GEORGIAN MEDICAL NEWS

ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**,ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმების (ინგლისურ,რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენ-ტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ,რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი,მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემა-ჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები,ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტო-სურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი,ანათლების შედებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სუ-რათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოურ ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხო-ური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიდრმით). ანბანური წყობით წარმოადგენით ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი,წელი,ჟურნალის №,პირველი და ბოლო გვერდები). მონოგრაფიის შემოხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიდრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანე-ლის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა,მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა,რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შე-ჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

Содержание:

DETERMINANTS OF PRETERM BIRTH AMONG MOTHERS WHO GAVE BIRTH AT A REFERRAL HOSPITAL, NORTHWEST ETHIOPIA: UNMATCHED CASE- CONTROL STUDY

Sefineh Fenta Feleke[1]*, Anteneh Mengsit[2], Anteneh Kassa[3], Melsew Dagne[4], Tiruayehu Getinet[2], Natnael Kebede[5], Misganaw Guade[1], Mulat Awoke[4], Genanew Mulugeta1, Zeru Seyoum[5], Natnael Amare[5].

[1]Department of Public Health, Collage of Health Sciences, Woldia University, Woldia, Ethiopia.

[2]Department of Public Health, Collage of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia.

[3]Department of Public Health, Collage of Health Sciences, Wolkite University, Wolkite, Ethiopia.

[4]Department of Nursing, Collage of Health Sciences, Woldia University, Woldia, Ethiopia.

[5]School of medicine. Collage of Health Sciences, Woldia University, Woldia, Ethiopia.

Abstract.

Background: Preterm birth is described as babies that are born alive before the end of 37 weeks of pregnancy. About 15 million babies are born preterm annually and more than a million died due to complications. In developing nations, like Ethiopia, PTB is underreported and underestimated.

Objective: To identify determinates of preterm birth among mothers who gave birth at Felege Hiwot Comprehensive Specialized Referral Hospital, Northwest Ethiopia.

Method: Unmatched case-control study design was conducted. The total sample size was 558 mothers 140 cases and 418 controls. Simple random sampling was used to select the study population. Data were coded and entered into Epidata, version 3.2, and was analyzed by using STATA version 14.

Result: Mothers with a history of antepartum hemorrhage (AOR 3.53, 95% CI 1.31-9.47), premature rupture of membrane (AOR 8.9, 95% CI 4.51-17.57), pregnancy-induced hypertension (AOR 3.65, 95% CI 1.78-7.51), history of multiple pregnancies (AOR 2.49, 95% CI 0.89-6.95), primigravida (AOR 0.16, 95% CI 0.03-0.97) and Primiparity(AOR 0.054, 95% CI 0.05-0.64) had statistically significant association with experiencing preterm birth.

Conclusions: The odds of giving preterm birth were higher among women with antepartum hemorrhage, PIH, PROM, and multiple pregnancies, but lower among primigravida and primiparous mothers.

Key words. Preterm, determinants, pregnancy, Ethiopia.

Introduction.

Preterm birth is described as babies that are born alive before the end of 37 weeks of pregnancy. Preterm births dependent on gestational age has sub-categories: highly preterm (less than 28 weeks); very preterm (28-32 weeks); moderate to late preterm (32-37 weeks) [1].

Preterm birth can be accidental (due to spontaneous preterm labor and/or preterm membrane rupture) or induced by the provider (by cesarean or labor induction) [2]. Literature cites a relative proportion of 70 percent are spontaneous preterm birth and 30 percent are provider-initiated preterm births [2]. Common indications for provider-initiated preterm birth include maternal (such as pre-eclampsia, eclampsia, placental abruption, and placenta previa) or fetal (such as intrauterine growth restriction or fetal distress) conditions [3].

An estimated 15 million babies worldwide are born too early. That's more than 1 in 10 infants. About 1 million newborns die per year because of preterm birth complications [4].

