

Research Article

The Prevalence and Outcomes of Uterine Rupture in Wolliso St. Luke Catholic Hospital, Oromia Regional State, Southwest Shewa, Ethiopia

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OPEN ACCESS**Keywords**

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- Outcome
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Abstract

Introduction: Uterine rupture is a life threatening obstetric complication responsible for numerous maternal and perinatal deaths. It is a major public health problem in developing countries including in Ethiopia. This study examined the prevalence and outcomes of uterine rupture.

Methods: Hospital based retrospective cross-sectional study was conducted at Wolliso St. Luke Catholic Hospital from January 1, 2009 to December 31, 2013 by abstracting information from medical records. Descriptive statistics was analyzed to determine the prevalence of uterine rupture and its outcomes using SPSS software.

Result: The analysis revealed that 151 cases of uterine rupture among 14,152 deliveries, making the prevalence rate 1.07% (95% CI= 0.91, 1.25%). The majority were multi-gravid (67.8%), from rural area (96.7%), had prolonged duration of labor (63.3%), and 53.3% did not attend prenatal care. Obstructed labors due to cephalo-pelvic disproportion (42.2%), mal-presentation or mal-position (37.8%), previous cesarean scar (15.6%), instrumental deliveries (3.3%), and induction or augmentation with pitocin (1.1%) were reported as the causes of uterine rupture. With regard to obstetric management: uterine repair with bilateral tubal ligation performed for (40%), total abdominal hysterectomy (26.7%), repair only (24.4%), and subtotal abdominal hysterectomy (8.9%) of the cases. Of the total (90 women), (50%) of the women developed post-operative complications, of which anemia was the commonest (33.3%). Fetal and maternal case fatality rate was 94.4% and 4.4% respectively.

Conclusion: The prevalence of uterine rupture, perinatal mortality, maternal morbidity and mortality were unacceptably high in the study institution. The commonest underlying causes of uterine rupture were obstructed labor. Therefore, obstetricians and midwives should be competent enough to prevent and detect early warning signs of uterine rupture. Moreover, improving the coverage and quality of health service would reduce perinatal and maternal morbidity and mortality as a result of uterine rupture.

ABBREVIATIONS

ANC: Ante Natal Care; BP: Blood Pressure; ART: Anti Retrovirus Therapy; C/S: Cesarean section; COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; FHB: Fetal Heart Beat; PMTCT: Prevention of Mother To Child Transmission; SPSS: Statistical Package for Social Science; VBAC: Vaginal Birth After Cesarean section; VCT: Voluntary Counseling and Testing; WHO: World Health Organization; BEmONC: Basic and Emergency Obstetrics and Neonatal Care; CEmONC: Comprehensive Emergency Obstetrics and Neonatal Care.

INTRODUCTION

Uterine rupture is a life threatening obstetric complication resulting in severe maternal and fetal morbidity and mortality.

It is a complete separation of uterine musculature through all of its layers with all or part of the fetus, placenta or both being extruded from uterine cavity. It may be spontaneous, traumatic or associated with prior uterine scar and may occur before or during labor, or at the time of delivery. Lack of health information, illiteracy, poor antenatal care follow-up, poverty, home deliveries, and delay in referrals all contribute to uterine rupture [1,2].

The incidence of ruptured uterus varies in different parts of the world. It is rare in developed countries as 0.086% in Australia and 0.023% in Ireland. Whereas, in the developing countries as frequent as 0.63% in Yemen, 0.57% in Ethiopia, and 0.45% in Morocco. Unlike in the developed world, where excessive and prolonged use of oxytocin in the presence of

scarred uterus is the major cause, in less developed countries, fetopelvic disproportion, causing obstructed labor, is the major cause of uterine rupture. Similarly, obstructed labor is leading cause of maternal illness and death in the Sub-Saharan Africa and South Asia. [3-5]. Rupture of uterus may occur spontaneously as a result of obstructed labor to fetopelvic disproportion, malposition and malpresentation, uncontrolled use of uterotonic agents, incompetent operative vaginal delivery, and obstetrics maneuvers including previous C/s and myomectomy [6]. Likewise, women are more likely to experience uterine rupture while laboring for a Vaginal Birth after Cesarean section (VBAC). Recent studies also indicated that the risk for uterine rupture is somewhat higher when labor is induced with misoprostol for women planned for VBAC, single-layer closure of prior cesarean incision, VBAC within less than 18 to 24 months after a prior cesarean, age older than 30 years, classical uterine incision, two or more prior Cesarean Section (C/S), and VBAC after the 40th week of pregnancy [7].

