WOLKITE UNIVERSITY

College of medicine and health sciences

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The magnitude of preterm birth among mothers who gave birth in Wolikte University specialized hospital, Gubreye, Gurage zone, Ethiopia August 2022

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Abbreviation

ACOG ……. American college of gynecology

AGA …… Appropriate for Age

BPP ……. Biophysical profile

BW …….. Birth weight

CD …… caesarian delivery

Dr. …….. Doctor

EDHS…….. Ethiopian Demographic and Health Survey

GA …….. Gestational age

GBS ……group B streptococcus

LBW …….. Low birth weight

IVH ……. Intra ventricular hemorrhage

NEC …… necrotizing enterocolitis

NICU ……. Neonatal intensive care unit

PTB …… pre term birth

RDS …… respiratory distress syndrome

SNNPE ……. Southern nation nationalities of Ethiopia

UNICEF……. United Nation International child emergency fund

VLBW …….. Very low birth weight

WHO …… world health organization

WUSH ……. Wolkite University specialized hospital

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Abstract

Background: Preterm birth is a birth that occurs after 20 weeks of gestation and before completion of 37 menstrual weeks of gestation (after 28 weeks of gestation in our set up) regardless of birth weight and sub-divided as extremely preterm, very preterm and preterm. The rate of preterm birth and death varies all over the globe. , therefore, this study aimed to asses prevalence of preterm birth retrospective of past 3 month and provide further relevant data for future researches to be done in our hospital.

Objective: To assess magnitude of preterm birth among mothers who gave birth in wolikte university specialized hospital in past 3 months, 2014 E.C.

Method: This study was conducted in wolikte university specialized teaching hospital which is located in Gurage zone, Southern nation nationalities of Ethiopia, Ethiopia from August 22 to August 26 2022GC. Retrospective descriptive study design was employed. Data was collected by reviewing registration books from wolikte university specialized hospital gynecology and obstetrics ward; and from delivery chart. Data was entered to epi-info version 3.5.1 and exported to spss version 21 for analysis. Ethical clearance was secured by ethical committee of Wolkite University, college of medicine and health science.

Result: From 167 samples based on calculated sample size 20.89 % are preterm among those preterms 55.1 % are males and 44.9 % are females. From the total samples on their gestational age 1.2 % are born between 26-28 weeks, 4.2 % are between are 28-32 and 13.2 % are between 32 – 37, 81.4 % are more than 37 weeks.

Conclusion and recommendation: the prevalence of preterm birth is higher in our set up. We recommend to increase awareness of preterm birth, contributing factor and possible complication related to it.

1. Introduction

1.1 Background of the study

Preterm birth is a birth that occurs after 20 weeks of gestation and before completion of 37 menstrual weeks of gestation regardless of birth weight and sub-divided as extremely preterm , very preterm and preterm neonate (born in 26-28, 28-32 and 32-37 week of gestational age respectively and by birth weight: low, very low and extremely low birth weight (<2500 g ,1500-2500 g ,<1000g) . But according to our national preterm birth its defined as a birth that occurred after 28 weeks of gestation and before completion of 37 weeks of gestation .The classification consists of early preterm , moderate preterm and late pre term who are born in 28-32 complete weeks, 32-33+ 6 days ,34 – 36+6 days respectively. (1, 2)

During this period, marked physiologic transitions occur in all organ systems, and they learn to respond to many forms of external stimuli, which implies that this

period is a highly exposed time for preterm as they are completing many of the adjustments required for extra-uterine survival. A developing baby moreover goes through important growth throughout pregnancy; including the final weeks and months in which vital organs developed. But preterm neonate is born prior to this vital event are well established. Therefore, they faced a variety of physiologic handicaps which predispose to; feeding difficulty, altered body temperature, apnea and bradycardia, complicated nutritional, fluid and electrolyte management, sepsis and hypoglycemia (3 ,4and 5).

This shows that preterm birth is a pervasive disorder that impacts all the functioning of the neonate on short- and long-term basis like neurodevelopment, education, psychosocial, growth, and health outcome for those even survived. mortality is also inversely related to GA and so far, preterm birth is still continuing to be the leading cause of peri and postnatal mortality mainly in undeveloped states where health services are not only limited but also not well functioning .Neonatal mortality is a death of newborn from the time of birth to the first 28th days of life irrespective of the GA and preterm neonatal death within birth to 28thday of life who is < 37 week of GA (4, 6, 7)

The rate of preterm birth and death varies all over the globe. In 2018, >15 million babies are born <37 weeks of GA and of which, among those > 80% of births were between 32-37 weeks and from this, 60%-85% found in Africa and South Asia and of these births, more than 1.1 million deaths occur due to prematurity of preterm birth (8) . As a result, preterm birth is public health problem in the globe. it is serious in developing countries and the most cause of neonatal death (4 out of 5) worldwide, followed by congenital anomalies even if there are different patterns in survival rates. In developed countries, 50% and 90% of preterm neonate born at 24

and 28 weeks-GA survived to discharge from the hospital, yet <10% of this baby survive in low-income one. But >75% can be prevented without intensive care [9].

Globally, there are different policies, strategies, and programs which work on prevention and care of preterm birth like Sustainable Development Goals (SDGs) and Every Women and Every Child initiative [10, 11]. Despite of this, it is the first leading cause of NMR and the second most cause of under-five mortality in the world.

In Ethiopia, a report of United Nations international child education and fund (UNICEF) and Ethiopian Demographic and Health Survey (EDHS), one of the main causes of neonatal death (23% and 29 per 1000 live births respectively) is preterm birth and one in thirty five and one in eight babies born did not survive to celebrate its first and fifth birthday in that order, is due to death associated to preterm birth. According to FMOH report, prematurity is first cause of neonatal mortality and the fourth cause of under-five mortality in Ethiopia [12, 13-16].