Across 184 countries, the rate of preterm birth ranges from 5% to 18% of babies born [5]. However, there are stark disparities in survival rates around the world. Half of the babies born at or below 32 weeks die in low-income settings due to a lack of practical, cost-effective, and critical care, such as comfort, breastfeeding assistance, basic infection care, and trouble Breathing [6]. In Ethiopia, every year, 320,000 babies are born too early and because of direct preterm complications, 24,400 children under five die [7]. According to the 2019 Mini Ethiopia Demographic and Health Survey neonatal mortality rate was 30 deaths per 1,000 live births and prematurity was the major cause of death [8].

Furthermore, the effect of preterm birth is also prolonged beyond the neonatal phase and throughout life [9]. Hence, the largest risk of severe health issues, including cerebral palsy, intellectual disability, chronic lung disease, and vision and hearing loss, is faced by babies born before maturity. This introduces a lifelong disability dimension. At some point in their lives, most people will face the struggles and potential disasters of preterm birth either directly in their families or indirectly through events for the nations.

Factors associating the underlying epidemiological or medical risk factors with preterm birth are poorly understood and the exact etiology is still not known. However, certain factors are known to increase the risk of a woman entering a preterm birth [10,11].

Well-known risk factors for preterm birth are demographic factors such as young maternal age, rural residence, Short interval between pregnancies, < 4 antenatal care visits, antepartum hemorrhage, chronic illness, pregnancy induced hypertension, multiple pregnancy, history of preterm birth, premature rupture of membrane, hemoglobin level less than 11g/dl, low educational level and poor maternal nutritional status before and during pregnancy [12-16].

Preterm childbirth, however, may be generally preventable. Three-quarters of preterm birth-related deaths may be prevented without an intensive care unit. Current cost-effective interventions include antenatal corticosteroids injections for pregnant women of 24-34 weeks of gestational age at risk of preterm delivery; kangaroo mother care, early initiation (initiated

within the first hour of birth) and exclusive breastfeeding for the first six months of life and basic care for infections and breathing difficulties [1].

To alleviate this burden in the past few decades, numerous methods have been attempted internationally, including in Ethiopia, to prevent and enhance the treatment of preterm births [17-19]. The literature recommends treatment methods for improving preterm birth-related outcomes such as antenatal corticosteroid use, antibiotics, mother care for kangaroos, urgent intensive care, and diverse long-term health services. Through aligning policies with Sustainable Development Goals (SDGs) and investing in Every Woman and Every Child initiative, the global community has dedicated itself to reducing preterm births [20,21]. Collectively, pre-term birth prevention, diagnosis and management are a wise approach to accelerate the achievement of the global goal of ending all preventable deaths of newborns and children by 2030. At the same time, this approach would decrease maternal deaths and stillbirths and associated health system costs.

Preterm birth prevention is a global research priority, but to date, limited progress has been achieved. Research is underway to recognize genomic, transcriptomic, proteomic, immunologic, and metabolomic preterm birth markers early in pregnancy and improve the assessment of gestational age [22].

In developing nations, like Ethiopia, PTB is under reported and underestimated. However, it is the leading cause of neonatal and under-five mortality in Ethiopia. Furthermore, research examining determinants of preterm birth in Ethiopia is limited. Therefore, this study aimed to determinates of preterm birth among mothers who gave birth at Felege Hiwot Comprehensive Specialized Referral Hospital, Northwest Ethiopia.

Methods.

