	2.5
Indications for Thyroidectomy		
Cosmetic reason	56	28
Malignancy	38	19
Pressure symptoms	7	3.5
Toxic symptoms	93	46.5
Thyroid gland Infection	6	3
Type of the procedure		
Lobectomy	81	40.5
Lobectomy and Isthmusectomy	40	20
Near total thyroidectomy	16	8.0
Total Thyroidectomy	8	4.0
Total Thyroidectomy and Lymph node Dissection.	6	3.0
Subtotal thyroidectomy	42	21.0
Incision and drainage (thyroid abscess drainage)	6	3
Others	1	0.5

toxic symptoms, pressure symptoms, and type of thyroidectomy had a *p* value of <0.25 and included in the multivariable logistic regression model. In the multivariable logistic regression analysis, duration of the anterior neck

Table 4 Post-operative Complications with their respective type of thyroidectomy of patients operated for thyroid disease at HFCSUH and JGH from February 1, 2019 – February 30, 2023

No.	Type of surgery	Post-operative Complications	Frequency (n = 19)
1.	Lobectomy	Hemorrhage	2
		Seroma	1
		Surgical site infection	1
		Hospital acquired infection	2
		Hypocalcemia	1
2.	Sub Total Thyroidectomy	Hemorrhage	2
		Hypocalcemia	1
3.	Total Thyroidectomy	Hypocalcemia	4
		Hypothyroidism	2
		Hemorrhage	1
		DVT	1
		Surgical site infection	1
		HAI	1

swelling and total thyroidectomy were statistically significant associated with complicated postoperative course. On the other hand, being female sex was associated with a lower risk of developing complicated post-operative course.

Patients who presented with anterior neck swelling after 20 years has 52.8 times more likely to develop post-operative complications when compared with those who presented with in 5 years duration [(AOR 52.892 CI=95% (6.087-459.568) P=0.000)]. Similarly, those patients who have undergone total/near total thyroidectomy were 20.1 times more likely to develop complicated post-operative course than those who undergone hemi-thyroidectomy [(AOR-20.139 CI=95% (4.059-99.931) P=0.000]. Being female was 0.124 times less likely to have postoperative complications when compared to male counterpart [(AOR 0.124 CI=95% (0.34-0.494) P=0.003)] (Table 5).

Discussion

This study assessed the patterns, treatment outcome and associated factors of surgically treated thyroid disease at Hiwot Fana Comprehensive Specialized Hospital and Jugol General Hospital. In our study, the majority of patients' presentations were in their third and fourth decades, which is consistent with previous existing studies done in different regions of Ethiopia. This finding could be attributable to high magnitude of colloid goiters in the reproductive age groups, which is the most frequent thyroid condition in Ethiopia, and early hospitalization for cosmetic reasons to undergo surgical intervention in younger age groups [1, 2, 3, 4, 5, 7, 10-11].

In the present study, female predominate with F: M ratio of (5.4:1). This study's finding is similar to other research done in different parts of Ethiopia and Africa that indicated female preponderance of thyroid problems with the F: M ratio (4.7:1 to 11.7:1) [4, 5, 10-15]. Many women experience their first thyroid problems during periods of hormonal instability during their reproductive

age and during highly stressful emotional, physical, and psychological conditions such as menopause and pregnancy. In addition, Graves and Hashimoto's thyroid autoimmune illnesses could be the cause of the other explanation for the predominance of goiters in females [4, 5].

More than half of patients (52.5%) in our study attended the hospital within five years of the illness, which was comparable with other similar studies done in different parts of Ethiopia and Tanzania [2, 3, 10, 15]. This early presentation could be due to the patient's interest in cosmetics, the development of toxic symptoms, and the stigma they felt as a result of their illness.

Based on this study finding, benign goiters by including toxic goiters (49.5%) an simple colloid goiters (26.5%) were the common thyroid disorders which was aligned with studies done in Gonder, Addis Ababa and Jimma but there was relatively higher rate of toxic goiter in our study as compared to the above studies (1, 2, 3, 5, 10-11). Similarly the rate of thyroid carcinoma (19%) in the present study is comparable to studies done in Addis Ababa (15.9%), but higher than those reported from Gondar (10.2%), Jimma (4.43%), and Saudi Arabia ((5.3%) and lower than a study done in Bangladesh (46%) [2, 3, 10, 16]. This discrepancies in the pattern of thyroid disorders could be attributable to geographic differences in disease epidemiology.