Uterine rupture is associated with both fetal and maternal clinical manifestations. A non-reassuring fetal heart rate pattern is the most common fetal finding, including variable and late decelerations, followed by bradycardia. Maternal manifestations are vaginal bleeding, sharp pain between contractions, contractions that slow down or become less intense, unusual abdominal pain or tenderness, recession of the fetal head, maternal tachycardia and hypotension [7]. In these situations, delay in management places both mother and fetus at significant risk. Major maternal complications are hemorrhage, shock, post-operative infections, bladder damage, ureteric damage, thrombophlebitis, amniotic or pulmonary embolism, disseminated intravascular coagulation and death [6,8,9].

Maternal mortality has been identified as a major public health problem in the developing world and various strategies to reduce it have been proposed and implemented by national governments and WHO for almost three decades. The primary health care strategy, the safe motherhood initiative, and later, the mother-baby package are a few of these [3,10]. Ethiopia is one of the developing countries where maternal and perinatal mortality rates are still very high. The maternal mortality ratio in Ethiopia is one of the highest in sub-Saharan African, 676/100,000 live births according to Ethiopian 2011 DHS data [4,11]. The high maternal morbidity, mortality and fetal mortality that follow uterine rupture calls for an integrated effort to prevent underlying factors. Good ANC, family planning services, early detection and referral of obstructed labor, availability of transportation and obstetric care are the essential factors to prevent uterine rupture and to decrease the maternal and fetal morbidity and mortality [12]. However, little is known about the prevalence and management outcomes of uterine rupture, particularly in the study area. Accordingly, the aim of this study is to examine the prevalence and management outcomes of uterine rupture. The result of this study will help the concerned authorities to design appropriate strategies that will prevent and reduce uterine rupture related maternal and fetal morbidity and mortality in the study setting and may be extrapolated to the community at large. This study will also help as a baseline for further studies in the future.

METHODS AND MATERIALS

Study area and period

The study was carried out in Wolisso St. Luke Catholic Hospital from March 1-30 2014 over five years retrospectively. Wolisso is the capital of South Western Shoa Zone and located 115 kilo meter (km) from Addis Ababa, the capital city of Ethiopia. Currently, it is providing full health care services for the population of Wolisso town and its surroundings estimated to be over 1.2 million people. Wolisso St. Luke Catholic Hospital is owned by Ethiopia Catholic Church and began service on January 2001. There are two Government Hospitals near Wolisso in Tulu Bolo, 35 km away and in Ambo, (West Shoa Zone) 65 km from Wolisso. Attat Hospital in the Gurage Zone (Southern people's Region) is 60 km from Wolisso. It has a total of 220 health care professionals, including 2 Surgeons, a Gynecologist, Internist, Ophthalmologist, Pediatrician, and 3 General practitioners/dentists. There are 200 beds in use; 14 beds in gynecology ward, 24 beds in maternity ward and 11 beds in obstetrics unit (3 waiting beds, 5 first stage, and 3 second stage beds). It also consists medical, surgical, ophthalmology, Orthopedic, physiotherapy, psychiatric, ultrasound and X-ray, and laboratory services. It also has maternal waiting area for high risk mothers.

Study Design: A facility based cross-sectional retrospective study was conducted to review incidence and factors associated with management outcome of uterine rupture at Wolisso St. Luke Catholic hospital in the past five years.

Population: The source population of this study are all records of pregnant women admitted for delivery at Wolisso St. Luke Catholic hospital while, the study Population is all records of pregnant women with a diagnosis of uterine rupture at Wolisso St. Luke Catholic hospital from January 1, 2009 to, December 31, 2013. Out of the total 14,152 deliveries occurred over the 5 years period, the records of 90 women with a diagnosis of uterine rupture were analyzed.

Inclusion & exclusion criteria

The inclusion criteria were all records of pregnant women with a diagnosis of uterine rupture while the exclusion criteria were all records of pregnant women recorded with incomplete information on the uterine rupture.