Study setting and study period:

Unmatched case–control study design was conducted from 24th February 2021 to 30th April 2021 from medical records of mothers and newborns in Felege Hiwot Referral hospital from January 30/2019 to January 30/2021. Felege Hiwot comprehensive specialized hospital was established with the German State government during the regime of Emperor H/ Selassie I in April 1963 G.C and is one of the oldest public hospitals in the Northwestern part of the country and located at northern end of the city near Lake Tana and aspires to see a healthy, productive, and prosperous society and become a center of medical service Excellency by 2029. During its establishment, it was planned to serve for 25,000 people. Currently it serves more than 10 million people coming from Bahir Dar city, west Gojjam zone, east Gojjam zone, Awi zone, North and South Wollo zones, South& North Gondar zones and some parts of Benishangul Gumuz and Oromia regions. The hospital has currently a total of 1431 manpower (5 obstetrician and gynecologist and 63 midwives among others) in different disciplines. It has a total 500 formal beds, 11 wards (emergency ward and Inpatient wards such as Gynecological &Obstetric, Surgical, orthopedics, Medical, Pediatric, L&D, Eye unit, NICU, psychiatrics, oncology and 22 OPDS), 39 clinical and non-clinical departments /service units / providing laboratory,

Diagnostic, curative & Rehabilitation service at outpatient & inpatient bases as well as disease prevention & health promotion services.

Study Design:

This was unmatched case–control. Cases were live newborns delivered before 37 completed weeks of gestational age (preterm) at FHCSH from January 30/2019 to January 30/2021. Controls were live newborns delivered after 37 completed weeks of gestational age (term) in the same study area during the same period. Cases and controls were randomly selected from medical records.

Sample size determination:

Sample size will be estimated by using EPI INFO 7.2.2.Software by considering double population proportions formula. Different variables that were associated with preterm birth will be used and the variable that yields highest sample size will be used. Sample size will be calculated using r = 3 (ratio of cases to controls), 80% power and 95% confidence level, nonresponse rate 10% and percent history of abortion among controls (no preterm births) and cases (preterm births) 23.3% and 38.3% respectively from the study conducted in Dilla University Referral Hospital is provided a total sample size of 459 (which included for Cases 115 and for controls 344) (Table 1).

$$n = \frac{[[z\alpha/2\sqrt{(1 + 1/\gamma)}\, p\, (1 - p)] + [z\beta\sqrt{p1\, (1 - p1)} + \underline{\frac{p2\, (1 - p2)]}}{\gamma}}]^2}{(p1 - p2)2}$$

where n1 is sample size, zα standard normal variant for level of significance, r number of controls per case, zβ standard normal variant for power or type II error, p1 probability of events in control group, and p2 probability of events in case group.

Sampling technique:

Simple random sampling was used to select the study population: medical records of all live births delivered at FHCSH during the study period, categorized into preterm (case) and term (control) based on gestational age from logbooks. Then, cases and controls were extracted from logbooks. Using computer generated random number, desired sample sizes of 115 cases and 334 controls were selected by random sampling.

Variables of the study.

Dependent variable:

Newborn this was dichotomized as 1 if neonate is preterm and 0 if neonate is not.

Independent variables:

Socio-demographic characteristics: Residence, Maternal age. **Maternal obstetric characteristics:** History of preterm birth, History of abortion, gravidity, Parity Multiple pregnancy, APH, PROM, and PIH. **Maternal medical condition:** HGB, Diabetic mellitus, Chronic Hypertension and HIV.

Operational definitions:

Last Menstrual Period: The date of the starting of last menstruation the women had to the index pregnancy.

Table 1. Sample size determination for determinates of preterm birth among mothers who gave birth at Felege Hiwot Comprehensive Specialized Referral Hospital, 2021.

S.No	Variables	Percent of exposure among control	Percent of exposure among cases	Case to control ratio	Sample size (with 10% non-response)
1.	Birth interval less than 2 years [14]	17.8%	33.7 %	1:3	366
2.	History of preterm birth [23]	3.8%	16.9 %	1:3	256
3.	Pregnancy induced hypertension [24]	12%	25.9 %	1:3	381
4.	History of abortion [25]	23.3%	38.3%	1:3	459*
5.	Urinary tract infection [25]	7.2%	18.3%	1:3	429

Table 2. Demographic characteristics of mothers who gave birth at Felege Hiwot Comprehensive Specialized Referral Hospital, Northwest Ethiopia, 2021.

