OPEN ACCESS

GAVIN PUBLISHERS

Case Report

Conditioning Factors of Preterm Birth among South America and African Countries: When Geographical Differences Become Less Important than People's Background. The Case of Argentina & Ethiopia

Bezawit K Bekele[1], Gustavo H Marin[2*], Biniyam B Tasi[1], Lupe Marin[2], Bethel S Bayu[1], Gina Marin[2], Dagim W Giorgis[1]

[1]Addis Ababa University, College of Health Science. Address: 6 Kilo Yekatit 12 Square College of Health Sciences Addis Ababa, Ethiopia

[2]National University of La Plata, CONICET. National Scientific and Technical Research Council, Argentina. Calle 60 & 120 (1900) La Plata, Argentina

***Corresponding author:** Gustavo H Marin, National University of La Plata, CONICET. National Scientific and Technical Research Council, Argentina. Calle 60 & 120 (1900) La Plata, Argentina

Abstract

Introduction: Although preterm birth is a worldwide problem, more than 70% of these events occur in Africa, Latin America and South Asia. In order to analyze potential common factors associated to preterm labor in different scenarios, we performed a study in countries from two of the most affected continents: Africa (Ethiopia) & South America (Argentina). **Methods:** A hospital based, unmatched case-control study was conducted among 1222 Argentine and 192 Ethiopian women who gave birth in selected hospitals during 2019, using systematic random sampling technique. Data was collected through clinical repots, individual interviews and chart reviews. The information was analyzed in SPSS version 26,using descriptive parameters .A univariate analysis was applied to evaluate associations between independent variables and preterm birth. **Result:** Pre-terms birth were detected in 10.9% and 33.3% of all deliveries in Argentina and Ethiopia. The majority of preterm birth in Argentina and Ethiopia were associated to earlier ages (<25years old); first pregnancy; multiple gestation; lower education of the couple; lower socio-economic status; less health controls; hypertension; infection; bleeding or presence of congenital anomalies of newborn. **Conclusion:** Argentina and Ethiopia are countries with enormous differences, however regarding to preterm births it is possible to identify common factors, like socio-economic status and quality of health service related to preterm labors. Early risk detection, strengthening health care capacities, and improvement of social conditions of pregnant women are action recommended to reduce the prevalence of preterm birth and new borne morbidity/mortality in both scenarios.

Introduction

Preterm labor is defined as the birth of a live baby that occurs before 37 weeks of pregnancy are completed [1]. Although preterm birth is a worldwide problem, more than 70% these events occur in low or middle-low-income countries located in Africa, Latin America and South Asia [2]. The Global Action Report on Preterm Birth provides the first-ever national, regional, and global estimates of preterm birth. The report shows that preterm birth is on the rise in most countries and is now the second leading cause of death globally for children under five, after pneumonia [1]. The "born too soon report", published by WHO, drew global attention to the issue of preterm birth and reported that more than 1 in 10 of the world's babies are born too soon each year, which is traduced in 15 million each year [1]. Preterm birth often leads to lifelong complications, including neurodevelopmental impairment and disabilities such as learning difficulties, hearing impairment and behavioral problems, chronic lung disease, retinopathy of prematurity and lower growth achievement [3,4]. Preterm birth also affects the infant's family, who may have to spend substantial time and financial resources to care for the newborn. Preterm birth therefore has considerable cost implications, not only for families but also for a country's health services [5].

The cause of preterm birth is unknown in almost half the cases. Some risk factors have been identified, for example pregnancy-related irregularities, short time period between pregnancies, women younger than age 18, certain lifestyle, domestic violence, long working hours with long periods of standing, genetic features, or environmental pollutants [1-7]. However, the complexity and overlap of risk factors are not well understood and their mechanisms are unknown in most cases. WHO estimates 15 million babies are born too early every year and approximately 1million children die each year due to complications of preterm birth [1]. Advances in prenatal and neonatal care have improved the survival for preterm infants but even if they survive, they have to face many challenges in their lifetime, including learning disabilities and visual and hearing problems. About 75% of perinatal deaths and 50% of neurological abnormalities are directly related to preterm birth [8].

In almost all countries with reliable data, preterm birth rates are increasing. Even if preterm is a global problem more than 70% of preterm births occur in Africa, Latin America and South Asia. In lower income countries, on average, 12% of babies are born too early compared with 9% in higher income countries [1,2]. According to UN report, Ethiopia is among the five countries Pakistan, Nigeria, Congo, and India- responsible for 50% of all newborn deaths in the World. The overall newborn mortality rate was 36.5 each 1000 born alive children. Profile of preterm and low birth weight prevention and care, in Ethiopia, 320,000 babies are born too soon each year and 24,000 children under five die due to direct preterm complications [4].

