ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF NURSING AND MIDWIFERY

POST GRADUATE STUDY

PREVALENCE OF CONGENITAL ANOMALIES AND ASSOCIATED FACTORS AMONG NEWBORNS IN BISHOFTU GENERAL HOSPITAL, OROMIA, ETHIOPIA, 2019.

PRINCIPAL INVESTIGATOR: SAMUEL GEDAMU (BSC)

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COLLEGE OF HEALTH SCIENCE

SCHOOL OF NURSING AND MIDWIFERY

NAME OF INVESTIGATOR	SAMUEL GEDAMU(BSc)
NAME OF ADVISOR(S)	ENDALEW GEMECHU(ASSISTANT PROFESSOR, PHD fellow) Address : endalewaau2012@gmail.com WORKINESH DABA(MPH/RH, BSc, BA) Address: Workinesh.daba@aau.edu.et
FULL TITTLE OF THE THESIS	PREVALENCE OF CONGENITAL ANOMALIES AND ASSOCIATED FACTORS AMONG NEWBORNS IN BISHOFTU GENERAL HOSPITAL, OROMIA, ETHIOPIA: A RETROSPECTIVE STUDY.
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STUDY AREA	BISHOFTU GENERAL HOSPITAL
ADDRESS OF INVESTIGATOR	Email : Samigedamu1983@gmail.com Cell phone : 0910981474 and 0973276971

Approval Sheet

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SCHOOL OF NURSING AND MIDWIFERY

APPROVAL BY THE BOARD OF EXAMINATION

This thesis by **Samuel Gedamu** is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of masters in maternity and reproductive health nursing.

INTERNAL EXAMINER

_____	_____	_____	_____
NAME	RANK	SIGNITURE	DATE

RESEARCH ADVISORS

_____	_____	_____	_____
NAME	RANK	SIGNITURE	DATE
_____	_____	_____	_____
NAME	RANK	SIGNITURE	DATE

DEPARTMENT HEAD

_____	_____	_____	_____
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DEDICATION

I dedicate this thesis to the children and to the family of the children who have been affected by congenital anomaly and to those who lost their life because of these problem.

DECLARATION

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis.

This thesis is submitted in partial fulfillment of the requirement for a graduate degree from the Addis Ababa University at College of Health Sciences, School of Nursing and Midwifery. The thesis is deposited in the Addis Ababa University Digital Library and is made available to local, national and international scientific community. I solemnly declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

1. _____ _____ _____

Name of student Signature Date

Name of advisors

1. _____ _____ _____

Name of Major Advisor Signature Date

2. _____ _____ _____

Name of Co-Advisor Signature Date

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ACRONYMS AND ABBREVIATIONS

AOR: adjusted odds ratio

BD: birth defect

BDs: birth defects

CA: congenital anomaly

CAs: congenital anomalies

COR: crude odds ratio

EDHS: Ethiopian demographic health survey

EUROCAT: European registration of congenital anomalies and twins

OR: odds ratio

SPSS: statistical package for social science

TOPFAs: termination of pregnancy for fetal anomaly

USA: united States of America

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ABSTRACT

Background: Congenital anomalies, affect millions of babies worldwide with a prevalence of 3% and it is estimated that, globally, 303,000 newborns die within the first 4 weeks of life due to congenital anomalies. In Ethiopia, there are a number of babies are born with congenital anomalies; however, a few studies have been studied regarding the prevalence and risk factors for the anomalies. **Objective:** The main objective of this study was to assess the prevalence of congenital anomalies and associated factors among newborns in Bishoftu general hospital, Oromia, Ethiopia. **Methods:** descriptive retrospective crossectional study was employed. The data entry and analysis was conducted by using SPSS version 24. Categorical variables were summarized as proportions and were compared using Pearson**'**s Chi square test, Crude (unadjusted) and adjusted odds ratios were calculated to quantify the strength of association between the factors and congenital anomalies. The 95% confidence intervals were determined and the factors with a p-value of less than 0.05 were considered to have a significant association with congenital anomalies. **Result:** Out of 2218 live births 23 newborns were diagnosed with congenital malformations, making the prevalence rate of 1% per 100 live births. The most common prevalent types of congenital anomaly were anencephaly (30.4%).Maternal age above 35(AOR =6.5, 95%CI = (2.4-18), P value= 0.001),birth order above 3(AOR=8.4; 95%CI=3.4-20.7; P value =0.001), birth weight less than 2.5(AOR=0.3;95%CI=0.1-0.9),P value=0.037) and singleton pregnancy(AOR =6.4;95%CI =2-18.9,P value =0.001) had a significant association with the occurrence of congenital anomalies, whereas maternal use folic acid during pregnancy(AOR=0.036; 95% CI =.0.008-0.15;Pvalue=0.001) had a protective effect against congenital anomalies. **Conclusion and recommendation:** Congenital anomaly is common and accounts for 1 %(10/1000 live births) in Bishoftu general hospital and anencephaly is the most prevalent type followed by hydrocephalus and spinal bifida. Large community-based studies in different geographical, environmental and socio-economic settings should be conducted in Ethiopia to determine the prevalence of congenital anomalies and their associated factors.

Key terms: congenital anomalies, prevalence, newborns, Bishoftu general hospital.

1. Introduction

1.1. Background

Birth defects or congenital anomaly can be defined as structural or functional abnormalities, including metabolic disorders, which are present from birth. It can also be defined as structural or functional anomalies (for example, metabolic disorders) that occur during intrauterine life and can be identified prenatally, at birth, or sometimes may only be detected later in infancy, such as hearing defects. Birth defects can cause spontaneous abortions and stillbirths and are a significant but under recognized cause of mortality and disability among infants and children under five years of age. They can be life-threatening, result in long-term disability, and negatively affect individuals, families, health-care systems and societies(1, 2).