Maternal Demography	Category	Cases, n (%)	Controls, n (%)	Total, n (%)
Age	< 20 yrs.	17 (14)	51 (15)	68 (15)
	20-34 yrs.	92 (79)	288 (84)	380 (82)
	>=35 yrs.	7 (10)	4 (1)	11 (2)
Residence	Urban	72 (62)	247 (72)	319 (69)
	Rural	44 (37)	96 (28)	140 (30)

Anemia: According to WHO, the pregnancy anemia defined as HGB level below 11 gm/dl (HCT<33%).

Pregnancy induced hypertension (PIH): Is systolic blood pressure ≥ 140 mm Hg or diastolic blood pressure ≥ 90 mm Hg at after gestation age of twenty weeks on previously normal hypertensive woman.

Gravidity: The total number of pregnancies, including abortion, ectopic pregnancy and any other pregnancies documented on the chart.

Parity: The number of deliveries after 28 weeks of gestation including IUFD and still birth documented in the chart.

Instrument.

Data was collected using a semi structured checklist through chart review. Checklists were developed after reviewing various relevant literatures [12,14-16,26]. It consists of socio-demographic (Maternal age, Residence), Maternal obstetric characteristics : (History of previous preterm birth, History of previous abortion, gravidity, Parity, Multiple pregnancy, APH, PROM, Gestational DM and PIH), Maternal medical condition : (Anemia, Diabetic mellitus, Chronic Hypertension, UTI, and HIV). A total of five health personnel were involved in the data collection process. four health personnel, who have diploma in Midwifery, as data collectors and one personnel, who own Bachelor of Science (BSc) Degree in Midwifery, as supervisors.

Data Analysis.

Data were coded and entered into Epidata, version 3.2 and using STATA version 14 for cleaning and analysis. Data were summarized using simple frequency tables, graphs, and charts. Bivariable analysis was done for candidate associated factors for multivariable logistic regression analysis at P<0.25 and multivariable logistic regression analysis employed to assess the relative effect of independent variables on dependent variables, with significance at P=0.05.

Research Ethics Approval.

The ethical consent was obtained from the ethical review board of Bahir Dar University, college of medicine and health sciences Institutional review board. Ethical approval number was not given since it was given as an assignment to full fill part of research methodology course. It is a retrospective study of medical records and personal identifiers were not used on the data collection checklist. So, the IRB waived the requirement for informed consent from each participant. The chief executive officer at Felege Hiwot Comprehensive Specialized Hospital offered permission to conduct the study. Confidentiality and privacy were maintained by omitting the personal identifier of the participant during the data collection procedure and information was used only for research purposes.

Patient and public involvement.

There was no direct interaction with patients in this study and no direct patient involvement in the design or conduct of this study.

Results.

Demographic characteristics of mothers:

Median age of mothers who gave birth is 24 years old with IQR (29-19 years). The majority of the participants 380 (82 %) were in the age group of 20-34 years. More than two third of the participants 319 (69 %) were urban residents (Table 2).

Obstetric and Clinical Characteristics of mothers:

In terms of obstetric characteristics, 18 (53%) of the mothers in the cases has previous had an abortion, whereas just 4 (66%) of the mothers in the control group has previously had an abortion. More than two-thirds of the 340 controls (99%) are primigravida, while only 3 (1%) are multigravida. When it comes to antepartum hemorrhage, 20 (17 %) of the cases has antepartum hemorrhage, while 10 (3%) of the controls has antepartum hemorrhage.

Nearly, 29 (25%) of cases had history of pregnancy induced hypertension, while 30 (8.7%) of controls had history of pregnancy induced hypertension. In terms of previous pregnancies, 15 (13%) of cases and 15 (4%) controls have had multiple pregnancies.

Regarding on clinical characteristic of mothers only 5 (4 %) cases have HIV status positive, whereas 15 (4%) controls have HIV status positive. About hemoglobin level, 22 (19%) cases have Hgb level less than 11gm/dl, while 65 (19 %) controls have Hgb less than 11gm/dl (Table 3).