On the other hand, among newborn from Argentina it was reported an average rate of 8.2 deaths per 1,000 live births during 2019, however there were observed large differences among regions of the country (range 6.8-16.0). The result of this study may help program managers, local stake holders, and obstetric care providers to design evidence-based interventions to reduce preterm birth and decrease newborn morbidity and mortality. It will also help to fill the research gaps in the study area and serve as baseline information for other countries. Developing countries like Argentina or Ethiopia lack reliable data about elements related to preterm birth. Therefore, this study aims to provide relevant data regarding the factors associated with preterm birth among women who gave birth in the Capital Region of Buenos Aires State in Argentina, and Addis Ababa, Ethiopia. In order to determine and compare conditioning factors associated with preterm birth in Ethiopia and in Argentine we proposed the present study.

Methodology

Study setting: The study was carried out in hospitals of the XI Sanitary Region of Buenos Aires, Argentina and from at three major hospitals in Addis Ababa in Ethiopia (Tikur Anbessa Specialized Hospital, Gandhi memorial hospital and Zewditu memorial hospital).

Period of Study: The period of Study was February to March, 2020. The hospitals enrolled were located in the Capital of Buenos Aires State, Argentina (which belongs to the Region XI); and in Addis Ababa, the capital city of Ethiopia.

Study design: Hospital based, unmatched, case control study was conducted from February to, March, 2019.

Targeted population: The source population is all women of reproductive age living in Buenos Aires State and in Addis Ababa. The study population are all women who delivered in Hospitals of the Region XI, Buenos Aires, Argentina and in 3 hospitals (TASH,ZMH,GMH) from 1stFeb 2019 up to 31stMar, 2019.An inclusion criterion was deliveries at enrolled hospitals during the specified study period. An exclusion criterion was all patients that terminated their pregnancy before 28 weeks of gestation, post term pregnancies, those with uterine anatomic abnormality or cervical cerclage.

Variables of the study: Preterm birth was the dependent variable. Independent variables were sociodemographic status such as age, religion, marital status, occupation, income, education, past obstetric, and medical history such as, parity, gravidity, birth interval, previous history of abortion, still birth, preterm birth, bleeding during pregnancy, hypertension during pregnancy, DM

during pregnancy, chronic medical condition as well as fetal characteristics such as sex and presence congenital anomalies and others such as frequency of antenatal controls performed (ANC) or pre-labor rupture of the membranes (PROM).

Sample size determination: The minimum sample size of the patients was calculated using the following statistical formula:

$$n = r+1/r \ (p*)(1-p*)(Z_\beta + Z\frac{a}{2})^2 / (p_1 - p_2)^2$$

n = Sample size

r= Ratio of control to cases

P* = Average proportion exposed =proportion of exposed cases + proportion of control exposed/2 Z_β= Standard normal variate for power

Z a/2= Standard normal variate for level of significance

$p_1 - p_2$ = Effect size or difference in proportion expected based on previous studies. p_1 is proportion in cases and p_2 is proportion in control.

By using: Power 80% (Z_β **0.84**)

: Significance level 0.05 (Z a/2= 1.96)

: r= 2 (equal number of cases and controls)

: Odds ratio of 2 or greater

: Proportion of cases exposed p_1 0.51

: Proportion of controls exposed p_2 0.3

P*=$p_1 + p_2/2$=0.405

n = 2+1/2 (0.405)(1-0.405)(0.84 + 1.96)² / (0.51-0.3)²=64

Sampling techniques: We used systematic sampling technique to select study subjects for both the case and control group.

Data collection tools and procedures: The data source for the study were patients who fulfilled the criteria and their medical record. Data was obtained with medical record (chart) reviews and individual interviews using a pretested questioner. The questionnaire was first prepared in English language and then translated into Amharic, Oromiffaor and Spanish during data collection according to the participant needs. The questionnaire contains maternal socio-demographic characteristics such as age, religion, education level and occupation, medical and obstetric history such as diabetes, hypertension, bleeding, fetal characteristics such as congenital anomalies and others, like number of ANC visit. The data collection was conducted between

February –March period by team members after receiving adequate training. The supervising advisor has assured quality of the data.

Variables operational definition: The following operational definitions pertain to the study:

- Abortion: The termination of a pregnancy earlier than 28 weeks of gestation; this is not considered a preterm delivery in the context of this study.

- Preterm birth: An infant born between 28 and 37 weeks of gestation.

- Full-term birth: An infant born between 37 and 42 weeks of gestation.

- Post-term birth: An infant born after 42 full weeks of gestation.

- Infection during pregnancy: Any infection of the reproductive system experienced during pregnancy, including urinary tract infections.