Data collection method

All records (delivery registration book and all operative records from operation log book) of women who came for delivery during the study period were reviewed to identify those women managed for uterine rupture from January 1, 2009 to December 31, 2013. The cards were collected from card room using medical record number. Based on the inclusion and exclusion criteria of the study, cards were selected for revision. The data were collected using questionnaire prepared by reviewing relevant literatures.

Study variables

The dependent Variables-were Maternal Outcome and Perinatal Outcome and the independent Variables were: Age, Address Gravidity, ANC follow-up, Gestational age, Onset of

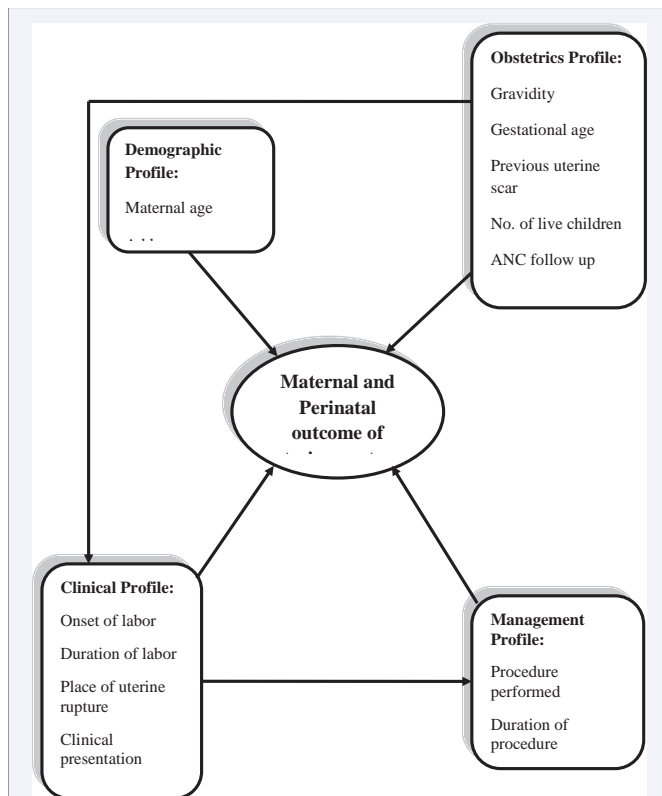


Figure 1 A conceptual framework developed based on review of different literatures. The arrows in the framework indicate the association between the factors (in the boxes) and the outcome variable.

labor Duration of labor, Place of rupture, Previous cesarean scar, Clinical presentation, Cause of uterine rupture Intra operative findings, Procedure done, Duration of procedure,

Data collection instruments and procedure

Two midwives collected the data after training on how to how to collect the data while the principal investigator supervised the data collection process.

Data quality control

Before actual data collection, the questionnaire was pre-tested on 5% of similar records from other similar hospital (Attat Hospital). Possible amendments were made to the tool based on the findings of the pre-test. Appropriate data collection techniques were followed during the process of data collection. Finally, crosschecking was made between data obtained from operation room books with that of patients' cards.

Data processing, analysis and interpretation

Data were entered and analyzed using SPSS version 16.0 windows soft ware and interpreted with frequencies, rates, and percentages.

Operational definitions of variables

- 1. Good maternal outcome:** Women with a clinical diagnosis of uterine rupture improved and discharged from the hospital and or/ developed no postoperative

complication/s

- 2. Bad maternal outcome:** Women with a clinical diagnosis of uterine rupture who have died in the pre, intra or post-operative period and or/ developed one or more postoperative complication/s.
- 3. Fetal outcome:** (Alive, Dead)
- 4. Combined site of uterine rupture:** When uterine rupture occurs in more than one uterine sites

Ethical consideration

Ethical permission letter was obtained from Ethical Clearance Board of Jimma University to undertake the research. Official letter was written and handed to Wolisso St. Luke Catholic Hospital and data collection was done following official permission from the hospital.

RESULT

A total number of deliveries during the study period were 14,152. There were 151 cases of uterine rupture with a prevalence of 1.07%. Sixty one were excluded because of incomplete documentation and missing cards. A total of ninety (90) uterine rupture were included for final analysis.