Determinates of preterm birth:

Variables that have a P-value of less than 0.25 were moved to multivariable logistic regression analysis to determine the predictors of preterm birth. Based on the final multivariable analysis model, variables that were identified as independent predictors of preterm birth were as follows: gravidity, parity, antepartum hemorrhage, pregnancy induced hypertension, multiple pregnancies, premature rupture of membrane and age.

Mothers with a history of antepartum hemorrhage had three-fold-higher odds of having preterm birth (AOR 3.53, 95% CI 1.31-9.47) compared to mothers with no history of antepartum hemorrhage. Mothers with a history of pregnancy induced hypertension were more than three times (AOR 3.65, 95% CI 1.78-7.51) as likely to have preterm birth as their control counterparts.

The odds of having preterm birth among mothers who had premature rupture of membrane were 8.9 times that of those who had not premature rupture of membrane (AOR 8.9, 95% CI 4.51-17.57). Mothers who had a history of multiple pregnancies during pregnancy had 2.49 times the odds of having PTBs compared to those who had not multiple pregnancies (AOR 2.49, 95% CI 0.89-6.95).

Being a primigravida (first-time pregnant) is associated with a significantly lower risk of preterm birth compared to being a multigravida (AOR 0.16, 95% CI 0.03-0.97). Having one child (primiparity) is associated with a significantly lower risk of preterm birth compared to being a multipara (AOR 0.054, 95% CI 0.05-0.64) (Table 4).

Discussion.

This study was an unmatched case-control study on 459 mothers who gave birth at Felege Hiwot Referral Hospital intending to identify the determinant of preterm births. PTB remains a significant cause of morbidity and mortality among neonates and children. In Ethiopia, every year, 320,000 babies are born too early and because of direct preterm complications, 24,400 children under five die. According to the 2019 Mini Ethiopia Demographic and Health Survey neonatal mortality rate was 30 deaths per 1,000 live births and prematurity was the major cause of death. The present study aimed to assess determinants of PTB, in order to contribute to tackling morbidity- and mortality-related PTBs. By combining as many risk factors as feasible, this study tried to look at the determinants of PTB. Several maternal variables were shown to be strongly linked to preterm birth. These include gravidity, parity, antepartum hemorrhage; pregnancy induced hypertension, multiple pregnancies, and premature rupture of membrane.

The present study showed that current obstetric complications, such as APH, PROM, PIH, and were associated with the risk of PTB. Similarly significant associations have been observed in Iran, China, and India. This suggests that contemporary obstetric problems may have a significant impact on preterm birth rates.

The result from multivariable regression analysis in the present study shows that multiple pregnancies have been associated with the increased likelihood of PTB. Thus, women with multiple pregnancies were 2.49 times more likely to experience PTB as compared to those women with singleton pregnancies

Table 3. *Obstetric and Clinical characteristics of mothers who gave birth at Felege Hiwot Comprehensive Specialized Referral Hospital, Northwest Ethiopia, 2021.*

Obstetric characteristics	Category	Cases, n (%)	Control, n (%)	Total, n (%)
History of previous abortion	Yes	18 (53)	4 (66)	22 (55)
	No	16 (47)	2 (34)	18 (45)
Gravidity	Primigravida	79 (68)	340 (99)	419 (91)
	Multigravida	37 (32)	3 (1)	40 (9)
Parity	Primiparity	81(69)	342(99)	423(92)
	Multiparty	35(31)	1(1)	36(8)
History of antepartum hemorrhage	Yes	20 (17)	10 (3)	30 (6)
	No	96 (83)	333 (90)	429 (94)
History of pregnancy induced hypertension	Yes	29 (25)	30 (8.7)	59 (13)
	No	87 (75)	313 (91)	400 (87)
History of multiple pregnancy	Yes	15 (13)	15 (4)	30 (6)
	No	101 (87)	328 (96)	429 (94)
Clinical characteristics				
HIV Status	Positive	5 (4)	15 (4)	20 (4)
	Negative	111 (96)	328 (96)	439 (96)
Hgb level	<11gm/dl	22 (19)	65 (19)	87 (18)
	>=11gm/dl	94 (81)	278 (81)	372 (82)
History chronic hypertension	Yes	3 (2)	4 (1)	7 (1)
	No	113 (97)	339 (99)	452 (99)