- A uterine anatomic abnormality: is a type of female genital malformation resulting from an abnormal development of the Müllerian duct(s) during embryogenesis.

- Cervical cerclage: refers to a variety of procedures that use sutures or synthetic tape to reinforce the cervix during pregnancy in women with a history of a short cervix.

- Chronic disease: A condition or disease that usually lasts for 3 months or longer, and may get worse over time. E.g.: Cancer, heart disease, HIV.

Data processing and analysis: Data was checked manually for completeness and it was entered into Microsoft excel and transferred to SPSS version 26 for analysis. The data entered into the SPSS, was analyzed using descriptive parameters and a univariate analysis was applied to evaluate associations between independent variables and preterm birth. The processed data was interpreted and presented using simple frequency tables, and texts.

Ethical considerations: Prior to the initiation of the study, ethical clearance was obtained from Scientific Research Commission CIC in Argentina and the College of Health Sciences, Addis Ababa University and a permission letter for data collection from the Department of Obstetrics and gynecology of respective hospitals.

Results

Complete data sets were obtained from 1222 participants [1030 belonged to Argentina (A) and 192 to Ethiopia (E)]. Pre-term deliveries were observed in 113(10.9%) and 64(33.3%) of the A& E cases respectively. Almost half of the patients had less than 25 years old of age in both countries (n=512; 49.7% (n=93; 48%). Regarding the best educational level achieved, more than 40% of the patients had finished high school (45% in A and 40% in E). At

the time of enrollment, almost all the respondents were married or in couple [(n=907, 88.1% (A) and 1 n=187; 97.4% (E)]. In50% of the patients in both countries, the monthly family income was equal to or less than the minimum wage (A-n=560; 54%, E n=82; 42%). In Argentina, half of the patients received regular government help or worked in the public sector before pregnancy period while in Ethiopia only 11% of the women were in this condition (Table 1).

Variables	Categories	Ethiopia					Argentina				
		Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
age	<25	35 (54.7)	58 (45.3)	93 (48.4)	1.78 (0.93 - 3.41)	0.081	62 (54.9)	450 (49.1)	512 (49.7)	1.44 (0.94 - 2.20)	0.0962
	25-35	21 (32.8)	62 (48.4)	83 (43.2)	Ref		37(32.7)	386 (42.1)	423 (41.1)	Ref.	
	>=35	8 (12.5)	8 (6.3)	16 (8.3)	2.95 (0.98 - 8.85)	0.0533	14 (12.4)	81 (8.8)	95 (9.2)	1.80 (0.93 - 3.49)	0.0766
Maternal education	primary	26 (40.6)	43 (33.6)	69 (35.9)	1.85(0.91–376)	0.0911	55 (57.5)	460 (50.1)	515 (50.0)	1.3 (0.86-1.93)	0.2129
	secondary	19 (29.7)	58 (45.3)	77 (40.1)	Ref		45 (39.8)	427 (46.6)	472 (45.8)	Ref.	
	higher	11 (17.2)	20 (15.6)	31 (16.1)	1.68(0.68-4.13)	0.2591	6	24 (0.4)	32 (3.1)	-	0.5164
	read	3 (4.7)	3 (2.3)	6 (3.1)	3.05(0.57-16.41)	0.1935	1 (0.9)	3 (0.3)	4 (0.4)	3.16(0.32-31.04)	0.2972
	write	5 (7.8)	4 (3.1)	9 (4.7)	3.82(0.93-15.68)	0.0633	2 (1.8)	5 (0.6)	7 (0.7)	3.80 (0.72-20.13)	0.0928
Occupation	housewife	40 (62.5)	73 (57)	113 (58.9)	Ref		40 (35,4)	310 (33,8)	350 (34)	Ref.	
	public /govhelp	5 (7.8)	16 (12.5)	21 (10.9)	0.57(0.19 - 1.67)	0.3062	52 (46)	414 (45,1)	466 (45,2)	0.97 (0.63 - 1.50)	0.904
	private	14 (21.9)	27 (21.1)	41 (21.4)	0.95(0.45-2.01)	0.8856	15 (13,3)	135 (14,7)	150 (14,6)	0.86 (0.46 - 1.61)	0.6399
	merchant	5 (7.8)	12 (9.4)	17 (8.9)	0.76 (0.25 - 2.31)	0.6294	6 (5,3)	58 (6,3)	64 (6,2)	0.80 (0.33-1.98)	0.6308
Relationship status	marriedcouple	61 (95.3)	126(98.4)	187(97.4)	Ref		91 (80,5)	816 (89)	907 (88,1)	Ref	
	single	3 (4.7)	2 (1.6)	5 (2.6)	3.1(0.5 - 19.03)	0.222	22 (19,5)	101 (11)	123 (11,9)	1.95 (1.17 - 3.25)	0.0089
Spouseeducation	1st	19 (31.3)	26 (21.0)	45 (24.5)	1.24(0.61-2.52)	0.5492	55 (48,7)	443 (35,4)	498 (48,3)	1.04 (0.67-1.62)	0.8483
	2nd	36 (57.8)	61 (48.5)	97 (51.6)	Ref		53 (46,9)	453 (43,4)	506 (49,2)	Ref.	
	higher	6 (10.9)	39 (30.5)	45 (24)	0.3(0.12 - 0.74)	0.009	5 (4,4)	21 (1,2)	26 (2,5)	-	0.0472
Monthlyincome	low	34 (53.1)	48 (37.5)	82 (42.7)	1.95(0.91-4.15)	0.0838	69 (61.1)	491 (53.5)	560 (54.4)	1.35 (0.91-2.01)	0.1414
	standard	16 (25)	44 (34.4)	60 (31.3)	Ref		44 (38.9)	424 (46.2)	468 (45.4)	Ref	
	high	14 (21.9)	36 (28.1)	50(26)	1.07 (0.46 - 2.48)		0 (0)	2(0.2)	2 (0.2)	-	