Congenital anomalies are associated with infant morbidity and mortality, especially in the neonatal period, which makes their early diagnosis important for the planning and allocation of specialized health service resources (prenatal, natal and post-natal), for the reduction of morbidity and mortality, especially in the early neonatal period, and for the improvement of quality of life and survival rates. Although approximately 50% of all congenital anomalies cannot be linked to a specific cause, there are some known genetic, environmental and other causes or risk factors, it has been reported that Low-income may be an indirect determinant of congenital anomalies, with a higher frequency among resource-constrained families and countries. It is estimated that about 94% of severe congenital anomalies occur in low- and middle-income countries. Infections, age and nutritional status of the mother is also associated with the cause of congenital anomalies **(1).**

According to the study conducted in the city of Sao polo maternal age, multiple pregnancies and low birth weight are associated with the presence of congenital anomalies and female gender was considered protective for the occurrence of CAs(3).another study which are conducted in Pakistan Mardan medical complex shows

that consanguinity and lack of folic acid intake are the most common risk factor for the presence of CAs (4)**.**

The study conducted in Latvia on epidemiological aspects of congenital anomalies and associated risk factors indicates that newborns born from multiple pregnancies, male neonate, preterm birth, maternal alcohol consumption and smoking, not having antenatal care and mothers age above 35 are highly associated with the presence of CAs (5)**.**

According to the study of Tanzania maternal factors such as lack of peri-conceptional use of folic acid and an inadequate attendance to antenatal clinic and Infant factors such as female sex, a birth weight of 2.5 kg or more, singleton pregnancy and a birth order above 4 were significantly associated with CAs**(6).**

The study conducted in Ethiopia shows that maternal alcohol use, unidentified medication use during pregnancy and exposure to chemicals were significantly associated with the occurrence of CAs, whereas iron folate use before and during early pregnancy had a protective effect from congenital anomalies**(7)**.Congenital birth defects being one of the main causes of neonatal mortality, are very common in our country and most common type of CAs are orofacial (34.2%), neural tube (30.8%), upper and lower limb (12.8%), cardiovascular system (10.3%), digestive system and abdominal wall (4.8%), unspecified congenital malformations (2.5%), Down syndrome (2%), genitourinary system (2%), head, face, and neck defects (0.4%), and others (0.3%)(8).

1.2. Statement of problem

Congenital anomalies, affect millions of babies worldwide occurring at around 1 in every 33 babies born. Some defects are more severe than others and it is estimated that, globally, 303,000 newborns die within the first 4 weeks of life due to congenital anomalies (9).

According to WHO, 17%–42% of infant mortality was attributed to congenital anomalies, in 11 European registration of congenital anomalies and twins (EUROCAT) countries, average infant mortality with congenital anomaly was 1.1 per 1000 births, with higher rates where termination of pregnancy for fetal anomaly (TOPFA) is illegal, the rate of stillbirths with congenital anomaly was 0.6 per 1000 and the average TOPFA prevalence was 4.6 per 1000, nearly three times more prevalent than stillbirths and infant

deaths combined(10)**.** In Spain, there were 13,660 deaths (53.4% males, 46.6% females) due to rare CAs along the period 1999–2013. In terms of type of CA, the highest percentage (40.3%) of deaths corresponded to rare CAs of the circulatory system, followed by a 16.9% due to chromosomal abnormalities, 14.5% due to other congenital malformations, and 9.2% due to rare CAs of the nervous system(11).

In united states of America a total of 23,161 deaths occurred in children under age 1 year in 2016.The infant mortality rate was 5.87 per 1,000 live births, the neonatal mortality rate (deaths of infants aged 0–27 days per 1,000 live births) was 3.87, and the post neonatal mortality rate (deaths of infants aged 28 days through 11 months per 1,000 live births) was 2.00. From the 10 leading cause of infant death in USA congenital anomaly takes the first place **(12).**

In Ethiopia, from 2012-2016 the infant mortality rate was 48 deaths per 1,000 live births. The child mortality rate was 20 deaths per 1,000 children surviving to age 12 months, while the overall under-5 mortality rate was 67 deaths per 1,000 live births. The neonatal mortality rate was 29 deaths per 1,000 live births, and the post-neonatal mortality rate was 19 deaths per 1,000 live births, but the cause for these death was not described in this survey(13)**.**Even though the exact number of congenital anomaly is not known in Ethiopia, there are a number of babies are born with congenital anomalies; however, a few studies have been studied regarding the prevalence and risk factors for the anomalies, this study shows that the magnitude of birth defects increased from time to time. From 2010–2014, there were 319,776 various medical records of children aged 0–17years. Out of these, 6,076 (58.5% male, 41.5% female), (1.9% with 95% CI: 1.85%–1.95%) had BD's**(8).** Another study conducted on prevalence and risk factors of neural tube defect in three teaching hospitals of Addis Ababa shows that 55 cases of NTDs out of 8677 births after 28 weeks of gestation with birth prevalence of 63.4 per 10,000 births (95% confidence interval (CI), 51–77). A total of 115 cases were medically terminated after 12 weeks of gestation. Fifty-six of these terminations (48.7%) were due to NTDs. Thus, total prevalence of NTDs after 12 weeks' gestation is 126 per 10,000 births (95% CI, 100–150**)(14).**

So, planning for the birth defect program activities with clear aims, objectives and intended short, medium and long term outcomes are essential to reduce the burden of

BDs. In addition, establishing a surveillance system as well as obtaining political support, financial aid and identifying geographical regions and understanding the health care system capacity are also important components to reduce the occurrence of BDs. Implementing preventing strategies based on BD data, linking children with BD to the health service and creating awareness about BDs and the uses of folic acid/multivitamins or nutritional status are necessary to reduce the events of BDs. It is also important to identify cases, establish data base and report to partners and responsible bodies(8).Hence, the aim of the present study is to assess the prevalence of congenital anomalies and associated factors among newborns delivered in Bishoftu general hospital, Oromia region, Ethiopia.

1.3. Significance of the study

This study is important in adding the wealth of information regarding the prevalence and common prevalent types of congenital anomaly and it is also important to identify factors predisposing to congenital anomaly.

Since, there is no adequate study was done on this specific area results from this study support the development of strategies for improving the management and rehabilitation of patients with congenital anomalies in this particular context.

The study is also important in creating awareness so as to reduce the occurrence of anomalies and it is also important for policy makers/responsible bodies to develop preventive strategic plans and finally it is used as a reference by different researcher.