Demographic history

The majority of women 66.7% (60/90) with uterine rupture were from age group of 19-34 years old. In addition, most 96.7% (87/90) of the uterine rupture cases came out of Wolisso town (Table 1).

Obstetric profile

Of the total 90 cases of ruptured uterus, 67.8% of them were multigravid, 30% were grand-multigravid and 2.2% were primigravid. According to the previous live children data 90% had one or more live children. The highest number of rupture

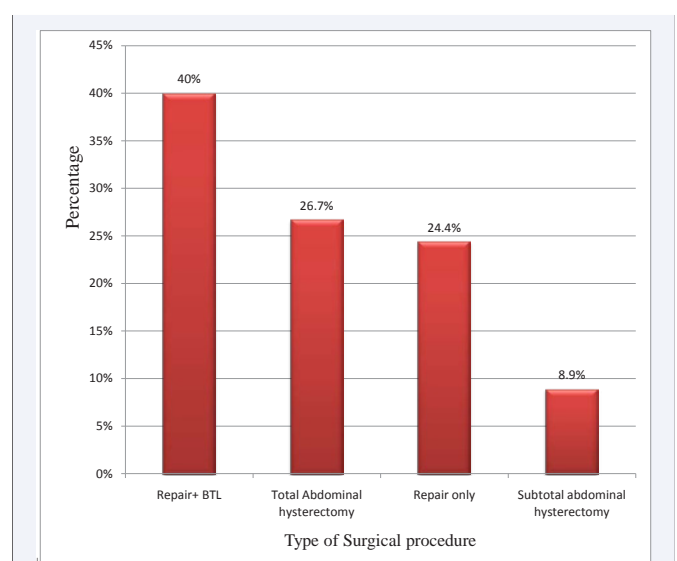


Figure 2 Type of surgical procedures performed among women admitted for uterine rupture.
 Abbreviation: BTL: Bilateral Tubal Ligation

Table 1: Age and address of the study subjects at Wolisso St. Luke Catholic Hospital. N=90.

	Frequency	Percentage (%)
Age in years		
≤18	8	8.9
19-34	60	66.7
≥35	22	24.4
Address		
In Wolisso town	3	3.3
Out of Wolisso town	87	96.7

(80%) was occurred in term pregnancy and the rest 20% were in post-terms. Forty eight (53.3%) mothers did not have any antenatal care follow up and only (46.7%) had follow up. Eighty four percent (76/90) of the mothers had no previous cesarean scar whereas 15.6% had previous cesarean scar. Of the total, 14 of the cases had previous cesarean scar, most of them (57.1%) had the scar on the lower uterine segment.

Clinical profile

The onset of labor was spontaneous in the 98.9% of cases and induction with pitocin was done for one (1.1%) of the cases. In the 63.3% of the mothers labor had lasted for more than 24 hours while it was less than 24 hours in the 36.7% of cases. Eighty seven percent (78/90) of cases presented with a sign of rupture at admission, while 13.3% were having rupture after hospital admission. Cessation of fetal movement was the main complaint in 78.9% of cases, abdominal pain in 77.8% and vaginal bleeding in 64.4% of the cases. Twenty three percent (21/90) of the women came with un-recordable Blood Pressure (BP). Fetal Heart Beat (FHB) was heard only in 12.2% of the cases at the time of admission (Table 2). The underline causes of uterine rupture were obstructed labor due to cephalo-pelvic disproportion and malpresentation/malposition, previous cesarean scar, obstetric maneuvers and induction/augmentations. Where obstructed labor due to cephalo-pelvic disproportion was the

Management profile

Rupture were complete in 86 (95.6%) and 4 (4.4%) incomplete of the cases. In 41.4% of the cases the rupture occurred in lower uterine segment. Repair with or without bilateral tubal ligation (36 with, 22 without) was done for 64.4% of the cases, (Table 3, 4 and Figure 2).

A 26.7% of women had associated organ injury. The commonest injured organ was vagina + cervix in 16.7% of cases. Upon operation ureteric injuries occurred in 2.2% of cases and the rest 97.8% did not have intra operative accident. The surgery lasted less than 60 minute in 57.8% and more than 60 minute for 42.2% of cases. Fifty percent (45/90) of women were having bad maternal outcome, of those 41(91.1%) developed one or more postoperative complications and 4(8.9%) women died after surgery. Regarding fetal outcome 85 (94.4%) babies were still born and 5(5.6%) babies delivered alive. Among the women who developed post operative complications (45/90), anemia was the commonest occurred in 33.3% of cases. Among the anemic cases 8(53.3%) women transfused with blood. 56.7% of women discharged within 7 days of hospital admission, while 33.3% of them stayed for 8 to 13 days and the rest 10% discharged after fourteen or more days (Table 5,6).