Table 1: Demographic and socioeconomic characteristics of patients enrolled in the study.

From the collected data, we found that the odds of delivering a preterm birth were lower among the women in couple or with in cases where her spouses attended higher education in both countries. Comparing to the control group, although the differences were not statistically significant, we observed higher prevalence rates of preterm birth in women greater than or equal to 35 years of age, less than

25 years of age, who can only read and write(no formal education), and who had low monthly income either in Argentina and Ethiopia (Table 1). Concerning maternal obstetrics characteristics, the study demonstrated that in both countries the mode of delivery preferred was SVD (Argentina 80.3%, Ethiopia 57.3%), even in pre-term births (Argentina OR 0.54, 95% CI 0.31-0.97; and Ethiopia OR 0.72, 95%CI 0.39-1.34). Noteworthy, while in Argentina overall PROM was 1,2%; in Ethiopia it was 24.5% but when the analysis focuses just in Pre-term deliveries these percentages were similar (30.1 vs 48.4% respectively) detecting that PROM is a significant variable associated to Pre-term delivery. Concerning infection during their pregnancy, it was detected a great disparity between both countries, since Argentina has an overall level of 5.47% vs 19.8% in Ethiopia; and even this level increased in Pre-term births that differences not only is maintained but increased (8.8% vs 34.4% respectively). Patients with history of abortion duplicated its percentage of Pre-term births in both countries; while among first time pregnancies, Pre-terms births increased in 25% either in Argentina and Ethiopia. According to the results obtained women with multiple gestation increased more than 5 times the risk of having a Pre-term delivery (Table 2).

Variables	Categ.	Ethiopia					Argentina				
		Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
Gravidity	1	38 (59.4)	50 (39.1)	88 (45.8)	3.61 (1.7-7.66)	0.0008	41 (36.3)	267 (29.1)	308 (29.9)	1.59 (0.93-2.70)	0.0872
	2	12 (18.8)	57 (44.5)	69 (35.9)	ref		24 (21.2)	248 (27.0)	272 (26.4)	ref	
	3	7 (10.9)	16 (12.5)	23 (12)	2.08 (0.7 - 6.15)	0.1862	21 (18.6)	206 (22.5)	227 (22.0)	1.05 (0.57-1.95)	0.8681
	4	5 (7.8)	4 (3.1)	9 (4.7)	5.94 (1.39-25.43)	0.0164	15 (13.3)	129 (14.1)	144 (14.0)	1.20 (0.61-2.37)	0.5958
	>=5	2 (3.1)	1 (0.8)	3 (1.6)	4.57 (0.35-59.11)	0.2445	12 (10.6)	67 (7.3)	79 (7.7)	1.85 (0.88-3.89)	0.1006
	primi	38 (59.4)	50 (39.1)	88 (45.8)	2.28 (1.24-4.21)	0.0083	41 (36.3)	267 (29.1)	308 (29.9)	1.39 (0.92-2.09)	0.1164
	multi	26 (40.6)	78 (60.9)	104 (54.2)	ref		72 (63.7)	650 (70.9)	722 (70.1)	ref	
Parity	1	40 (62.5)	54 (42.2)	94 (49)	2.36 (1.18-4.73)	0.0154	47 (41.6)	277 (30.2)	324 (31.5)	1.47 (0.90-2.41)	0.1252
	2	16 (25)	51 (39.8)	67 (34.9)	ref		29 (25.7)	251 (27.4)	280 (27.2)	ref	
	>=3	8 (12.5)	23 (18)	31 (16.1)	1.11 (0.42-2.96)	0.8367	37 (32.7)	389 (42.4)	426 (41.6)	0.82 (0.49-1.37)	0.4554
	primi	40 (62.5)	54 (42.2)	94 (49.0)	2.28 (1.23-4.23)	0.0086	48 (42.5)	268 (29.2)	316 (30.7)	1.79 (1.12-2.67)	0.005
	multi	24 (37.5)	74 (57.8)	98 (51.0)	ref		65 (57.5)	649 (70.8)	714 (69.3)	ref	
Modeof delivery	svd	40 (62.5)	70 (54.7)	110 (57.3)	ref		99 (87.6)	728 (79.4)	827 (80.3)	ref	
	cs	24 (37.5)	58 (45.3)	82 (42.7)	0.72 (0.39-1.34)	0.303	14 (12.4)	189 (20.6)	203 (19.7)	0.54 (0.31 - 0.97)	0.0382
Historyofs till-birth	no	62 (96.9)	125 (97.7)	187 (97.4)	ref		111 (98.2)	911 (99.3)	1022 (99.2)	ref	
	yes	2 (3.1)	3 (2.3)	5 (2.6)	1.34 (0.22-8.25)	0.7495	2 (1.8)	6 (0.7)	8 (0.8)	2.74 (0.55-13.7)	0.2024
Multipleges ationhistory	no	61 (95.3)	124 (96.9)	185 (96.4)	ref		110 (97.3)	916 (99.9)	1026 (99.6)	ref	
	yes	3 (4.7)	4 (3.1)	7 (3.6)	1.52 (0.33-7.03)	0.5885	3 (2.7)	1 (0.1)	4 (0.4)	24.98 (2.58-242.24)	0.0048