2. Literature Review

2.1. Definition of congenital anomaly

Birth defects or congenital anomaly can be defined as structural or functional abnormalities, including metabolic disorders, which are present from birth. It can also be defined as structural or functional anomalies (for example, metabolic disorders) that occur during intrauterine life and can be identified prenatally, at birth, or sometimes may only be detected later in infancy, such as hearing defects. Irrespective of definition, birth defects can cause spontaneous abortions and stillbirths and are a significant but under recognized cause of mortality and disability among infants and children under five years of age. They can be life-threatening, result in long-term disability, and negatively affect individuals, families, health-care systems and societies(2).

2.2. Mortality due to congenital anomaly

According to WHO, 17%–42% of infant mortality was attributed to congenital anomalies, in 11 European registration of congenital anomalies and twins(EUROCAT) countries, average infant mortality with congenital anomaly was 1.1 per 1000 births, the rate of stillbirths with congenital anomaly was 0.6 per 1000 and the average termination of pregnancy for fetal anomaly(TOPFA) prevalence was 4.6 per 1000, nearly three times more prevalent than stillbirths and infant deaths combined(10). Specifically in Spain, there were 13,660 deaths due to rare CAs along the period 1999–2013. In terms of type of CA, the highest percentage (40.3%) of deaths corresponded to rare CAs of the circulatory system, followed by a 16.9% due to chromosomal abnormalities,14.5% due to other congenital malformations, and 9.2% due to rare CAs of the nervous system(11).

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2.3. Prevalence and common types of congenital anomaly

According to the report of department of congenital heart defect congenital anomalies, affect millions of babies worldwide with a prevalence rate of 3% and it is estimated that, globally, 303,000 newborns die within the first 4 weeks of life due to congenital anomalies(9).

Congenital disorders are a common condition worldwide, a retrospective study conducted in Brindisi shows that Out of 8,503 newborns recorded 194 subjects are diagnosed with congenital anomalies(228.2/10,000 total births).83 subjects were observed with congenital heart diseases with an excess of 49.1%(15). Another retrospective study which is conducted in Maa-O-Shishu Hospital, Bangladesh from July 2010 to June 2011 shows that from the total number of admission (2395) and total number of death (141), Congenital anomalies were 105. Among the Congenital anomalies, congenital heart disease was 62, Club foot was 9, Down syndrome was 8, Hydrocephalus was 5, Cleft lip & cleft palate was 5, Umbilical hernia was 4, Duodenal atresia was 3, Tongue tie was 3, Pierre robin syndrome was 3, Hisprung disease was 2 and Mermaid syndrome was one(16).

A cohort study conducted in India shows that among 1822 births, the total prevalence of major congenital anomalies was 230.51(170.99–310.11) per 10 000 births. Congenital heart defects were the most commonly reported anomalies in the cohort with a prevalence of 65.86 (37.72–114.77) per 10 000 births. Although neural tube defects were two and a half times less as compared to congenital heart defects, they were nevertheless significant at a prevalence of 27.44 (11.73–64.08) per 10 000 births. In this cohort, congenital anomalies were the second largest cause of neonatal death(17). A crossectional study among stillborn and live born infants in two Lebanese hospitals in Mount-Lebanon shows that of the all 1000 single births, 24 (2.4%) were diagnosed as being congenitally malformed. Cardiovascular system defects and limbs anomalies (4/1000) were mostly detected, followed by genitourinary system (2/1000), nervous system (2/1000), respiratory system (2/1000) malformations and chromosomal anomalies (1/1000)(18).

The study conducted in New York City on prevalence of upper extremity congenital anomaly indicates that the overall prevalence of congenital upper extremity anomalies was 27.2 cases per 10,000 live births. Polydactyl was most common with 12,418 cases and a prevalence rate of 23.4 per 10,000 live births. The next most common anomalies included syndactyl with 627 cases affecting the hands (1498 total) and reduction defects (1111 cases). There were a total of 4,883,072 live births in New York State during the study period(19). The prevalence of major congenital anomalies in tertiary hospital of Riyadh population appears to be higher than international prevalence's, with a high recurrence rate. A total of 63452 obstetrical ultrasound examinations were performed for 30632 female Saudi obstetric patients from the period of January 2007 to December 2012 from this 1598 fetuses were diagnosed with major congenital anomalies, including 1064 (66.6 %) fetuses with isolated major anomalies and 534 (33.4%) fetuses with non-isolated major anomalies. The antenatal prevalence of congenital anomalies was 52.1 per 1000 pregnancies(20).

A review of articles which were conducted between 1992 and 2014 on prevalence of congenital anomaly in Iran which reviews 455 studies shows that the overall prevalence of congenital anomalies among infants was estimated to be 2.3%. The overall prevalence rates, in terms of gender, were estimated to be 3% in boys and 2% in girls. While the highest prevalence rates were related to musculoskeletal anomalies (27.5%), skin anomalies (19.7%) and genitourinary system anomalies (15.8%), the lowest prevalence rate was related to respiratory system (1.82%) (21).

The study conducted on the prevalence and associated factors of congenital anomalies in newborns in the city of São Paulo from 2010 to 2014 indicates that from a total of 819,018 live births occurred in the city in 14,657 (1.6%) of them, some congenital anomaly was reported. The most frequent congenital anomalies found were those related to osteoarticular system followed by those related to the cardiovascular system(3). Another study from medical birth register data of Latvia shows that during the time period from year 2000 to 2010 3.2% (n=7451) of live births were diagnosed congenital anomalies at maternity units. 66.1% (n=4927) of which had major congenital anomalies that are related to serious defects for newborn. Period prevalence of major congenital anomalies among live births is 211.4/10 000 (95% CI 197.4 –226.2). Overall,

prevalence rate has statistically significant decreased – on average by 5.2/10 000 during the years.($p<0.01$)(5).

A descriptive, cross-sectional study in ayub teaching hospital Abbottabad, Pakistan shows that a total of 2,360 patients were admitted in NICU during the study period. One hundred patients were noted to have congenital anomalies. The most frequent anomalies involved the central nervous system (31%). Meningomyelocele was the commonest defect (71%, 22 out of 31 cases of CNS defects), among these males were more (77%, 17 out of 22 of Meningomyelocele cases) than females (14 out of 31). These were followed by patients born with congenital heart defects (16%). Patients with urogenital anomalies (6%) were all male except for one who had ambiguous genitalia(22).