1.2 statement of the problem

From the 135 million world's live births in 2010, nearly 14.9 million (11.1% of all live births) were born preterm birth. (17) Worldwide, there is a significant disparity in the prevalence rates of preterm birth depending on the method of gestational age assessment and the perceived fetal age of viability.(18) Rates of preterm birth ranged from 5% in northern European countries to 18% in Malawi in 2010. More than 60% of all preterm births worldwide occur in low income and lower-middle income (low resource, high fertility) countries of South Asia and Sub- Saharan Africa. (19)

The burden of preterm birth is a serious public health concern contributing substantially to death and a significant cause of long-term loss of human potential amongst survivors all around the world.(20) Of the estimated 5.94 million children under five who died in 2015 worldwide,17.8% (1.055 million, uncertainty range 0.935–1.179 million) were due to complications of preterm birth. Consequently, complications of preterm birth were accounted for approximately 35% of deaths

among neonates globally in 2016; it is the leading cause of death amongst neonates and was the leading cause of death in children under five years of age.(21) Moreover, preterm neonates who survived would remain vulnerable to long- term complications that may persist all over their lives. This added dimension of lifelong disability exacts a high toll on individuals born preterm, their families, and the communities in which they live.

There are no many researches done on recent years regarding preterm birth in Ethiopian, SNNPE but the burden is around 10.48 % nationally (22) and the prevalence of preterm birth is 15.5% in Butajira, Southern Nation and Nationalities region (34) which is higher when compared to the national burden, so we wanted to identify the magnitude in Gurage zone through our research.

1.3. Significance of the study

Ethiopia has made considerable progress in reducing the under-five mortality rate by two-thirds. However, still it is one of the top five countries contributing more than half of the neonatal deaths globally. Preterm birth related complications are the leading cause of neonatal deaths. (23)

In the line with providing relevant data such as the magnitude of preterm birth have a paramount importance in designing an effective intervention strategy. Therefore, this study aimed to identify the prevalence of preterm birth and use the findings as an input for obstetric department to improve the neonatal health outcomes , for the public health department to do further researchers on preterm birth.

2. Literature review

Rates of preterm birth ranged from 5% in northern European countries to 18% in Malawi in 2010. More than 60% of all preterm births worldwide occur in low income and lower-middle income (low resource, high fertility) countries of South Asia and Sub Saharan Africa. (24, 25)

Many researchers have been conducted on different part of the world regarding preterm birth the research were able to mention the prevalence of preterm birth on those areas.

A research was done at Michigan, USA on placental vascular pathology findings and pathways on American journal of epidemiology vol 170 and the research used institutional based prospective short study design. It mentions the prevalence of preterm birth on the study population was 12.8%. (26)

Another research done on multinational level mentioned the prevalence of preterm birth in Brazil was 21.7%. The research was done on national, regional, and world-wide estimation of preterm birth rate on 2012. (27)

The prevalence of preterm births in Sub Saharan Africa countries has been reported to be high such as a retrospective review of singleton birth done at tertiary hospital in Ghana on 2015 shows 18.9% of the deliveries were preterm also on a research done at a tertiary center in Lagos, Nigeria on 2016 regarding characteristics and risk factor of preterm birth about 16.8 % of births were preterm, (28)

On a research done at Kenya to determine the prevalence and the factor associated with preterm birth at keneyatta national hospital with employment of hospital based cross sectional descriptive study on maternity unit, it shows about 18.3% of birth were preterm. (29)

A secondary multivariant analysis research done in Malawi on factors associated with preterm, early preterm and late preterm birth on 2149 women's in community based randomized placebo controlled trial for prevention of preterm birth shows 16.3% of prevalence of preterm birth.(30)

In Ethiopia, 320,000 babies are born to soon each year. However, there are significant regional disparities regarding the prevalence of preterm birth. (31)

On a research done on epidemiology of preterm birth in Ethiopia : systemic review and meta-analysis involving 22 studies with a total of 12,279 participants showed the prevalence of preterm birth to be 10.48 % from overall pooled prevalence of the studies.(32)

A research done on preterm birth and associated factor among mothers who gave birth in Gonder town health institution by employing facility based cross sectional

study on 2012 with a sample size of 540 mothers, it showed the prevalence of preterm birth to be 4.4% (32) another institutional based cross sectional study done at Axum and Adwa town public hospitals on 2017 showed the prevalence of preterm birth to be 13.3% in Central Zone, Tigray Regional State, Ethiopia (34)

Research done regarding Preterm Birth and Associated Factors among Mothers Who Gave Birth in Fafen Zone Public Hospitals, Somali Regional State, Eastern Ethiopia the prevalence showed preterm birth was 12.3%. (35)

A study done at Debre marqose referral hospital in preterm birth and associated factor among mothers who gave birth in Debre marqose town health institutions showed the prevalence of preterm birth to be 11.6 %. The study was done in 2013 by using institutional based cross-sectional study. (36)

A published journal on Ethiopian journal of reproductive health vol 4 showed the prevalence of preterm birth to be 7.1% in a city like Addis Ababa. (37)

3. Objective

3.1 General objective

- To assess magnitude of preterm birth among mothers who gave birth in past 3 months, in WUSTH, GURAGE ZONE, SNNPR, ETHIOPIA 2014 E.C.

3.2 Specific objective

- To determine prevalence of preterm birth and its variables among mother who gave birth in WUSTH in the past 3 month, 2014 E.C.