Variable	Category	Preterm n(%)	Term n(%)	Total n(%)	OR (95%CI)	p-value	Preterm n(%)	Term n(%)	Total n(%)	OR (95%CI)	p-value
Multiple gestation	no	47 (73.4)	120 (93.8)	167 (87)	ref		107 (94.7)	909 (99.1)	1011 (98.2)	ref	
	yes	17 (26.6)	8 (6.3)	25 (13)	5.43 (2.19-13.42)	0.0003	6 (5.3)	8 (0.9)	14 (1.4)	6.37 (2.17-18.71)	0.002
Birthinterval	<1yr	2 (3.1)	4 (3.1)	6 (3.1)	1.41 (0.23-8.8)	0.7136	18 (15.9)	91 (9.9)	109 (10.6)	1.95 (1.04-3.66)	0.0349
	01-Mar	11 (17.2)	31 (24.2)	42 (21.9)	ref		30 (26.5)	296 (32.3)	326 (31.7)	ref	
	>=3	14 (21.9)	47 (36.7)	61 (31.8)	0.84 (0.34-2.09)	0.7064	28 (24.8)	273 (29.8)	301 (29.2)	1.01 (0.59-1.74)	0.966
	new	37 (57.8)	46 (35.9)	83 (43.2)	2.7 (1.2-6.09)	0.0166	37 (32.7)	257 (28.0)	294 (28.5)	1.42 (0.85-2.36)	0.176
Historyo fabortion	no	54 (84.4)	112 (87.5)	166 (86.5)	ref		101 (89.4)	864 (94.2)	965 (93.68)	ref	
	yes	10 (15.6)	16 (12.5)	26 (13.5)	1.3 (0.55-3.05)	0.5515	13 (11.5)	53 (5.8)	65 (6.32)	2.10 (1.10-3.98)	0.0206
Historyofpr etermbirth	no	57 (89.1)	120 (93.8)	177 (92.2)	ref		100 (88.5)	880 (96.0)	980 (95.14)	ref	
	yes	7 (10.9)	8 (6.3)	15 (7.8)	1.84 (0.64-5.33)	0.2597	12 (10.6)	37 (4.0)	50 (4.86)	2.85 (1.44-5.65)	0.0017
PROM	no	33 (51.6)	112 (87.5)	145 (75.5)	ref		79 (69.9)	906 (98.8)	985 (95.63)	ref	
	yes	31 (48.4)	16 (12.5)	47 (24.5)	6.58 (3.21-13.48)	2.67E-07	34 (30.1)	11 (1.2)	45 (4.37)	35.45 (17.3-72.66)	1.00E-33
Bleedingdurin gpregnancy	no	54 (84.4)	116 (90.6)	170 (88.5)	ref		102 (90.3)	871 (95.0)	973 (94.46)	ref	
	yes	10 (15.6)	12 (9.4)	22 (11.5)	1.79 (0.73-4.4)	0.2044	11 (9.7)	46 (5.0)	57 (5.54)	2.04 (1.03-4.07)	0.0384
Infectionduri ngpregnancy	no	42 (65.6)	112 (87.5)	154 (80.2)	ref		103 (91.2)	874 (95.3)	974 (94.56)	ref	
	yes	22 (34.4)	16 (12.5)	38 (19.8)	3.67 (1.76-7.65)	0.0005	10 (8.8)	43 (4.7)	56 (5.47)	0.54 (0.27-1.11)	0.0899

Table 2: Maternal obstetrics and medical characteristics (N=192).