DISCUSSION

The prevalence of uterine rupture in the present study was 1.07% or 1 in 94 deliveries. The prevalence in this study is lower when compared to studies conducted in Pakistan university hospital (1:41) and in Ethiopia, Aira Hospital (1:27), Debre Markos Hospital (1:26) and Yirgalem General Hospital (1:19), [13-16]. However it is higher than studies done in Tanzania (1:445), Saudi Arabia (1:1,048) and Netherland (1:1708), [17-19]. This difference in prevalence may be difference in delivery service coverage, health seeking behavior of the community, accessibility of facilities, and availability of skilled personnel.

In our study 97.8% of cases were multiparas, 96.7% were rural residence, in the 63.3% of women labor lasted for more than 24 hours and 53.3% were not having antenatal care follow up. This result is consistent with other reports that multiparity, rural residence, prolonged labor and lack of antenatal care were risk factors for uterine rupture [3,13,17,20-23]. It is evidenced that increasing parity is used to be associated with increased rate of uterine rupture. Nevertheless, one study suggested that with proper antenatal care, modern obstetrics, and advanced neonatal services, there is no difference in outcome between garnd-multiparous women and women with low parity [24]. As reported by the WHO's systematic review in developed countries rupture of the uterus is largely associated with previous cesarean scar which may be due to high caesarean section rate as compared to less and least developed countries where, 75% of cases of uterine rupture were associated with unscarred uterus [25]. Our finding showed that majority (84.4 %) of uterine rupture occurred on unscarred uterus but only 15.6% were from women who have previous cesarean scar, which is comparable with other studies done in developing countries [3,17,18,21]. The commonest reported causes of ruptured uterus in this study were obstructed labor due to cephalopelvic disproportion (42.2%), malpresentation and mal-position (37.8%), which is in concordance with reports from other developing countries [3,17].

In the present study uterine rupture occurred after hospital admission in 12 (13.3%) cases. One possible cause of uterine rupture that occurred in the hospital setting is induction or Pitocin-augmentation. In this study induction/augmentation contributed for 1.1 % uterine rupture, while a study in USA showed the overall rate of rupture among all patients with induction of labor was 2.3% [26]. The difference might be due to the fact that, the US study was done among women who had one prior caesarian section, while previous C/s is a risk factor for uterine rupture by itself. It should be noted that, uterine rupture after hospital admission is unacceptable, signaling early detection of warning signs of uterine rupture and take appropriate timely measures.

The type of surgical intervention in ruptured uterus depends on the site, extent, hemodynamic status of the patient, fertility wish, as well as experience of the surgeon. In this study, repair with bilateral tubal ligation (40%), and repair only (24.4%) were the two most obstetric managements done for uterine ruptured cases. Our result is in agreement with other studies [17,21,23]. This maybe because ruptured uterus is an obstetric emergency that require quick response to arrest bleeding and repair provides a quick means to achieve homeostasis. In the context of Ethiopian culture, a sterile woman can face long term social and economic problems, which would also justify for the above procedures.

Table 2: Distribution of clinical presentation of the study subjects at Wolisso St.Luke Catholic Hospital. N=90.

Clinical signs and symptoms of uterine rupture		Frequency	Percentage (%)
Cessation of fetal movement	Yes	71	78.9
	No	9	10
Constant abdominal pain	Yes	70	77.8
	No	17	18.9
Vaginal bleeding	Yes	58	64.4
	No	31	34.4
Abdominal tenderness	Yes	82	91.1
	No	6	6.7
Uterine contraction	Yes	7	7.8
	No	83	92.2
Abdominally palpable fetal parts	Yes	55	61.1
	No	26	28.9
Vital Signs			
Maternal BP	Recordable	21	23.3
	Un-recordable	69	76.7
FHB	Negative	79	87.8
	Positive	11	12.2

Table 3: Distribution of cause of uterine rupture of the study subjects at Wolisso St. Luke Catholic Hospital. N=90.