In Africa the prevalence of congenital anomaly looks worse, A cross-sectional retrospective study conducted in Newborn Special Care Unit (NBSCU) of the University of Nigeria Teaching Hospital shows that Seventeen (17) out of a total of six hundred and seven newborn babies admitted in the newborn unit of UNTH over the study period (Jan 2007-March 2011) were found to have congenital abnormalities of various types, giving a prevalence of 2.8%. Common abnormalities seen in these babies were mainly surgical birth defects and included cleft lip/cleft palate, neural tube defects (occurring either singly or in combination with other abnormalities), limb abnormalities (often in combination with neural tube defects of various types), omphalocoele, umbilical herniae, anorectal malformations and dysmorphism associated with multiple congenital abnormalities(23). Another descriptive, retrospective study using an audit of the current database was undertaken to evaluate the number of notifications received, types of BDs reported and the quality of reporting across South Africa for data received from 2006 to 2014. A total of 14 571 notifications were received, including 13 252 BDs and 1 319 zero notifications, across all nine provinces. Commonly reported BDs included Down syndrome, cleft lip and palate, talipes equinovarus, neural tube defects and albinism(24).

A cross-sectional analysis which was conducted in the labor ward registers at four Dares Salaam hospitals between October, 2011 and February, 2012 shows that a total of 28217 resident births were encountered. Overall birth prevalence of selected defects was 28.3/10000 live births. Neural tube defects and indeterminate sex were the most and least common defects at birth

(9.9nd 1.1/10 000live births, respectively). Among stillbirths (66.7%) and deaths that occurred within less than 5 days of an affected live birth (18.5%), neural tube defects were the most frequently associated structural defect(25).

The study conducted in our neighbor Zagazig University Hospital, Egypt shows that the overall incidence of CAs among live born neonates was 2.5%, as most of the cases were referred to Zagazig University Hospital (Egypt) for delivery. The musculoskeletal system (23%) was the most commonly involved followed by the central nervous system (20.3%).Involvement of more than one system was observed in (28.6%) cases(26).

In Ethiopia the magnitude of birth defects increased from time to time. From 2010–2014, there were 319,776 various medical records of children aged 0–17years. Out of these, 6,076 (58.5% male, 41.5% female), (1.9% with 95% CI: 1.85%–1.95%) had BD's(8).

A study conducted on prevalence and risk factors of neural tube defect in three teaching hospitals of Addis Ababa shows that 55 cases of NTDs out of 8677 births after 28 weeks of gestation—birth prevalence of 63.4 per 10,000 births (95% confidence interval (CI), 51–77). A total of 115 cases were medically terminated after 12 weeks of gestation. Fifty-six of these terminations (48.7%) were due to NTDs. Thus, total prevalence of NTDs after 12 weeks' gestation is 126 per 10,000 births (95% CI, 100–150)(14).

2.4. Factors predisposing to congenital anomaly

Birth defects are a diverse group of disorders of prenatal origin which can be caused by single gene defects, chromosomal disorders, multifactorial inheritance, environmental teratogens and micronutrient deficiencies. Maternal infectious diseases such as syphilis and rubella are a significant cause of birth defects in low- and middle-income countries. Maternal illnesses like diabetes mellitus, conditions such as iodine and folic acid deficiency, and exposure to medicines and recreational drugs including alcohol and tobacco, certain environmental chemicals, and high doses of radiation are other factors that cause birth defect(2)

According to the study conducted in the city of Sao polo maternal age, multiple pregnancies and low birth weight are associated with the presence of congenital anomalies and female gender was considered protective for the occurrence of CAs(3).another study which are conducted in

Pakistan Mardan medical complex shows that consanguinity and lack of folic acid intake are the most common risk factor for the presence of CAs (4).

The study conducted in Latvia on epidemiological aspects of congenital anomalies and associated risk factors indicates that newborns born from multiple pregnancies, male neonate, preterm birth, maternal alcohol consumption and smoking, not having antenatal care and mothers age above 35 are highly associated with the presence of CAs (5).

The study conducted in Tanzania shows that maternal factors such as the lack of peri-conceptional use of folic acid, a maternal age of above 35 years and an inadequate attendance to antenatal clinic are among the risk factor for the occurrence of CAs and Infant factors that were significantly associated with congenital anomalies were female sex, a birth weight of 2.5 kg or more, singleton pregnancy and a birth order above four (6).

The study conducted in Ethiopia shows that unidentified medication use, alcohol drinking during early pregnancy, and exposure to chemicals had a significant association with the occurrence of congenital anomalies, whereas iron folate use before and during early pregnancy had a protective effect from congenital anomalies(7).

Conceptual framework

The conceptual framework used in this study was adopted and modified from study conducted in Tanzania, Ethiopia and Sao polo (3, 6, 7). This framework described three factors of congenital anomalies such as socio demographic factors, maternal factors and fetal factors.

Socio demographic factors includes, maternal factors and infant factors

These factors causes congenital anomalies and Fig 1 illustrates this conceptual framework