4. Methodology and materials

4.1 study area and period

This study was conducted in WUSH which is located in Gurage zone, SNNPR, Ethiopia from August 22 to August 26 2022 GC. WUSH is located 170 km far from the capital city Addis Ababa. Gurage Zone is one of the zone which belongs to SNNPR, Ethiopia. The total population of this zone are 1,727,522 among this 846,486 are men and 881,076 are women; with an area of 5,893.40 square kilometers, & it has a population density of 217.13. [38]

Wolkite is the administrative center of the Gurage zone. This town has a total population of 92, 517 and the climatic condition of the Wolkite town is warm and temperate with a daily temperature ranges from 18^0c-20^0c & annual rain fall of

1244mm^3 .The catchment population of WUSH is expected to be 800,000 people according to the information from hospital administration. [39, 40]

The hospital has four major department: Medicine, Surgery, Paediatrics and gynaecology and obstetrics. In the hospital there is five general surgeon, five obstetrician and gynaecologist, four paediatrician Paediatric surgeon. In the hospital there are more than 150 beds for inpatients from this the department of paediatrics and child health has 25 bed in NICU, 25 bed in the ward. In the obstetrics and gynaecology ward there are 25 bed in maternity , 11 bed in labor ward and 20 bed in gynaecology in addition to this there is two major and one minor OR (operation room).

The hospital, apart from giving daily medical service and referral center, it also uses as a teaching center for students coming from government and private institutions.

4.2 Study design

Retrospective descriptive institutional based study design was employed.

4.3Sources Population

All mother who gave birth in WUSH in the past 3 months in 2014 E.C.

4.4Inclusion and exclusion criteria

4.4.1 Inclusion criteria

All mothers who gave birth in the past 3 month in WUSH 2014 E.C.

4.1.2 Exclusion criteria

Incomplete medical records like gestational age, baby weight.

Unavailable medical charts from medical record room.

4.5 Sample size and sampling procedure

The sample size was determined by using the single population proportion formula: the sample size was determined based on "p" value which was taken from prevalence of preterm birth in Jimma referral hospital which is 25.9 %, took our P value as 0.259.

- using $n = z^2 p(1-p)/w^2$ where,

  n= required minimum sample size

  Z= z-score value corresponding to a given level of confidence (1.96)

  p= estimated population proportion

  w= allowable margins of error

- At the level of significance 5%
- precision level .05

  n = (1.96)2 (.259) (.741)

  = 294.8 ~ 295

- Correction formula $nf = n_i/1+ n / N$

nf = corrected sample

ni = initial sample

N = source population

- nf = 295 / 1 + 295 / 385
- nf = 167

Our source population was 385 use correction formula and sample size become 167 and 5% non-response rate = 8.35~8 so that the total sample size will be 175.

- ✓ Three hundred eighty five mothers were delivered in the three consecutive months i.e. (Ginbot one to Hamle thirty) in WUSH 2014E.C. So, we used systematic probability sampling. Therefore, we gave identification number for each mothers gave birth during study period and to compute k th interval we divided total deliveries to total number of sample size`````` that is 385/167~2, but to get the starting point we randomly selected from 1-2 by lottery method.

4.6 Variables

1. Socio demographic factors
    - Age , ethnicity
    - Educational status, occupational status
    - Marital status
2. Fetal and maternal condition of the respondents

- ✓ GA of the newborn (number of preterm) , Sex of the baby ,
- ✓ APGAR score , weight of the baby , mode of delivery

- ✓ Parity of the pregnant women ,
- ✓ Number of prior preterm birth

4.7 Operational definition

Preterm birth is birth of the baby after reaching age of viability and before 37 completed weeks of gestational age (41).

4.8 data collection procedures

4.8.1 Data collection tool

Data was be collected by reviewing registration books from WKUSH gynecology and obstetrics ward, and from mothers and neonates chart.

4.8 Data quality control

Data was collected by our group members, prior to data collection we discussed with each other's on the objectives of the study and how to gather information from the mothers and neonates chart.

4.9 Data processing, Analyzing and presentation

Data was entered to epi-info version 3.5.1 and exported to SPSS version 21 for analysis. Independent variables was computed with dependent variables, and comparing results with similar studies. Magnitude of preterm birth describes as percentage and averages.

5 Ethical consideration

Ethical clearance was secured by ethical committee of Wolkite University, college of medicine and health science. Institutional consent was obtained from Wolkite University specialized teaching hospital administrative office. An official letter was given to hospital from Wolkite University. Privacy and confidentiality was maintained during data collection period by avoiding to give information's to third person and not to use for non-academic purpose.

6. Result

We found 30 of the cases are preterm which about 20.89 %. Among those preterms 55.1 % are males and 44.9 % are females. The result of birth weight among the preterms showed 58.7 % are more than 2500 gram which is normal birth weight , 35.9 % are between 2000 – 2500 gram that is low birth weight , 3.6 % are between 1500 – 1999 gram which is very low birth weight and remaining 1.8 % are less than 1500 which make them extremely low birth weight. Regarding their GA 1.2 % are born between 28-32 weeks which make them early preterm, 4.2 % are between are 32-33 which is moderate preterm and 13.2 % are between 34-37 which is late preterm , 81.4 % are more than 37 weeks. About 33.5 % have APGAR score 0 - 3 which is low , 20.4 % of them have APGAR score of 4-6 that is moderate , 46.2 % have a score of 7 - 10 which is normal . Regarding their GA

1.2 % are born between 28-32 weeks which make them early preterm, 4.2 % are between are 32-33 which is moderate preterm and 13.2 % are between 34-37 which is late preterm , 81.4 % are more than 37 weeks. About 33.5 % have APGAR score 0 - 3 which is low , 20.4 % of them have APGAR score of 4-6 that is moderate , 46.2 % have a score of 7 - 10 which is normal . Among the mothers who gave birth to preterm baby in the current pregnancy, 20.1 % of them have prior preterm birth and all of them has only 1 prior pre term birth. When we see the result of mode of delivery 66.5 % have spontaneous vaginal delivery, 13.2 % are breech assisted delivery, 10.8 % have instrumental delivery and 9.6 % delivered through caesarian delivery. Regarding the occupational status of the mothers 40.1 % are hose wives, 26.9 % are merchants, 13.8 % are government employee, 9 % are students and 1.2 % are unemployed. In the marital status shown in the result 3.6 % are single, 91 % are married, 4.2 are divorced and 1.2 are widowed. Regarding the ethnicity of the mothers 54.5 % are Gurage, 22.8 % are Amhara, 13.8 are Oromo and 9.6 % are others. Among the samples 26.3 % are educated up to grade 8 , 35.3 % are educated up to grade 10 , 14.4 % are educated up to grade 12 , 13.8 % have higher education learning and 10.2 % are illiterate.