The post-operative complication rate in our study was (9.5%) in agreement with other studies reported from Tanzania (7.9%) [15] but lower than a study done in at St Paul Hospital (18.6%), Nigeria (27.9%), and India (20%) [11, 17, 18]. This could be attributed difference in disease pattern, hospital setups and operative skills from place to place. For instance, hospitals with a high burden of thyroid carcinoma and multinodular goiters would need total or subtotal thyroidectomy would be more associated with post-operative complications as compared to lobectomy. In our study the most common operation

Table 5 Bi-variable and multivariable binary logistics regression analysis of factors associated with surgical treatment outcome of the surgically treated thyroid disease at HFCSUH and JGH

Variables	Category	Post-operative course		COR	AOR	P-value
		Complicated (%)	Uncomplicated (%)			
Duration of the anterior neck swelling	≤ 5 Years	3(3)	96(97)	1	1	
	6 to 10 years	7(10.8)	58(89.2)	3.862(0.961-15.525)	4.158(0.820-21.072)	0.85
	11 to 15 years	2(8.3)	22(91.7)	2.909(0.458-18.468)	2.700(0.354-20.597)	0.338
	Greater than 15 Years	7(58.3)	5(41.7)	44.800(8.83-227.3300)	52.892(6.087-459.5.68)	0.000**
Type of the thyroidectomy	Lobectomy	6(5)	115(95)	1	1	
	Subtotal thyroidectomy	3(7.2)	39(92.8)	1.474(0.352-6.178)	2.199(0.377-12.821)	0.381
	Total thyroidectomy	10(33.3)	20(66.7)	9.583(3.133-29.312)	20.139(4.059-99.931)	0.000**
Gender	Male	10(28.57)	25(71.4)	1	1	
	Female	9(5.4)	156(94.6)	0.144(0.053-0.0.39)	0.124(0.34-0.494)	0.003*

* Significant association p<0.05, 1 = indicate for reference group, ** = p_ < 0.001

done was lobectomy which is relatively lower rate of developing complications [11, 17, 18].

In this study, hypocalcemia (2.5%), and hemorrhage (2.5%) were the common immediate complication, this was also reported similarly at study done at St Paul Hospital [11]. This is due to the presence of huge goiters with highly vascularized thyroid tissue in some of our patients and the presence of advanced thyroid malignancies in some patients.

In our study, long standing goiters and total/ near total thyroidectomy were significantly associated with complicated post-operative course. Similarly study done on associated factors in resource limited areas identified total thyroidectomy was significantly associated with development of post-operative complications [11]. This could be due to those tumors were huge in size and the risk of developing tracheomalacia, bleeding, recurrent laryngeal nerve and parathyroid gland injuries were high as compared to goiters with small size and short duration [3, 11]. Another possible reason could be due to new development of thyrotoxicosis and malignant transformation of previously simple goiters which could need total or near total thyroidectomy, which were associated with increased complication rate. On the other hand, being female in this study were protective association to develop post-operative complications, but we couldn't get similar findings that strengthens this finding. This could be due to the goiters in females were more benign and also many females opt for surgery for cosmetic reasons which were relatively lower risk of developing complications as compared to male counterparts.

Limitation of this study

Since this research was a retrospective study, including other characteristics that could only be assessed by observation or history-taking was not possible. The absence and incompleteness of selected medical records were another limitation of the study. The last limitation of this study is the small sample size even if multi-center study, so we recommend researchers to conduct with large sample size for conclusion to the general population.

Conclusion

This study showed that toxic goiter was as the commonest thyroid disease. From thyroid carcinoma, follicular carcinoma is more common, which indicates also the high burden of multinodular goiter followed by papillary carcinoma. The magnitude of complicated post-operative course was low in compared to the data reported from worldwide. Hemorrhage and hypocalcemia is the most common post-operative complication. Long duration of the presentation, and total/near thyroidectomy were associated high risk of developing complicated

post-operative course. Public health measures such as iodination of salt and health education could play a role in reducing the occurrence of these preventable diseases especially in iodine deficient areas. It also helps to provide information about the treatment options so that patients could seek medical attention earlier.

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Author contributions

GA and EA involved in conceptualization, formal analysis and methodology, validation writing – original draft. AA and SN contributed in supervision, writing – review & editing. All authors read and approved the final manuscript.

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Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from Institutional Health Research Ethics Review Committee (IHRERC) of the College of Health and Medical Sciences, Haramaya University (Ref number = IHRERC/169/2023). Haramaya University, College of Medical and Health Sciences IHRERC allowed the review of patients' medical records with justifiable reason (for research purposes) regardless of patients' consent. Informed consent from the participants was waived by Institutional Health Research Ethics Review Committee (IHRERC) of the College of Health and Medical Sciences, Haramaya University and Informed, volunteer, written and signed consent was obtained from the head of the Hospital to review the patients' medical records as the study was retrospective by chart review. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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