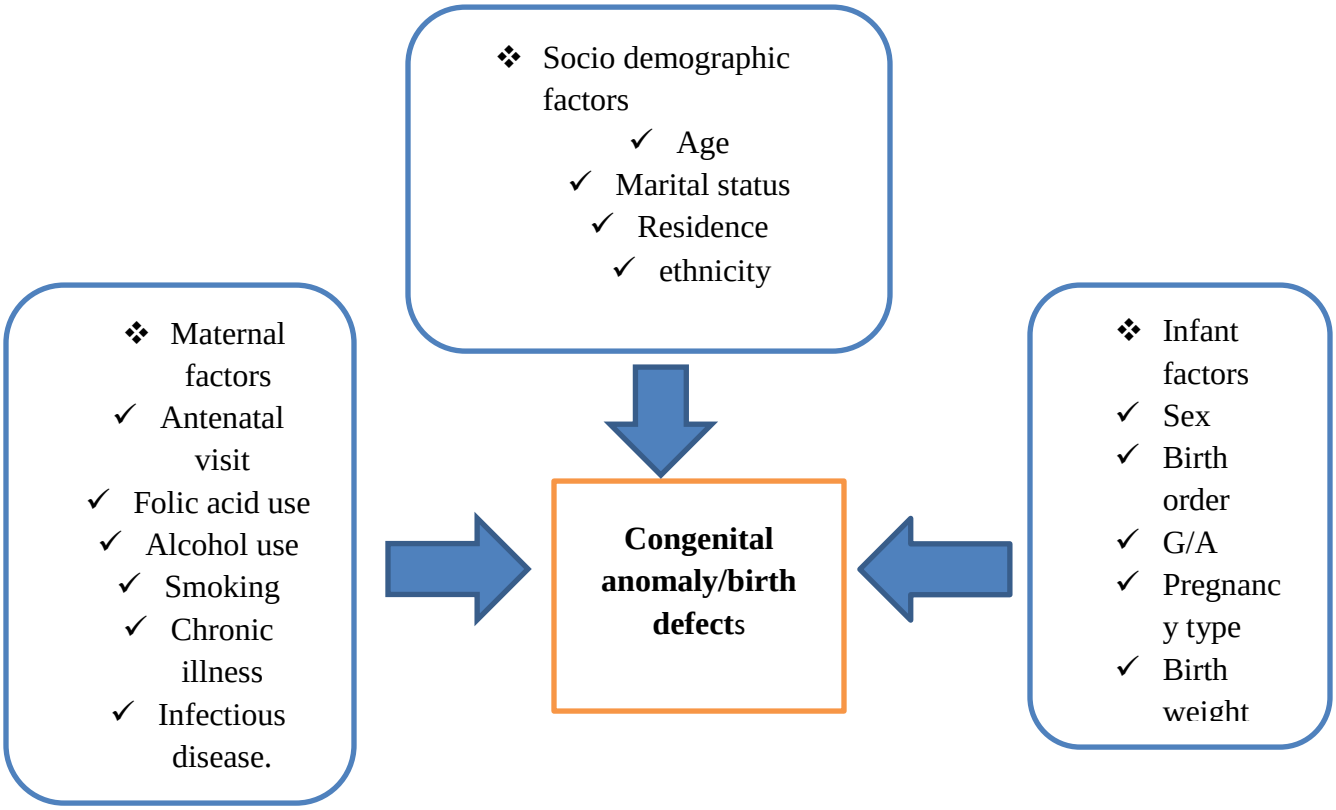

Figure 1: Conceptual frame work shows congenital anomalies and associated factors among newborns in Bishoftu general hospital, Ethiopia 2019.

3. Objectives of the study

3.1. General objective

- ✓ To assess the prevalence of congenital anomalies and associated factors among newborns in Bishoftu general hospital, Ethiopia 2019.

3.2. Specific objectives

- ✓ To determine the prevalence of congenital anomalies among newborns in Bishoftu general hospital.
- ✓ To identify factors associated with congenital anomalies among newborns in Bishoftu general hospital.

4. Methods

4.1. Study Area and Period

This study was conducted in Bishoftu general hospital. Bishoftu general hospital is found in Bishoftu town which is located in Oromia Regional State, East Shewa Zone at a distance of 47 Km from Addis Ababa. According to 2015 Central statics Agency it's estimated that the total populations of Bishoftu are 147,100 and the town have one general hospital and three health centers. The hospital was established in 1948 to offer services for 1.2 million peoples.

The study was conducted from March 15 to April 30, 2019.

4.2. Study Design

Descriptive retrospective crossectional study was employed.

4.3. Description of Population

4.3.1. Source population

All records of newborns who delivered in Bishoftu general hospital.

4.3.2. Study population

The study population was neonate born in Bishoftu general hospital from September 14, 2018 to March 14, 2019.

4.4. Inclusion and exclusion criteria

All birth records from September 14, 2018 to March 14, 2019 and those newborns that were diagnosed with at least one birth defect were included and records with incomplete information and lost card was excluded from the study.

4.5. Sampling Methods

- All neonates who had been delivered in Bishoftu general hospital during specified period were retrieved.

4.6. Operational definition

Congenital anomaly/birth defect: obvious abnormality of structure or form or body which is present at birth or noticed during delivery.

4.7. Variables

4.7.1. Dependent variables:

Congenital anomaly/birth defect

4.7.2. Independent variables:

Socio-demographic characters (Age, Residence, marital status and Ethnicity) and presence of risk factors such as maternal (antenatal visit, folic acid use, smoking, alcohol use, chronic illness and infectious disease) and infant factors such as (sex, birth order, gestational age, pregnancy type and birth weight)

4.8. Data Collection tools and techniques

The data were collected from birth registration books in the first place and then by using their card number their charts was retrieved from card room and then full information was obtained from patient charts through structured checklist. The checklist contains socio-demographic characteristics, types of congenital anomaly and factors associated with congenital anomaly (I.e. maternal factors and infant factors) and the checklist were developed from previous study with little modification(3, 6, 7). Two midwives holding BSc degree were assigned to collect the data and one senior BSc midwives were used as supervisors.

4.8.1. Data Quality Control

The quality of the data was assured by using validated pre-tested questionnaires and proper data collection procedure. The pretest was done in similar hospital on records which were not included in the study. Data collectors was trained for one day intensively on the study

instrument and data collection procedure that includes the relevance of the study, objective of the study, and confidentiality of the information. The data collectors was worked under close supervision of the supervisors to ensure adherence to correct data collection procedures, supervisors and investigator reviews the filled questionnaires at the end of data collection every day for completeness. Moreover, the data were carefully entered and cleaned before the beginning of the analysis.

4.8.2. Data processing and Analysis

The data entry, cleaning, error checking, and analysis were conducted by using SPSS version 24. The results were summarized and presented by tables, charts and graphs. Percentage, frequency and mean were calculated. Categorical variables were summarized as proportions and were compared using Pearson's Chi square test. Crude (unadjusted) and adjusted odds ratios were calculated to quantify the strength of association between the factors and congenital anomalies. The 95% confidence intervals were determined and the factors with a p-value of less than 0.05 were considered to have a significant association with congenital anomalies.

