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# Assessment of the Knowledge, Attitude and Practices of Healthcare Professionals from selected Health Care Units in North West Ethiopia, towards Genetic Disorders

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# COLLEGE OF SCIENCE

# DEPARTMENT OF BIOLOGY

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August 2020

Bahir Dar, Ethiopia

# BAHIR DAR UNVERSITY

## COLLEGE OF SCIENCE

## DEPARTMENT OF BIOLOGY

# ASSESSMENT OF THE KNOWLEDGE, ATTITUDE AND PRACTICES OF HEALTHCARE PROFESSIONALS FROM SELECTED HEALTH CARE UNITS IN NORTH WEST ETHIOPIA, TOWARDS GENETIC DISORDERS

A THESIS SUBMITTED TO THE COLLEGE OF SCIENCE DEPARTMENT OF BIOLOGY, BAHIR DAR UNIVERSITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCE IN BIOLOGY (GENETICS)

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# DECLARATION

I declare that this thesis is my original work in partial fulfillment for the requirements for the degree of Master of Science in Biology (Genetics). All the sources of the materials used for this thesis and all people and institutions who gave support for thesis work are fully acknowledged.

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# APPROVAL SHEET

As a thesis research advisor, I hereby certify that I have read and evaluated this thesis prepared under my supervision, by Tigist Misganaw entitled as "Assessment of the Knowledge, Attitude and Practices of Healthcare Professionals from selected health care units in north west Ethiopia, towards Genetic Disorders." I recommended the paper to be submitted as fulfilling the requirement for the Degree of Master of Science in Biology (Genetics).

_____ _____ _____

Advisor Signature Date

As members of the board of examiners for the MSc thesis open defense examination, we certify that we have read and evaluated the thesis prepared by Tigist Misganaw and examined the candidate. We recommended the thesis to be accepted as fulfillment for the requirements of the Degree of Master of Science in Biology (Genetics).

_____ _____ _____

Chair Person Signature Date

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Internal Examiner Signature Date

_____ _____ _____

External Examiner Signature Date

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# TABLE OF CONTENTS

**Contents** **Page**

DECLARATION ..... i

APPROVAL SHEET ..... ii

ACKNOWLEDGMENTS ..... iii

TABLE OF CONTENTS ..... iv

LIST OF TABLES ..... viii

LIST OF ACRONOMYS ..... x

ABSTRACT ..... xi

1. INTRODUCTION ..... 1

1.1. Background of the study ..... 1

1.2. Statement of the problem ..... 3

1.3. Objectives of the study ..... 4

1.3.1. General objective ..... 4

1.3.2. Specific objectives ..... 4

1.4. Significance of the study ..... 5

2. REVIEW OF RELATED LITERATURE ..... 6

2.1. Genetic disorders ..... 6

2.2. Genetic epidemiology ..... 6

2.3. Types of genetic disorders ..... 6

2.4. Knowledge of health professionals about genetic disorders ..... 7

2.4.1. Knoweldge of health care professionals towards diabetes mellitus ..... 7

2.4.2. Knowledge of health care professionals towards Breast cancer ..... 7

2.4.3. Knowledge of health care professionals towards Sickle cell anemia ..... 7
2.4.4. Knowledge of health care professionals towards mental disorder ..... 8
2.4.5. Knoweldge of health care professionals towards heart disease ..... 8
2.4.6. Knoweldge of health care professionals towards asthma disease ..... 8
2.5. Attitude of health professionals about genetic disorders ..... 9
2.5.1. Attitude of health care professionals towards diabetes mellitus ..... 9
2.5.2. Attitude of health care professionals towards Breast cancer ..... 9
2.5.3. Attitude of health care professionals towards Sickle cell anemia ..... 9
2.5.4. Attitude of health care professionals towards mental disorder ..... 10
2.5.5. Attitude of health care professionals towards asthma disease ..... 11
2.6. Practice that health professionals do in genetic disorders ..... 11
2.6.1. Practice of health care professionals towards diabetes mellitus ..... 11
2.6.2. Practice of health care professionals towards Breast cancer ..... 12
2.6.3. Practice of health professionals towards Sickle cell ..... 13
2.6.4. Practice of health care professionals towards mental illness ..... 13
3. MATERIALS AND METHODS ..... 15
3.1. General description of the study area ..... 15
3.2. Study design and settings ..... 17
3.3. Sampling techniques ..... 17
3.4. Study Population ..... 17
3.5. Sample Size Determination ..... 17
3.6. Data collection ..... 18
3.7. Variables ..... 18

3.8. Operational definitions ..... 19
3.9. Inclusion exclusion criteria ..... 19
3.10. Data Analysis ..... 20
3.11. Ethical Consideration ..... 20
4. RESULT ..... 21
4.1. Socio demographic characteristics of the study participants ..... 21
4.2. Source of information about genetic disorders ..... 24
4.3. Knowledge of respondents on genetic disorders ..... 24
4.4. Attitude of respondents on genetic disorders ..... 26
4.4.1. Knowing the relevant family history information ..... 28
4.4.2. Reassuring patients those at low risk ..... 28
4.4.3. Advising the patients on possible signs or symptoms of a disease ..... 29
4.5. Practices of Genetic disorders by health care professionals ..... 30
4.6. Factors associated with knowledge, attitude and practice of genetic disorders ..... 32
4.7. The relations between knowledge and attitudes among Health care professionals ..... 36
5. DISCUSSION ..... 37
5.1. Knowledge of health care professionals towards genetic disorders ..... 37
5.2. Attitude of health care professionals towards genetic disorders ..... 39
5.3. Practices of health care professionals towards genetic disorders ..... 41
6. CONCLUSION AND RECOMMENDATION ..... 42
6.1. Conclusion ..... 42
6.2. Recommendation ..... 42
7. REFERENCES ..... 44