Table 4. *Multivariate analysis for determinants of preterm birth among mothers who gave birth at Felege Hiwot Comprehensive Specialized Referral Hospital, Northwest Ethiopia, 2021.*

Variables		Case, n (%)	Control, n (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Gravidity	Primigravida	79(68)	340 (99)	0.019(0.06-0.063)	0.16 (0.03-0.97)
	Multigravida	37(32)	3 (1)	1	
Parity	Primiparity	81(69)	342(99)	0.07(0.001-0.05)	0.054(0.05-0.64)
	Multiparty	35(30)	1(0.1)	1	
APH	Yes	20 (17)	10 (3)	6.93(3.14-15.32)	3.53(1.31-9.47)
	No	96 (83)	333 (90)	1	
PIH	Yes	29 (25)	30 (8.7)	3.47(1.98-6.10)	3.65(1.78-7.51)
	No	87 (75)	313 (91)	1	
PROM	Yes	58(50)	22(6)	14.59(8.29-25.66)	8.9(4.51-17.57)
	No	58(50)	321(94)	1	
Multiple pregnancy	Yes	15 (13)	15 (4)	3.24 (1.53-6.87)	2.49(0.89-6.95)
	No	101 (87)	328 (96)	1	
Age	< 20 yrs.	17 (14)	51 (15)	0.19(0.05-0.73)	8.05(0.22-10.49)
	20-34 yrs.	92 (79)	288 (084)	0.18(0.052-0.63)	5.61(0.16-7.84)
	>=35 yrs.	7 (10)	4 (1)	1	1

Abbreviation: *APH: Antepartum Hemorrhage; PIH: Pregnancy Induced Hypertension; PROM: Premature Rupture Membrane.*

This finding is supported by other similar conducted studies [24,27,28]. This may be due to because of excessive uterine distension (because the same higher risk is observed with polyhydramnios). Or the statistically significant association between multiple pregnancies and PTB might be due to the fact that multiple pregnancies could invoke uterine over distention which might revolve to end up with spontaneous PTB. In addition, multiple pregnancies are more likely to be linked with numerous complications such as preeclampsia, PROM, and polyhydramnios and these all per se could contribute to iatrogenic PTB. In addition, the more fetuses present, the higher the rate of preterm birth. This study also showed that antepartum hemorrhage is significantly associated with preterm birth line with other studies [16,29-33].

We found that mothers with PROM had more than eight increased the likelihood of having PTB as compared to mothers with no PROM. This is consistent with the study done [14,16,29-32]. The effect of a burst membrane on uterine contraction could explain this. Existing scientific evidence confirms that when a membrane ruptures, natural uterotonic chemicals are released, and these uterotonic chemicals drive uterine contraction, resulting in PTB.

Another determinant of preterm birth is pregnancy induced hypertension. Women who had pregnancy induced hypertension were 3.65 times more likely to have preterm birth as compared to those who had no pregnancy induced hypertension. This study is in agreement with the study done [23,24,34-36]. This could be related to vascular injury to the placenta caused by pregnancy-induced hypertension issues or iatrogenesis caused by the severity of hypertension or its complications. As a result, the oxytocin receptors are activated, resulting in preterm labor and delivery. Or else this conclusion could be explained by current scientific evidence suggesting that PIH is linked to vascular and placental injury, which causes oxytocin receptors to be activated, resulting in PTB.