Table 1: sex and birth weight distribution of the preterm birth among mothers who gave birth in Wolikte University specialized hospital, Gubreye, Gurage zone, Ethiopia August 2022.

Number	Variable	Percentage (%)
	Sex	
1	Male	55.1
2	Female	44.9
	Weight	
1	Normal birth weight	58.7
2	Low birth weight	35.9

3	Very low birth weight	3.6
4	Extremely low birth weight	1.8

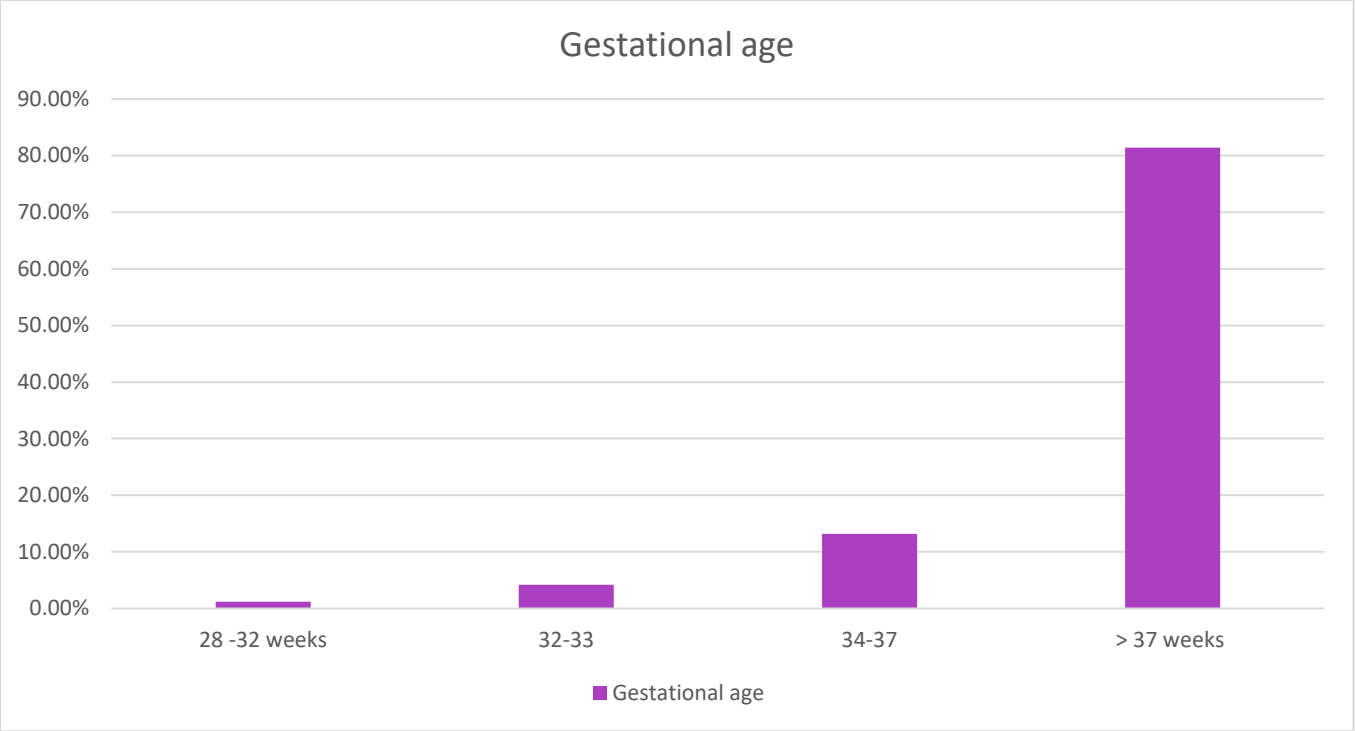

Figure 1: bar chart distribution of gestational age of preterm birth among mothers who gave birth in Wolikte University specialized hospital, Gubreye, Gurage zone, Ethiopia August 2022.