4.9. Ethical considerations

Ethical clearance was obtained from Addis Ababa University, College of Health Sciences Institutional Review Board. Supportive letters was written from school of nursing and midwife to Bishoftu general hospital. The purposes of the study were clearly explained to the hospital management and data collection was started after permissions were obtained from hospital manager/medical director. And finally data collected from the registration and patient charts was kept in secured and locked cabinets in order to maintain confidentiality.

4.10. Dissemination of findings

The result of this study will be disseminated to Addis Ababa University College of Health Science School of Nursing and Midwifery and Bishoftu general hospital.

5. RESULTS

5.1. Socio demographic characteristics

From a total of 2218 mothers the majority of the mother were married ,Sixty nine percent (69%) of the infants mothers were from urban area and the mean age of the mothers was 25.7 and the age of the women was ranges from 16 to 45,from a total of live births 63% of the infant were female, in terms of gestational age at the time of delivery 81.9% of the infant were term and in case of pregnancy type the majority (87.8%) of the births were singleton (Table 1)

Table 1 Frequency distribution of socio-demographic characteristics of the mother and infant factors in Bishoftu general hospitals, Oromia, Ethiopia, 2019.

	Frequency	Percent
Marital status		
Married	2081	93.8
Living together	26	1.2
Never married	1	.0
Divorced/separated	110	5
Residence of the mother		
Urban	1530	69.0
Rural	688	31.0
Ethnicity of the mother		
Oromo	873	39.4
Amhara	347	15.6
Gurage	315	14.2
Tigre	129	5.8
Others	554	25.0
Sex of the infant		
Male	820	37.0
Female	1398	63.0
G/A at the time of delivery		
Term	268	12.1
Preterm	1816	81.9
Post term	134	6.0
Pregnancy type		
Twins	270	12.2
Singleton	1948	87.8

5.2. Prevalence of congenital anomalies

Out of 2218 live births 23 newborns were diagnosed with congenital malformations, making the prevalence rate of 1% that is 10/1000 live births throughout the specified time period.

From a total of birth defects the most frequent type was anencephaly 7(30.4%) followed by hydrocephalus 6(26.1%), spinal bifida 2(8.7%), Talipes/clubfoot 2(8.7%), Ankyloglossia/tongue tie 2(8.7%), 0mphalocele 1(4.3%), spinal bifida and hydrocephalus 1(4.3) and others 1 (4.3%). (Fig. 2).

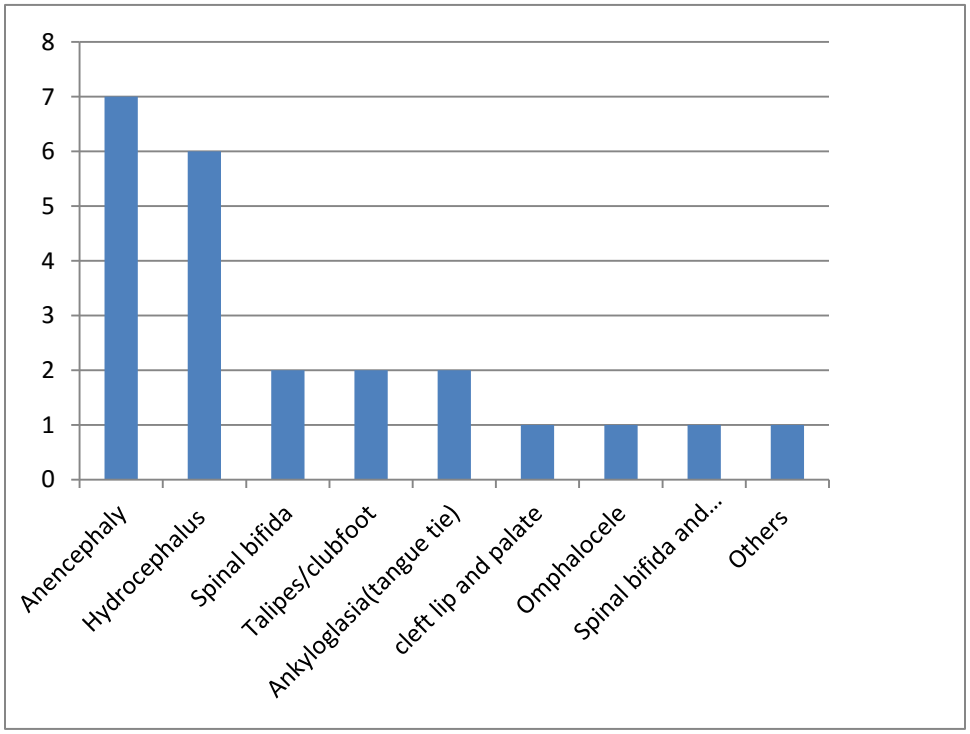

Figure 2: Frequency distribution of the commonest prevalent types of congenital anomalies in Bishoftu general hospital, Oromia, Ethiopia, 2019.

5.3.Factors associated with congenital anomalies

Maternal factors that were associated with presence of congenital anomaly were; maternal age above 35 (AOR =6.5, 95%CI = (2.4-18), P value= 0.001) and mothers from rural area (AOR=0.3; 95%CI=0.1-1; P value=0.043). On the other hand maternal use of folic acid during pregnancy had a protective effect against CAs (AOR=0.036; 95% CI =0.008-0.15; p value=0.001). Maternal alcohol intake, smoking history, history of chronic illness and history of infectious disease were not associated with the occurrences of congenital anomalies.

Table 2: Univariate and multivariate analysis of maternal factors associated with congenital anomalies in Bishoftu general hospital, Oromia, Ethiopia, 2019.