Cause	Frequency	Percentage (%)
Cephalo-pelvic disproportion	38	42.2
Malpresentation/Malposition	34	37.8
Previous C/S scar	14	15.6
Obstetric maneuvers	3	3.3
Induction/Augmentation	1	1.1

Table 4: Frequency distribution of the site of uterine rupture of the study subjects. N=90.

Site of uterine rupture	Frequency	Percentage
Lower uterine segment	37	41.1
Combined sites	21	23.3
Lateral (right or left)	11	12.2
Posterior	11	12.2
Fundal	10	11.1

Table 5: Maternal and neonatal outcomes of the study subjects at Wolisso St.Luke Catholic Hospital. N=90.

Outcome		Frequency	Percentage (%)
Maternal	Good	45	50
	Bad	45	50
Neonatal	Dead	84	93.3
	Alive	5	5.6

***Good maternal outcome**-women discharged from the hospital alive and or/ developed no postoperative complication/s

***Bad maternal outcome**-women who have died and or/ developed one or more postoperative complication/s.

The high perinatal mortality rate in this study 94.4% is in correlation with reports from Adigrat (98.1%) and Tanzania (96.3%) [17,27]. On the contrary it is higher when compared with other studies done in Yemen (54.3%), Saudi Arabia (33%), and Netherland (8.7%) [3,18,19]. The high perinatal mortality rate may possibly be due to majority of women came after cessation of fetal movement, delay between diagnosis and operation and problems related to neonatal care.

Similar to other studies [3,13,22], the commonest maternal morbidities associated with uterine rupture in this study were anemia (33.3%), wound site infection (22.2%) and dehiscence (17.8%). Among anemic patient's blood was transfused for 53.3% of cases which is comparable with Ishraq's report [3]. The maternal case fatality rate (4.4%) which is lower compared to studies done in Tanzania and Jamshoro, where the case fatality rate ranges between 12.9% to 20% [17,28], but comparable with 5% and 6% in Aira and Yirgalem General hospital, Ethiopia and 5.9% in university hospital, Pakistan [13,14,16]. However our result is higher than other studies where there is no maternal death due to uterine rupture at all [3,18]. The maternal morbidity and mortality may be due to delay in presentation of the mother to the health facility, delay in diagnosing uterine rupture and appropriate management [29,30].

CONCLUSION

The incidence of uterine rupture is high, 1 in 94 deliveries and maternal case fatality rate was 4.4%. Perinatal mortality rate was also high. Multiparity, rural residence, prolonged labor and lack of antenatal care were predisposing factors while obstructed labor was the leading cause of uterine rupture as reported in the operation logbook. Half of the women develop post operative complications. Obstructed labor being the leading cause of uterine rupture might be associated with early marriage and early child bearing as such harmful traditional practice (early marriage) is common in Ethiopia. Thus, creating public awareness on the consequences of early marriage could play a big role to reduce uterine rupture and its outcomes. Obstetricians and Midwives should be competent enough to prevent and detect early warning signs and symptoms of uterine rupture while making BEmONC and CEmONC services accessible.

Finally, the use of pretested survey questionnaire, training and supervision of data collectors would lend strength to this study. However, having information from records and logbooks might have suffered incompleteness. The sample size is smaller in our study (90), this limited our analysis to be only descriptive that would have otherwise been inferential and found out statistically significant independent factors (depicted in the conceptual framework) contributing to the outcomes of uterine rupture in the logistic regression analysis. The study being institution based, cross sectional design limits the potential to draw causal inferences. Therefore, longitudinal study with increased sample size is needed to identify various risk factors and outcomes of uterine rupture which would inform policy makers and other stakeholders to design strategies that would contribute to achieve the SDG goals targeted to reduce maternal and perinatal morbidity and mortality as a result of uterine rupture.

AUTHORS' CONTRIBUTIONS

TG- Conceptualized, designed the study; collected, analysed, interpreted the data and edited the manuscript

DW- Conceptualized, designed the study, interpreted the data and edited the manuscript.

CH- Conceptualized, designed the study, interpreted the data and edited the manuscript.

BT- Designed the study, analysed, interpreted the data and drafted the manuscript.

All authors have read and approved the final manuscript.

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