In relation to the maternal medical report, it was detected that those patients with history of GHTN hypertension increased in at least 6% their chances to have a pre-term delivery in both countries (OR1.85 95% 0.96-3.58 and OR1.72 95%CI 0.76 - 3.93 respectively), however previous chronic hypertension was a predictive factor for Pre-term delivery only in Ethiopia (OD 2.87, CI 0.74-11.18). Diabetes was only slightly associated with pre-term birth 1.78 and 1.52 times for Argentina an Ethiopia. Chronic disease was not statically significant (1.68 and 1.52 times) more likely to experience preterm birth (Table 3).

Variables		Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
Hypertension	No	47 (73.4)	108 (84.4)	155 (80.7)	ref		99 (87.6)	841 (91.7)	940 (91.3)	ref	
	chronic	5 (7.8)	4 (3.1)	9 (4.7)	2.87 (0.74-11.18)	0.128	2 (1.8)	21 (2.3)	23 (2.2)	0.81 (0.19-3.5)	0.7764
	GHTN	12 (18.8)	16 (12.5)	28 (14.6)	1.72 (0.76-3.93)	0.195	12 (10.6)	55 (6.0)	67 (6.5)	1.85 (0.96-3.58)	0.0624
DM	No	61 (95.3)	124 (96.9)	185 (96.4)	ref		107 (94.7)	889 (97.0)	996 (96.7)	ref	
	Yes	3 (4.7)	4 (3.1)	7 (3.6)	1.52 (0.33-7.03)	0.5885	6 (5.3)	28 (3.0)	34 (3.3)	1.78 (0.72-4.40)	0.2053

Presenceof chronicdisease											
	No	46 (71.9)	112 (87.5)	158 (82.3)	ref		93 (82.3)	813 (88.7)	906 (88.0)	ref	
	Yes	10 (15.6)	16 (12.5)	26 (13.5)	1.52 (0.64-3.6)	0.3394	20 (17.7)	104 (11.3)	124 (12.0)	1.68(1.00-2.84)	0.05

Table 3: Maternal co-morbidities related to Pre-terms birth.

Majority of the respondents (84.4% in A and 79.9% in E) had more than 4 antenatal care controls during the pregnancy period. Percentage of mothers with preterm delivery that had less than 4 antenatal controls was higher than mothers with term delivery (in Argentina 31.9% vs 13.6% and in Ethiopia29.7% and 15.6%, respectively) (Table 4).

Variables		Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
ANC visitsnumber	<4	19 (29.7)	20(15.6)	39 (20.3)	Ref		36 (31.9)	125 (13.6)	161 (15.6)	Ref	
	>=4	45 (70.3)	108(84.4)	153 (79.7)	2.28(1.11-4.67)	0.0244	77 (68.1)	792 (86.3)	869 (84.4)	0.34(0.22-0.52)	0,48

Table 4: Ante Natal Care Visits (ANC).

Fetal characteristics

Regarding fetal characteristics, it could be said that the number of female and male neonates given birth by our participants were almost equal. Only a small portion of our respondents gave birth to neonates with congenital anomalies, however among preterm deliveries these abnormalities increase almost 5 times when compared with control term births (Table 5).

Variables		Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
Baby sex	Male	29 (45.3)	68(53.1)	97 (50.5)	Ref		55(48.7)	485 (52.8)	540 (52.4)	Ref	
	female	35 (54.7)	60(46.9)	95 (49.5)	1.37(0.75-2.5)	0.3081	58(51.3)	432 (47.1)	490 (47.6)	1.18(0.80-1.75)	0.397
Congenita lanomalies	No	59 (92.2)	126 (98.4)	185 (96.4)	Ref		110(97.3)	912 (99.5)	1022 (99.2)	Ref	
	Yes	5(7.8)	2(1.6)	7(3.6)	5.34(1.01-28.33)	0.0491	3(2.7)	5(0.5)	8(0.8)	4.97 (1.17-21.10)	0.0545

Table 5: Fetal characteristics.