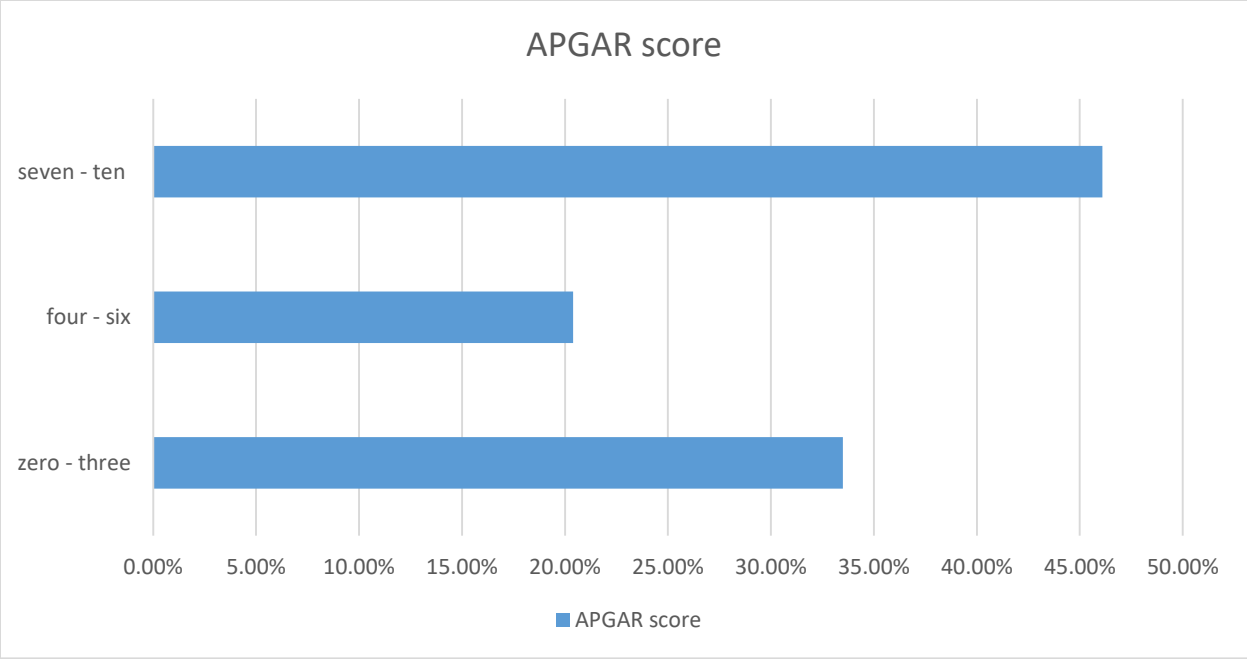

Figure 2: bar chart distribution of the AGRAR score of preterm birth among mothers who gave birth in Wolikte University specialized hospital, Gubreye, Gurage zone, Ethiopia August 2022.

Table 2: Distribution of mode of delivery, marital status and ethnicity preterm birth among mothers who gave birth in Wolikte University specialized hospital

Number	Variable	Percentage (%)
	Mode of delivery	
1	Spontaneous vaginal delivery	66.5 %
2	Breech assisted delivery	13.2 %
3	Instrumental delivery	10.8 %
4	Cesarean delivery	9.6 %
	Marital status	
1	Singleton	3.6 %
2	Married	91 %
3	Divorced	4.2 %
4	Widowed	1.2 %
	Ethnicity	
1	Gurage	54.5 %
2	Amhara	22.8 %
3	Oromo	13.8 %
4	Others	9.6 %

Gubreye, Gurage zone, Ethiopia August 2022.

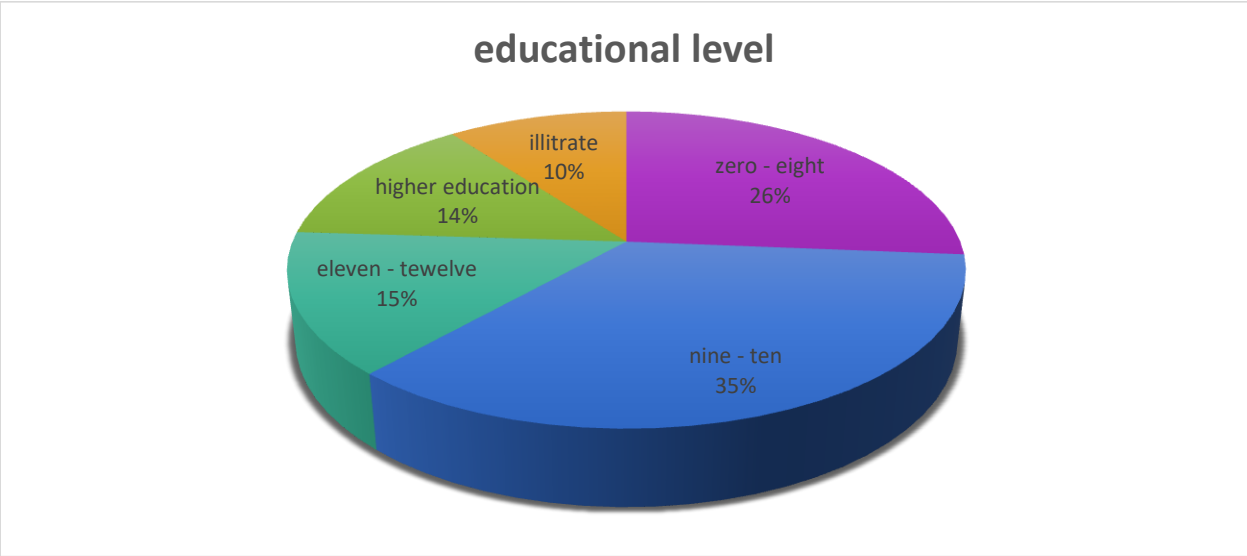

Figure 3: pie chart for educational level of the mothers of preterm birth among mothers who gave birth in Wolikte University specialized hospital, Gubreye, Gurage zone, Ethiopia August 2022.