The result from multivariable regression analysis in the present study shows both primigravida and Primiparity are both preventive factors for preterm birth. Which contradicts a study done in state of Missouri [37], which states that primiparous women are at increased risk of both medically indicated and spontaneous preterm birth. The findings suggest that studies on preterm birth should consider a risk assignment to include three groups.

Strengths of this study include the fact that it used statistical analyses appropriate to the study design and those cases and controls were selected correctly for a case–control study, with the results matching the method described. Limitations include the use of medical records of mothers and PTBs admitted to FHCSH, the results of which might lack generalizability to the entire population in the catchment areas. Furthermore, data were collected from each mother's card; due to this, some important variables were missed, such as previously highlighted factors with preterm birth in different studies.

Conclusion.

The odds of giving PTB were higher among women with antepartum hemorrhage, PIH, PROM and multiple pregnancies, but lower among primigravida and primiparous mothers. Most of the determinants of PTB were found to be modifiable. Thus, putting emphasis on prevention of obstetric and gynecologic complications such as antepartum hemorrhage, PIH and PROM would decrease the incidence of PTB.

Author contributions.

SFF, AMD, AK, and NA conception and design. MD, TG, MG and MA acquisition of data and analysis. SFF, ZY and GM drafted the manuscript and wrote it. All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Data availability statement.

The data set is available from the corresponding author on request.