Discussion

Maternal and child health problems have a high negative impact in terms of quality of life and morbidity and mortality of young members of the Society (newborns or young women) with a high potential of years to be lived. Of all risks, preterm birth is one of the main hazards for both mothers and newborns, and because of that, it is important to determine which factors might be associated to this problem. It is true that risk may depend on local or regional elements, however it is important to search for common factors that may collaborate in the global control problems associated with such sensitive issue as maternal and child health. In this study we compare a serious public health problem such as the preterm birth in two countries with totally different history, culture and realities, one of them located in South America (Argentina) and the other in Africa (Ethiopia). One of the factors associated with preterm birth either in population that attends public hospitals of Buenos Aires State, Argentina or in Addis Ababa in Ethiopia, was the age of the mother. Women with less than 25 years old had more risk for preterm delivery, aspect that was already described by other authors [9-20] both now confirmed by the present research. Concerning multiple gestation, our study revealed that this circumstance increased in 5 times preterm new births in both countries (Argentina and Ethiopia). Numerous studies have revealed that sociodemographic characteristics, history of obstetric abnormalities, primiparous, worse medical conditions and congenital anomalies in the newborn, are factors associated with preterm births. According to our study, we found similar patterns concerning to socioeconomic situation since mothers in whom low monthly income was declared, had 2 times more likely to experience preterm birth as compared to woman whose income is better, data observed in both countries. This may be attributed to women from low-income settings often experiencing nutritional deficiencies, a low level of education, insufficient healthcare, less access to transportation in order to accomplish with periodical health controls during pregnancy period [7]. This study also showed that women from Argentina and Ethiopia with multiple gestations had 5 times preterm birth

as compared to women with singleton pregnancies, a result also reported by other study [5]. On the other hand, preterm delivery was 2 times more likely among women who were pregnant for the first time [for Argentina OR 1.39 (0.92-2.09) and for Ethiopia OR2.28 (1.24 - 4.21)] than among those who had been pregnant before.

Noteworthy, although in both countries studied those women with history of preterm birth were also more likely to experience preterm birth than those who have no history, data was not statistically significant. This finding is in line with studies done by other countries like Iran [21], or regions like central zone of Tigray [9]. One important variable revealed as conditioning factor for preterm birth by our study, is the presence of infection during pregnancy [1,5]. The odd of pregnant women with infection to have preterm birth is 3 times higher compared to those who do not have infection in both countries examined. Similar to our results, Schieve et al has considered infection of urinary system as a risk factor for preterm birth [22]. In presence of infection, microorganisms are recognized by toll-like receptors (TLR) and other pattern recognition receptors which activate the innate immune system, inducing pro-inflammatory cascade. This cascade results in elaboration of effectors' molecules such as cytokines, prostaglandins, proteases and other enzymes, to produce a coordinated response including uterine contractions, placental detachment, infiltration of inflammatory cells into gestational tissues, a process known as cervical repining and weakening of fetal membranes, leading to preterm labor and preterm birth [23]. Concerning cardiovascular chronic disease, results obtained from this study showed that pregnant women with hypertension were more likely to experience preterm birth than those with normal blood pressure both in Argentina and Ethiopia. Similar findings were reported in studies done in Iran and Kenya [21,24]. Hypertensive patients are known to have a high incidence of pregnancy complications like abruptio placentae, infant intrauterine growth restriction (IUGR) and others illness, requiring premature surgical deliveries. Finally, this study revealed that women whose baby had a congenital anomaly were 5 times more likely to have preterm delivery than those with normal babies. This finding is in line with a study in done by other authors from USA [25], which stated that infants born preterm were more than twice likely to have major birth defects as infants born at term, and the association was much stronger at earliest gestational age.

Conclusion

Argentina and Ethiopia are countries with enormous differences, however regarding preterm birth common factors were observed, such as low socio-economic status, infection during pregnancy, primigravidity, hypertension, multiple gestation, congenital anomalies in new born, history of preterm birth, number of health controls performed to pregnant women; all

these has been identified as factors associated with preterm birth and preterm labors. Early risk detection, strengthening health care capacities, and improvement of conditions of pregnant women are action recommended to reduce the prevalence of preterm birth and new born morbidity/mortality in developing countries like the ones studied in this paper.

Ethical Issues

Ethical approval was obtained from Scientific Research Commission CIC in Argentina and the College of Health Sciences, Addis Ababa University and a permission letter for data collection nfrom the Department of Obstetrics and gynecology of respective hospitals.

Limitations

Our study included a relatively small sample size, which leaves us with lowpower to detect some associations between independent variables and the outcome of interest.

Acknowledgements

References

1. WHO. (2012) The Born too soon report, WHO report, Geneva.

2. Beck S, Wojdyla D, Say L. (2010) The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity. Bull World Health Organ, 88: 31-38.

3. Balchin J.C, Whittaker PJ, Steer, and Lamont RF. (2004) "Are reported preterm birth rates reliable? An analysis of interhospital di□erences in the calculation of the weeks of gestation at delivery and preterm birth rate," British Journal of Obstetrics and Gynaecology, 111: 160-163.