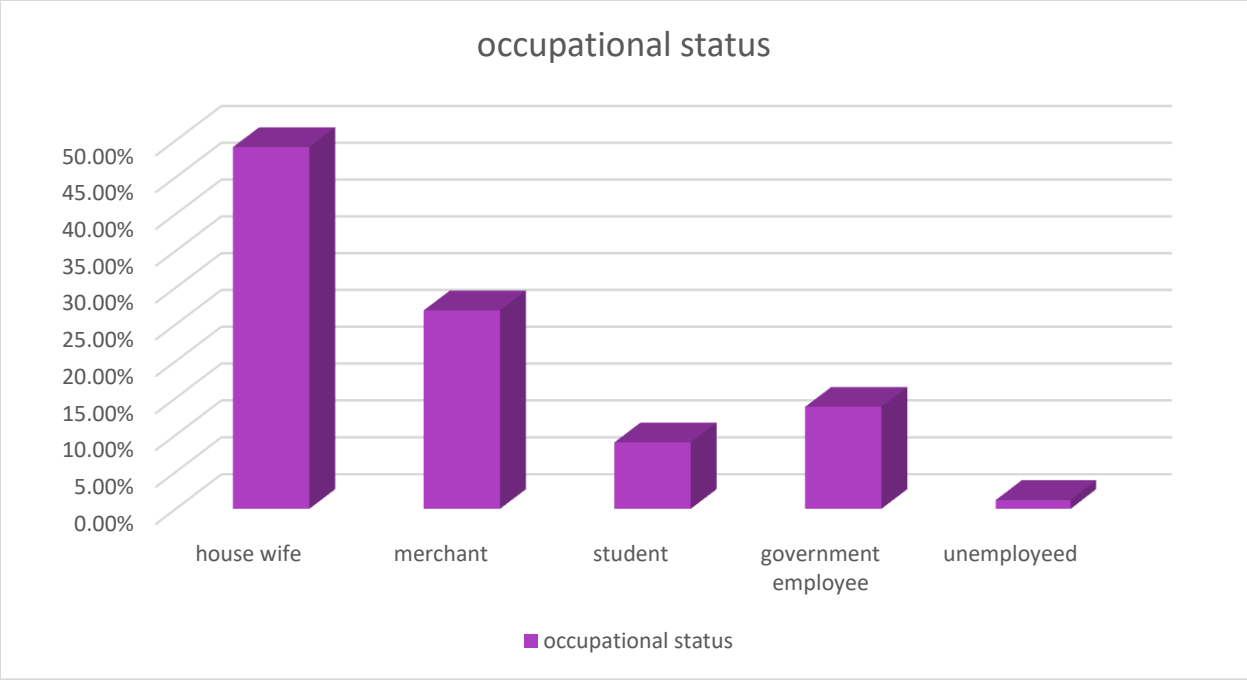

Figure 4: bar chart of the distribution of occupational status of preterm birth among mothers who gave birth in Wolikte University specialized hospital.

7. Discussion

Our study aimed at identifying the magnitude of the preterm birth in WUSH. The result of the study obtained from the secondary data for study subject has shown that all the preterm are registered with complete information.

In this study 20.89 % are preterms. Among those preterms 55.1 % are males and 44.9 % are females. This figure is around 2 times higher than the national prevalence of EDHS according to systemic review and meta-analysis research done involving epidemiology of preterm birth in Ethiopia in 2020 GC, showed the overall pooled prevalence of preterm birth is 10.48 %.

Compared to the prevalence of preterm birth in different part Ethiopia, it is relatively higher. When compared to a research done on preterm birth and associated factor among mothers who gave birth in Gonder town health institution which showed the prevalence of preterm birth to be 4.4% , our result is 4.74 times higher. On another study done at Axum and Adwa town which showed the prevalence of preterm birth to be 13.3%, compared to our finding it's 1.5 times lower.

On Research done regarding Preterm Birth and Associated Factors among Mothers Who Gave Birth in Fafen Zone Public Hospitals, Somali Regional State, Eastern Ethiopia the prevalence showed preterm birth was 12.3%. When compare to our result, our finding is 1.69 times higher.

The result of our research when compared to a study done at Debre marqose referral hospital in preterm birth and associated factors that showed the prevalence of preterm birth to be 11.6 % is 1.8 times higher.

A published journal on Ethiopian journal of reproductive health vol 4 showed the prevalence of preterm birth to be 7.1% in a city like Addis Ababa which when compared to our result is 2.9 times lower. A research was done at Michigan, USA mentions the prevalence of preterm birth on the study population to be12.8%, when compared to our finding its 1.6 times lower.

Another research done on multinational level mentioned the prevalence of preterm birth in Brazil was 21.7%. When compare to the finding, it's a little bit higher. The result of retrospective review of singleton birth done at tertiary hospital in Ghana on 2015 shows 18.9% were preterm. When compare to our finding its 1.1 lower.

Also on a research done at a tertiary center in Lagos, Nigeria on 2016 regarding characteristics and risk factor of preterm birth about 16.8 % of births were preterm which when compared to our result its 1.2 times lower.

On a research done at Kenya to determine the prevalence and the factor associated with preterm birth, it showed about 18.3% of birth were preterm , when compare to our result its 1.14 times lower.

8. Conclusion

The prevalence of pre-term birth in our set up is higher than most of the prevalence in different set ups such as Gonder , Debremarkose , Axum and Adwa , Fofan as well as cities like Addis Ababa as well as other countries like America , Kenya , Ghana and Malawi but its lower than brazil . our assumption is that WUSH is a referral hospital which receive different cases of high risk mother that are a risk factor for preterm birth , it's relatively new hospital so the gyni and obstetric department is not well established and equipped like that of other referral hospitals.

Our finding will help as a base line for further investigation and researches in the line of pre-term and help to establish mechanisms to decrease prevalence.

9. Recommendation

We recommend for South nation's nationalities people's regional states (SNNPR) health bureau, garage zone health department and WUTH to work on reducing of preterm birth by increasing awareness of preterm birth, contributing factors and possible complications related to it.

Increase awareness on ANC follow up , and on timely visit .increase awareness creation program for community on preterm birth , perinatal mortality , pregnancy related medical illness such as (preeclampsia ,gestational diabetes mellitus….) , so decreasing and managing those problems decrease prevalence of preterm birth. Increase on the establish well organized ,equipped ,and properly managed neonatal ICU set up with good collaboration with other health facilities for smooth referral system .