Variable	Category	Presence of CA,s		COR (95% CI)	P value	AOR (95%CI)	P value
		Yes	No				
Age of the mother	1.≥ 35	11(8.6%)	117(91.4%)	0.06(0.03-0.14)	0.001	6.5(2.4-18)	<0.001
	2.<35	12(0.6%)	2078(99.4%)				
Residence	1.urban	8(0.5%)	1522(99.5%)	4.2(1.8-10)	0.001	0.3(0.1-1)	0.043
	2.Rural	15(2.1%)	673(97.8%)				
ANC visit	1.Yes	10(0.5%)	1885(99.5%)	7.9(3.4-18.2)	0.001	3.2(0.8-12.8)	0.1
	2.No	13(4%)	310(96%)				
Maternal use of folic acid	1.yes	5(0.27%)	1823(99.7%)	17.6(6.5-47.8)	0.001	0.036(0.008-0.15)	0.001
	2.No	18(4.6%)	372(95.4%)				
Maternal alcohol intake	1.yes	1(1.5%)	64(98.5%)	0.66(0.08-4.97)	0.688	_____	_____
	2.No	22(1%)	2131(99%)				
Smoking history	1.yes	2(2.1%)	92(97.9%)	0.45(0.1-2)	0.298	_____	_____
	2.No	21(1%)	2102(99%)				
History of chronic illness	1.yes	4(6.8%)	55(93.2%)	0.12(0.04-0.37)	0.001	2.2(0.54-8.8)	0.26
	2.No	19(0.9%)	2140(99.1%)				
History of infectious disease	1.yes	4(2%)	197(98%)	0.468(0.158-1.4)	0.2	_____	____
	2.No	19(0.9%)	1998(99.1%)				

Infant factors that were associated with congenital anomalies were birth order above 3(AOR=8.4; 95%CI=3.4-20.7; P value =0.001),birth weight less than 2.5 kg (AOR=0.3;95%CI=0.1-0.9),P value=0.037) and singleton pregnancy (AOR =6.4;95%CI =2-18.9,P value =0.001).Sex of the infant and gestational age at the time of delivery was not associated with the occurrences of congenital anomalies in this study.

Table 3 : Univariate and multivariate analysis of infant factors associated with congenital anomalies in Bishoftu general hospital, Oromia, Ethiopia, 2019.

Variable	Category	Presence of CA,s		COR (95% CI)	P value	AOR (95%CI)	P value
		Yes	No				
Sex of the infant	1.Male	6(0.73%)	814(99.26%)	1.67(0.65-4.2)	0.28	_____	_____
	2.Female	17(1.2%)	1381(98.8%)				
Birth order	1.≥3	12(2.8%)	416(97.2%)	0.2(0.09-0.5)	0.001	8.4(3.4-20.7%)	0.001
	2.<3	11(0.6%)	1779(99.4%)				
Birth weight	1.≥2.5	14(0.7%)	1927(99.3%)	4.6(1.98-10.78)	0.001	0.3(0.1-0.9)	0.037
	2.<2.5	9(3.2%)	268(96.8%)				
Gestational age at the time of delivery	1.Preterm	3(1.1%)	265(98.9%)	0.66(0.68-6.4) 0.7(0.7-5.3)	0.9	_____	_____
	2.term	19(1%)	1797(99%)				
	3.post term	1(0.75%)	133(99.25%)				
Pregnancy type	1.twin	11(4%)	260(96%)	0.14(0.06-0.35)	0.001	6.4(2-18.9)	0.001
	2.singleton	12(0.6%)	1935(99.4%)				

6. DISCUSSION

The objective of this retrospective cross-sectional study was to report on the prevalence and factors associated with congenital anomalies among newborns in Bishoftu general hospital, Oromia, Ethiopia, 2019. The prevalence of congenital anomalies in this study was 1% that means 10/1000 live births which is near to the finding (19 per 1000) of study conducted in central and southwest Ethiopia by Molla,etal(8).The observed similarity in prevalence's with studies that used a long range retrospective study which is not similar to this study is difficult to explain. However the fact that both studies were done in hospitals with reviewing medical records may offer some explanation for the observed similarities.

This study is also comparable with the study conducted in Nigeria which is a prevalence of 2.8% even though the study was conducted on the newborn who were admitted in neonatal intensive care unit (NICU)(23).In addition to this study there are various studies showed that the prevalence rate of congenital anomalies is ranged from (1.23-3%) which is almost similar with the finding of this study (3, 4, 23). But the finding of this study is lower than the study conducted in mwanza,Tanzania by Florentine mashuda,etal which is a prevalence rate of 29% (6),the observed difference is may be due to the study population, they used neonates admitted in hospitals that is different from our study since, we used all neonate who born in stated hospital.

In this study the highest proportion of congenital anomalies was anencephaly (30.4%),followed by hydrocephalus (26.1%), spinal bifida (8.7 and Omphalocele (4.3%) with the least prevalent types of CAs.so this study is almost similar with the study conducted in Mardan medical complex, Pakistan which was reported hydrocephalus(27.3%) and anencephaly (18%) with commonest prevalent types and Omphalocele (1.7%) with the least prevalent types (4). It's also near to the study conducted in Ethiopia which ranks anencephaly at the third place and spinal bifida at first place(8).But ,The finding of this study is in contrast with the study conducted in South East Nigeria which reported cleft lip/palate as a most prevalent types of congenital anomaly(23).it is also in contrast with the study conducted in Brindisi, Italy, Mount-Lebanon, Lebanese, Latvia which reported congenital heart defects as a most prevalent types of congenital anomalies(5, 15, 18). The observed difference is may be due to the difference in geographical area.

The finding of this study shows that maternal age above 35(AOR =6.5, 95%CI = (2.4-18), P value= 0.001) which means those mother with age above 35 had 6.5 times greater chance of having congenitally deformed babies than the mothers with age below 35 and rural residence (AOR=0.3; 95%CI=0.1-1; P value=0.043) had a significant association with the occurrences of congenital anomalies and maternal use of folic acid (AOR=0.036; 95% CI =.0.008-0.15; p value=<0.001) is protective against CAs. This study is similar with the study conducted in Tanzania which showed that maternal age above 35 and non-use of folic acid during pregnancy is associated with the occurrences of CAs (6). This finding is also similar with the study conducted in central and southern part of Ethiopia which showed that as folic acid intake during pregnancy is protective against the occurrences of congenital anomalies(7).

There are various study which showed that maternal alcohol intake, smoking history ,chronic illness and history infectious disease had significant association with the occurrences of congenital anomalies(3, 7, 18) but, the finding of this study showed that there was no association between this variable and occurrences of congenital anomalies. The difference may be due to the methodology they employed and hence, this study used a retrospective study which is a secondary data and this may result a difference.