REFERENCES

1. World Health Organization : Preterm birth and low birth weight. 2020.
2. Mete S, Ozberk H. Relaxation-Focused Nursing Care in Threatened Preterm Birth: Can it be a Complementary Treatment? International Journal of Caring Sciences. 2020;13:1489.
3. Souza RT, Cecatti JG, Passini Jr R, et al. The burden of provider-initiated preterm birth and associated factors: evidence from the brazilian multicenter study on preterm birth (EMIP). PloS one. 2016;11:e0148244.
4. Liu L, Oza S, Hogan D, et al. Global, regional, and national causes of under-5 mortality in 2000-15: an updated systematic analysis with implications for the Sustainable Development Goals. Lancet. 2016;388:3027-35.
5. World Health Organization. WHO fact sheet on preterm birth. http://www.who.int/mediacentre/factsheets/fs363/en/
6. Organization WH: WHO fact sheet: Preterm birth. World Health Organization, Geneva, Switzerland. http://www who int/mediacentre/factsheets/fs363/en/
7. https://reliefweb.int/report/ethiopia/ethiopia-profile-preterm-and-low-birth-weight-prevention-and-care
8. DHS Program. Mini Ethiopia Demographic and Health Survey – 2019. Rockville (MD): ICF; 2019.
9. US Agency International Development Project Concern International, "Ethiopia profile of preterm and low birth weight prevention and care," ReliefWeb, Ethiopia, 2015.
10. F. A: Born too soon: the global action report on preterm birth: World Health Organization. 2012.
11. Offiah I ODK, Kenny L. Clinical risk factors for preterm birth. Preterm Birth-Mother and Child 1st ed InTech. 2012:73-94.
12. Muchie KF, Lakew AM, Teshome DF, et al. Epidemiology of preterm birth in Ethiopia: systematic review and meta-analysis. BMC pregnancy and childbirth. 2020;20:1-12.
13. Laelago T, Yohannes T, Tsige G. Determinants of preterm birth among mothers who gave birth in East Africa: systematic review and meta-analysis. Italian Journal of Pediatrics. 2020;46:10.
14. Woday A, Muluneh MD, Sherif S. Determinants of preterm birth among mothers who gave birth at public hospitals in the Amhara region, Ethiopia: A case-control study. PloS one. 2019;14:e0225060.
15. Wudie F, Tesfamicheal F, Fisseha H, et al. Determinants of preterm delivery in the central zone of Tigray, northern Ethiopia: A case-control study. South African Journal of Child Health. 2019;13:108-114.
16. Woldeyohannes D, Kene C, Gomora D, et al. Factors Associated with Preterm Birth among Mothers Who gave Birth in Dodola Town Hospitals, Southeast Ethiopia: Institutional Based Cross Sectional Study. Clinics Mother Child Health. 2019;16:2.
17. Soon BT. The global action report on preterm birth. Geneva: World Health Organization. 2012.
18. Griffin JB, Jobe AH, Rouse D, et al. Evaluating WHO-recommended interventions for preterm birth: a mathematical model of the potential reduction of preterm mortality in Sub-Saharan Africa. Global Health: Science and Practice. 2019;7:215-227.
19. Victora CG, Rubens CE, Group GR. Global report on preterm birth and stillbirth (4 of 7): delivery of interventions. BMC Pregnancy and Childbirth. 2010;10:S4.
20. Assembly G. United Nations: Transforming our world: The 2030 agenda for sustainable development. In.: Tech. Rep. 1; 2015.
21. Child EWE. The global strategy for women's, children's and adolescents' health. New York, NY: Every Woman Every Child. 2015.
22. World Prematurity Day: improving survival and quality of life for millions of babies born preterm around the world. 2020.
23. Abaraya M, Seid SS, Ibro SA. Determinants of preterm birth at Jimma university medical center, Southwest Ethiopia. Pediatric health, medicine and therapeutics. 2018;9:101.
24. Mekuriyaw AM, Mihret MS, Yismaw AE. Determinants of Preterm Birth among Women Who Gave Birth in Amhara Region Referral Hospitals, Northern Ethiopia, 2018: Institutional Based Case Control Study. International Journal of Pediatrics. 2020:2020.
25. Wakeyo D, Addisu Y, Mareg M. Determinants of Preterm Birth among Mothers Who Gave Birth in Dilla University Referral Hospital, Southern Ethiopia: A Case-Control Study. BioMed Research International, 2020.
26. Wassie M, Manaye Y, Abeje G, et al. Determinants of Preterm Birth among Newborns Delivered in Bahir Dar City Public Hospitals, North West Ethiopia. 2020.
27. Hailemichael HT, Debelew GT, Alema HB, et al. Determinants of adverse birth outcome in Tigrai region, North Ethiopia: Hospital-based case-control study. BMC pediatrics. 2020;20:1-9.
28. Shiferaw M, Tebeje NB, Mekonnen HS. Preterm birth determinants among newborns at six public hospitals in Northeast Amhara, Ethiopia: unmatched case-control study. 2020.
29. BMC Res Notes.
30. Berhe T, Gebreyesus H, Desta H. Determinants of preterm birth among mothers delivered in Central Zone Hospitals, Tigray, Northern Ethiopia. BMC research notes. 2019;12:266.

31. Mekonen DG, Yismaw AE, Nigussie TS, et al. Proportion of Preterm birth and associated factors among mothers who gave birth in Debretabor town health institutions, northwest, Ethiopia. BMC Research Notes. 2019;12:2.

32. Sifer S, Kedir B, Demisse G, et al. Determinants of preterm birth in neonatal intensive care units at public hospitals in Sidama zone, South East Ethiopia; case control study. J Pediatr Neonatal Care. 2019;9:180-186.

33. Suff N, Story L, Shennan A. The prediction of preterm delivery: What is new? In: Seminars in Fetal and Neonatal Medicine: 2019: Elsevier. 2019:27-32.

34. F DA, Buonuomo E, Palombi L, et al. The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstet. 2002.

35. Ville Y, Rozenberg P. Predictors of preterm birth. Best Pract Res Clin Obstet Gynaecol. 2018;52:23-32.

36. Vogel JP, Chawanpaiboon S, Moller A-B, et al. The global epidemiology of preterm birth. Best Practice & Research Clinical Obstetrics & Gynaecology. 2018;52:3-12.

37. Ananth CV, Peltier MR, Getahun D, et al. Primiparity: an 'intermediate' risk group for spontaneous and medically indicated preterm birth. The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstet. 2007;20:605-611.