10. Reference

1. Oynecoi Scand; recommend definitions , terminology and format for statistical tables related to the perinatal period and use of a new certificate for cause of perinatal deaths ; October 14, 1976 ; Acta Dbstet ;Modifications recommend by FIGO , WHO; 1977;56:247-53.

2. Federal ministry of health, management protocol on selected obstetric topics for hospital, 2020; chapter 16 preterm labor page 98-101.

3. Howson CP, Kinney MV, and Lawn J: Born too soon; the global action report on preterm birth, 2012 Geneva World Health organization, 1-112.

4. Robert M. Kliegman BFS, oseph W. St Geme III, Nina F. Schor, Richard E. Behrman. Overview of mortality and morbidity; 2016; Canada: Robert M. Kliegma; © p.789-79 chapter 93, Nelson textbook of pediatrics .20th edition.

5. Newman L, Rowley J, Vander Hoorn S, Wijesooriya NS, Unemo M, Low N, Stevens G, Gottlieb S, Kiarie J, Temmerman M: Global estimates of the prevalence and incidence of four curable sexually transmitted infections based on systematic review and global reporting, 2015 10(12) e0143304; PloS one 2015.

6. William W. Hay J, Myron J. Levin,Judith M. Sondheimer,Robin R. Deterding the new born infant in current diagnosis treatment pediatrics new born infant: 2009 ,New York , Chicago; Elisabeth H. TiloAdamA.Rosenberg;1-60 volume 9th edition .

7. Central Statistical Agency (CSA) and ICF, Ethiopia demographic and health survey; 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA .CSA and ICF.

8. United Nations Inter-agency Group for Child Mortality Estimation (UN IGME), 'Levels & Trends in Child Mortality: 2017: United Nations Children's Fund, New York, Report 2017, Estimates Developed by the UN Inter-agency Group for Child Mortality Estimation.

9. Hannah H Chang JL, Hannah Blencowe, Catherine Y Spong, Christopher P Howson, Sarah Cairns-Smith, Eve M Lackritz, Shoo K Lee, Elizabeth Mason, Andrew C Serazin, Salimah Walani, Joe Leigh Simpson, Joy E Lawn: Preventing preterm births: analysis of trends and potential reductions with interventions in 39 countries with very high human development inde. 2013 ; 381(223):12.

10. Gebreslasie. K: Preterm Birth and Associated Factors among Mothers Who Gave Birth in Gondar Town Health Institutions ;2016. : Hindawi Publishing corporation; Advances in Nursing.

11. Bekele I DTaDK: Prevalence of Preterm Birth and its Associated Factors among Mothers Delivered in Jimma University Specialized Teaching and Referral Hospital, 2017; Jimma Zone, Oromia Regional State, South West Ethiopia : J Women's Health Care: 6(1).

12. Born Too Soon The Global Action Report on PretermBirth ;2012. Geneva ,WHO; 128.

13. Revised Fact Sheet: Preterm births 2016. Geneva; WHO.

14. Stay Beck DW, Lale Say, Ana Pilar Betran,Mario Merialdi, Jennifer Harris Requejo, Craig Rubens, Ramkumar Menon & Paul FA Van Look: The worldwide incidence of preterm Birth and a systematic review of maternal mortality and morbidity ;2010. Bull World Health Organ , 88(31-38):8.

15. Akilew Awoke Adane1* TAA, Leta Gedefaw Ararsa2, Bikes Destaw Bitew3 and Berihun Megabiaw Zeleke.: Adverse birth outcomes among deliveries at Gondar University Hospital ;2014 :Northwest Ethiopia: BMC Pregnancy and Childbirth , 14(90).

16 Draper ES: Evaluating and comparing neonatal outcomes.2010 ;In.: BMJ Publishing Group;

17. Blencowe H, Cousens S, Oestergaard MZ, et al. National, regional, and worldwide estimates of preterm birth rates in the year 2010 with time trends since 1990 for selected countries: 2012, *Lancet* ; a systematic analysis and implications; 379(9832):2162–2172. doi:10.1016/S0140-6736(12)60820-4 .

18 Beck S, Wojdyla D, Say L, et al. The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity. 2010; *Bull World Health Organ;* 88:31–38. doi:10.2471/BLT.08.062554.

19.Lawn JE, Gravett MG, Nunes TM, Rubens CE, Stanton C. Global report on preterm birth and stillbirth (1 of 7): definitions, description of the burden and opportunities to improve data ,2010; *BMC Pregnancy Childbirth*. 10(1):1–22. doi:10.1186/1471-2393-10-S1-S1

20. Been JV, Millett C. Reducing the global burden of preterm births, 2019; *Lancet Glob Health* :e414.7(4) doi:10.1016/S2214-109X(19)30059-2 ,. Blencowe H, Cousens S, Chou D, et al. Born Too Soon: the global epidemiology of 15 million preterm births.2013: *Reprod Health*.;10 (1):S2. doi:10.1186/1742-4755-10-S1-S2.

21. Fund UNCs. *Levels and Trends in Child Mortality:2017*, New York; *Estimates Developed by the UN Inter-Agency Group for Child Mortality Estimation*; report 2017.

22. Aregawi G, Assefa N, Mesfin F, et al. Preterm births and associated factors among mothers who gave birth in Axum and Adwa Town public hospitals,2018; Northern Ethiopia, *BMC Res Notes*.12 (1):640. doi:10.1186/s13104-019-4650-0 ;2019.