On the side of infant factors associated with congenital anomalies according to the finding of this study birth order above 3(AOR=8.4; 95%CI=3.4-20.7; P value =0.001) which indicates that infant who delivered third or above had 8.4 times chance of being a congenitally anomalous baby than those who delivered second or below, birth weight less than 2.5 kg (AOR=0.3; 95%CI=0.1-0.9), P value=0.037) and singleton pregnancy (AOR =6.4; 95%CI =2-18.9, P value =0.001) had significant association with the presence of congenital anomalies. The finding of this study is similar with the study conducted in Mwanza, Tanzania which showed that singleton pregnancy and birth order of 3 and above had significant association with presence of congenital anomalies(6).But, the finding of this study is in contrast with the study conducted in the city of Sao Polo by Cosme ,etal which reports that premature babies and twins: had significant association with occurrences of CAs(3).The observed difference is may be due to the time period, which is a four year retrospective study in case of the study conducted in the city of Sao polo.

Limitation of the study

A retrospective, cross-sectional study of this nature is bound to be faced with a number of challenges, and expectedly so, as the investigators are not fully "in-charge" of the processes. Firstly, retrieving patients' folders from the hospital records was a rather extremely difficult task; some of the folders retrieved contained inadequate information and this affected the quality of the study.

In addition, a hospital based study of this nature, especially one restricted to only a section of the hospital as in the case of this study in instance, cannot be said to reflect truly what obtains in the general population.

Strength of the study

The major strengths of this study are that all births were thoroughly evaluated during the study period.

7. Conclusion

Congenital anomalies is common and accounts for 1 %(10/1000 live births) in Bishoftu general hospital and anencephaly is the most prevalent type followed by hydrocephalus and spinal bifida. Maternal age above 35, rural residence, birth order above 3, birth weight less than 2.5 and singleton pregnancy had a significant association with the occurrence of congenital anomalies, whereas maternal use folic acid during pregnancy had a protective effect against congenital anomalies.

8. Recommendation

Large community-based studies in different geographical, environmental and socio-economic settings should be conducted in Ethiopia to determine the prevalence of congenital anomalies and their associated factors.

Primary health care professionals (general practitioners, midwives, Health officers, nurses) in their preventive work should give information and pay attention to women at reproductive age, education on influence of antenatal care on pregnancy outcome, folic acid intake, treatment of chronic and acute diseases, with an aim to improve female knowledge and skills in situations covering issues related to the pregnancy planning.

Within the framework of the public health promotion and education programs on sexual and reproductive health, attention should be directed not only to factors related to contraception, family planning, infertility, but also issues on avoidable risk factors for congenital anomalies and prevention options should be emphasized.

Extensive collaboration between the obstetrician and pediatricians is required for antenatal diagnosis of many congenital anomalies so that proper parental education and counseling may be done.

Ministry of health should have to include congenital anomaly in Ethiopia demographic health survey which is important to have a baseline data on CAs.

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10. Appendix's

Appendix A: information sheet

My name is Samuel Gedamu, student at Addis Ababa University. I'm going to do research for partial fulfillment of the requirements for the degree of masters in maternity and reproductive health nursing and I ask Bishoftu general hospital management to give permission to collect data from medical record of patient. The aim of this study is to assess the prevalence of congenital anomalies and associated factors among newborns in Bishoftu general hospital. Upon completing this thesis the result of study will be disseminated for Bishoftu general hospital and Bishoftu health bureau and the result will be used to determine the prevalence of congenital anomalies and its associated factors in this hospital and it's also important to have preventive measures after knowing the risk factors since most of congenital anomalies are preventable. So I ask your permission. The data abstraction tool contains three parts including, Socio- demographic characteristics, types of congenital anomalies and risk factors.

Appendix B. Checklist

Tittle of the study: prevalence of congenital anomalies and associated factors among newborns in Bishoftu general hospital, Oromia, Ethiopia, 2019. A retrospective study

Direction: Based on client's medical profile, fill or encircle the correct information from the following.

<table>
<tr><td colspan="3">❖ Socio demographic characteristics of study subjects in Bishoftu general hospital</td></tr>
<tr><td>1. Age of the mothers</td><td colspan="2"></td></tr>
<tr><td rowspan="2">2. Marital status</td><td>1. Married</td><td>2. Living together</td></tr>
<tr><td>3. Never married</td><td>4. Divorced/separated</td></tr>
<tr><td>3. Residence</td><td>1. Urban</td><td>2. Rural</td></tr>
<tr><td rowspan="3">4. Ethnicity</td><td>1. Oromo</td><td>2. Amhara</td></tr>
<tr><td>3. Gurage</td><td rowspan="2">4. Tigre</td></tr>
<tr><td>5. Others</td></tr>
<tr><td>❖ Presence of congenital anomaly</td><td>1. Yes</td><td>2. No</td></tr>
<tr><td rowspan="8">❖ Types of congenital anomaly</td><td>1. Spinal bifida</td><td>9. Polydactyl</td></tr>
<tr><td>2. Hydrocephalus</td><td>10. Imperforate anus</td></tr>
<tr><td>3. Abnormal brain tissue</td><td>11. ankyloglasia</td></tr>
<tr><td>4. Encephalocele</td><td>12. cleft lip/plate</td></tr>
<tr><td>5. Microcephaly</td><td>13. anencephaly</td></tr>
<tr><td>6. Meningeoencephalocele</td><td>14. club foot</td></tr>
<tr><td>7. Gastroschisis</td><td>15. Talipes</td></tr>
</table>

	8. Omphalocele	16. others	
❖ Risk factors associated with congenital anomaly	A. Maternal factors		
	1. Antenatal visit	1. Yes	2. No
	2. Maternal use of folic acid during pregnancy	1. Yes	2. No
	3. Maternal alcohol intake	1. Yes	2. No
	4. Smoking history	1. Yes	2. No
	5. History of chronic illness	1. Yes	2. No
	6. History of infectious disease	1. Yes	2. No
❖ Risk factors associated with congenital anomaly	B. Infant factors		
	1. Sex	1. Male	2. Female
	2. Birth order (in number)		
	3. Gestational age	1. Preterm	2. term / 3. post term
	4. Pregnancy type	1. Twin	2. Singleton
	5. Birth weight (in Kg)		