4. Ethiopia profile of preterm and low birth weight prevention and care, aa.

5. Institute of Medicine (US) Committee on Understanding Premature Birth and Assuring Healthy Outcomes, R. E. Behrman and A. S.Butler, Eds., Preterm Birth: Causes, Consequences, and Prevention, in National Academies Press, 2007.

6. Marlow N, Wolke D, Bracewell MA, and Samara M. (2005) Neurologic and developmental disability at six years of age after extremely preterm birth," Te New England Journal of Medicine, 352: 9-19.

7. GuerraC C. de Moraes Barros MC, Goulart AL, Fernandes LV, Kopelman BI, et al. (2014) "Premature infants with birth weights of 1500–1999 g exhibit considerable delays in several developmental areas," Acta Paediatrica, 103: 1-6.

8. de Almeida AC, de Jesus ACP, Lima PFT, de Araujo MFM., and de Araujo TM. (2012) "Maternal riskfactors for ´ prematurebirths in a publicmaternity hospital in ImperatrizMA," Revista Gaucha de Enfermagem 2: 86-94.

9. Wudie FT, Tesfamicheal FA, Fisseha HZ, Weldehawaria NB, Misgena KH, et al. Determinants of preterm delivery in the centralzone of Tigray, northern Ethiopia: A case-controlstudy.Sajchseptember, 13: 3.

10. Aregawi G, Assefa N, Mesfn F, Tekulu F, Adhena T, et al. (2019) Preterm births and associated factors among mothers who gave birth in Axum and Adwa Town public hospitals, Northern Ethiopia, 12: 640.

11. Kelkay B, Omer A, Teferi Y, Moges Y. (2019) Factors Associated with Singleton Preterm Birthin Shire Suhul General Hospital, Northern Ethiopia, 2018.Hindawi Journal of Pregnancy 2019: 9.

12. Woldeyohannes D, Kene Ca, Gomora D, Seyoum and Assefa T. (2019) Factors Associated with Preterm Birth among Mothers who gave Birth inDodolaTown Hospitals, Southeast Ethiopia: Institutional Based Cross SectionalStudy. Clinics Mother Child Health, 16: 1000317.

13. Kuppusamy N, Vidhyadevi A. (2016) Prevalence of Preterm Admissions and the Risk Factors of Preterm Labor in Rural Medical College Hospital. Int J Sci Stud 4: 125-128.

14. WHO (World Health Organization). March of Dimes, the Partnership for Maternal Newborn and Child Health and Save the Children. Born Too Soon: the global action report on preterm births. Geneva: World Health Organization. 2012.

15. Central Statics Agency. (2021) Addis Ababa statistics, 2007.

16. Tesfaye ejigu. (2021) Addis Ababa`s ailing state hospitals. Addis standard (internet): Africa 2014.

17. Hailemariam HA and Demise B. (2019) "Assessment of the Setup of Delivery Room for Neonatal Resuscitation at TikurAnbesa Hospital Ethiopia". EC Paediatrics 8: 601-609.

18. Getinet Assabu, Muluwerk Tefera, Asmamaw Abebe, Heidi Busse. (2019) The magnitude of sexual abuse and its physical effects among female children seen at Gandhi Memorial Hospital in Addis Ababa, Ethiopia. Ethiop.J. Health Dev. 33.

19. Segen Gebremeskel Tassew (Bpharm). (2018) Management of Hospital-Acquired Infections among Hospitalized Patients at Zewditu Memorial Hospital, Addis Ababa, Ethiopia 2018.

20. Woldeyohannes D, Kene C, Gomora D, Seyoum K, Assefa T. (2019) 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. 16: 317.

21. Alijahan R, Hazrati S, Mirzarahimi M, Pourfarzi F, Ahmadi Hadi P. (2014) Prevalence and risk factors associated with preterm birth in Ardabil, Iran. Iran J Reprod Med 12: 47-56.

22. Schieve L, Handler A, Hershow R, Persky V, Davis F. (1994) Urinary tract infection during pregnancy: its association with maternal morbidity and perinatal outcome. Am J Public Health. 84: 151994.

23. Agrawal V, Hirsch E. (2012) intrauterine infection and preterm labour. Semin Fetal Neonatal Med. 17: 12-19.

24. Wagura1 P, Wasunna A, Laving A, Wamalwa D and Ng'ang'a P. (2018) Prevalence and factors associated with preterm birth at kenyatta national hospital,Wagura et al. BMC Pregnancy and Childbirth, 18: 107.

25. Honein MA, Kirby, RS, Meyer RE. The Association between Major Birth Defects and Preterm birth. Matern Child Health J 13: 164-175.