23. Fund UNCs. *Levels and Trends in Child Mortality: 2017,* New York*; Estimates Developed by the UN Inter-Agency Group for Child Mortality Estimation* ;16*, Report 2017.*

24. Blencowe H, Cousens S, Oestergaard MZ, et al. National, regional, and worldwide estimates of preterm birth rates in the year 2010 with time trends since 1990 for selected countries: a systematic analysis and implications. Lancet. 2012;379(9832):2162–2172. doi:10.1016/S0140-6736(12)60820-4

25. Lawn JE, Gravett MG, Nunes TM, Rubens CE, Stanton C. Global report on preterm birth and stillbirth (1 of 7): definitions, description of the burden and opportunities to improve data. BMC Pregnancy Childbirth. 2010;10(1):1–22. doi:10.1186/1471-2393-10-S1-S1

26. March of dimes foundation data book for Policy makers, maternal , infant, and child health in the United states, March of dimes foundation data book for policy makers, 2010.

27. C.holzman, R.kelly, P.senegaore et AL.,"placental vascular pathology finding and pathways to preterm delivery," American journal of epidmology, Vol 170, no. 2, pp 148-158 ,2009.

28. Onankpa B, Isezuo K. Pattern of preterm delivery and their outcome in a tertiary hospital. Int J Health Sci Res. 2014;4(3):59–65

29. Wagura P, Wasunna A, Laving A, Wamalwa D. Prevalence and factors associated with preterm birth at kenyatta national hospital.BMC Pregnancy Childbirth. 2018;18(1):1–8. doi:10.1186/s12884-018-17402

30. van den Broek NR, Jean-Baptiste R, Neilson JP. Factors associated with preterm, early preterm and late preterm birth in Malawi. PLoS One. 2014;9(3):e90128. doi:10.1371/journal.pone.0090128

31. Mengesha HG, Sahle BW. Cause of neonatal deaths in Northern Ethiopia: a prospective cohort study. BMC Public Health. 2017;17 (1):62. doi:10.1186/s12889-016-3979-8

32. kindie fentahun muchie , ayenew molla lakew , destaw fetene teshome , melaku kindie yenit , malelde mequanent sisay, fentahun ayenew mekonene , Yohannes ayanew habite ,epidmology of preterm birth in ethioipia ,systemic review and meta analysis , BMC pregnancy and childbirth , September 2020 GC.

33. Gebreslasie K. Preterm birth and associated factors among mothers who gave birth in Gondar Town Health Institutions. Adv Nurs. 2016;2016. doi:10.1155/2016/4703138

34. Aregawi G, Assefa N, Mesfin F, et al. Preterm births and associated factors among mothers who gave birth in Axum and Adwa Town public hospitals, Northern Ethiopia, 2018. BMC Res Notes. 2019;12 (1):640. doi:10.1186/s13104-019-4650-0

35. Ibrahim Ismail muhumed , Jamal Yusuf kebira , myria obejero mahibalhin , preterm birth and associated, factor among mothers who gave birth in Fagan zone public hospitals , Somalia region state, eastern Ethiopia, 2021:11 22-23 .

36. T.bekele , A. Amazon , and K. Z. Gebreselasie, " preterm birth and associated factor among mothers who gave birth in debremarkose town health institution , 2013 institution based cross sectional study," gynecology and obstetric vol. 5 no. 5 article 292, pp ,1-5, 2015.

37. M.koblinsky , F. Rain , and S. Tesfaye , " reducing maternal mortality and increasing use of skilled birth attendance : Ethiopia and MDG 5," Ethiopia journal of reproduction health, vol 4, no.1 pp. 4-15, 2010.

38. A study of the pattern Of admissions and outcome in a neonatal intensive care unit at high altitude,2012; Sri Lanka Journal of Child Health : **41**(2): 79-81

39. Causes of Neonatal admissions and deaths at a rural hospital; KwaZulu-Natal, South africa : Southern African Journal of Epidemiology and Infection.

40. Tigist Bekele AAaKZG: Preterm Birth and Associated Factors among Mothers who gave Birth in Debremarkos Town Health Institutions, 2013 ; Gynecol Obstet(Sunnyvale); 5(5), Institutional Based Cross Sectional Study : 2015.

41. Atnafu M. Tekleab1 Gesit M. Amaru1 Y. Abeje T.2 St Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia 1Department of Pediatrics And Child Health, 2Departmen2DepartmenMM, Kulkarni S, Tilahun T: Modeling Determinants of Time-To-Death in Premature Infants Admitted to Neonatal Intensive Care Unit ;Jimma University Specialized Hospital. Annals of Data Science

42. F. Gary Cunningham ,Kenneth J. Leveno ,Steven L. Bloom ,Catherine Y. Spong ,Jodi S.Dashe ,Barbara L. Hoffman; Preterm birth ;2013:United States ,Williams obstetrics 24th edition , chapter 42,830.

11. ANNEX

1) General information
   a) cheek list number =
2) Socio demographic data
   a) parity of the pregnant women (1 = 0-5 , 2 = 5-10 , 3 = 10 +)
   b) educational level of pregnant women (1= illiterate , 2 = 0-8 grade , 3 = 9-10 , 4 = 11-12 , 5 = higher education status)
   c) marital status (1 = single , 2= married , 3 = divorced , 4= widowed)
   d) occupational status of pregnant women (1= house wife , 2= merchant , 3= student ,4= government employee 5= unemployed)
   e) is there any prior preterm birth (1= no , 2= yes)
   f) if yes to question e , how many (1= single , 2 = 2- 3 , 3= 4+)
3) Fetus condition
   a) Gestational age (1 = 28 - 32 weeks , 2 = 32 -33 weeks , 3 = 34 – 37 weeks 4 = more than 37 weeks)
   b) Weight of the fetus (1= >/= 2500 gram , 2 = < 2500 gram , 3= < 1500 gram ,4 = < 1000 gram)
   c) APGAR score (1 = 0 - 3 , 2 = 4 - 6 , 3 = 7 -10)
   d) Mode of delivery (1= Spontaneous vaginal delivery , 2= breech assisted delivery , 3 = instrumental delivery 4 = caesarian delivery)