8. APPENDIXES ..... 53

8.1. Questionnaire ..... 53

# LIST OF TABLES

Table 1: Frequency distribution of socio-demographic characteristics of participants at healthcare units ..... 22

Table 2: Knowledge of Health care professionals towards genetic disorders at health care centers. ..... 25

Table 3: Attitude of Health care professionals towards genetic disorders at health care centers. 27

Table 4: Practice of Health care professionals towards genetic disorders at health care centers. 31

Table 5: Association between socio-demographic factors and Knowledge of genetic disorders on health care professionals ..... 33

Table 6: Association between socio-demographic factors and Attitude of genetic disorders ..... 34

Table 7: Pearson Correlation Coefficients between knowledge and attitudes among Health care professionals ..... 36

# LIST OF FIGURES

Figure 1. Map of the study area ..... 16

Figure 2. Distribution of the studied sample according to source of their knowledge about Genetic diseases. ..... 24

Figure 3. Distribution of respondents towards knowing the relevant family history information from patients ..... 28

Figure 4. Distribution of respondents towards reassuring patients those at low risk. ..... 29

Figure 5. Distribution of respondents towards Advising on possible signs or symptoms of a disease ..... 30

# LIST OF ACRONOMYS

| | |
|---|---|
| AOR: | Adjusted Odds Ratio |
| BC | Breast Cancer |
| CI: | Confidence Interval |
| COR: | Crude Odds Ratio, |
| CSA | Central Statistical Agency |
| CSD | Sickle Cell Disease |
| EMA | Ethiopian Meteorology Agency |
| HCP | Health Care Professionals |
| KAP | Knowledge, Attitude and Practice |
| NGOs | Non-Governmental Organization |
| SPSS | Statistical Packages for Social Science |
| USA: | United States of America |
| WHO: | World Health Organization |

# ABSTRACT

Genetic disorder is an abnormal condition that a person inherits through genes or chromosomes. There are several genetic disorders including diabetes mellitus, heart disease, breast cancer, asthma, sickle cell anemia, mental disorders and so on. The main aim of this study was to assess the knowledge, attitude, and practices of Healthcare professionals towards genetic disorders at selected healthcare units in north- western Ethiopia. This was a cross-sectional study conducted among 300 health professionals in northwestern Ethiopia. Data were collected using a semi-structured questionnaire to evaluate knowledge, attitude and practices health care professionals towards genetic disorders statically package for social sciences (SPSS) version 21 was used for data analysis. Description, cross tabulation and logistic regression, Bivariate and multivariate analysis were carried out to determine the association between independent variables and the knowledge, attitude and practice of genetic disorders among the study participants. Knowledge about genetic disorders was low in 118 (39.3%) of the participants. Multivariate logistic regression analysis showed that profession was significantly associated with Knoweldge. Medical doctors were found to be five times [AOR=5.186; 95%CI (2.469-10.894 P=0.000)] more likely to know about genetic disorders compared to those who are Nurses. Attitude about genetic disorders was low in 140 (46.7%) of the participants. Multivariate logistic regression analysis showed that profession was significantly associated with Attitude. Lab technicians were four times [AOR=4.015; 95%CI (1.419-11.361 P=0.009)] more likely to have positive attitude than nurses. Practice about genetic disorders was low in 139 (46.3%). The knowledge, attitude, and practice towards genetic disorders were poor among health care professionals. Health providers (nurses, midwives, lab technitians and pharmacists) should also read more and update themselves regularly.

**Key words:** Attitude, Genetic Disorders, Health Care Professionals, Knowledge, Practice.

# 1. INTRODUCTION

## 1.1. Background of the study

According to Mehta (2011), genetic disorder is an abnormal condition that a person inherits through genes or chromosomes. He further said that some genetic disorders are caused by mutations in the DNA of genes while other disorders are caused by changes in the overall structure or number of chromosomes.

There are several genetic disorders including diabetes mellitus, heart disease, breast cancer, asthma, sickle cell anemia, mental disorder and so on (Bankhead *et al*., 2001).

Globally, an estimated 422 million adults are living with Diabetes milltuse, according to the World Health Organization (WHO). The number is projected to almost double by 2030. Increases in the overall diabetes prevalence rates largely reflect an increase in risk factors for type 2 DM, notably being overweight or obese (Katie *et al*., 2014). In 2010, 12.1 million people were estimated to be living with diabetes in Africa, and this is projected to increase to 23.9 million by 2030 (Hall *et al*., 2011). More than 80 % of diabetes deaths occur in low and middle-income countries (Mathers *et al*., 2006). World Health Organization estimated the number of diabetic cases in Ethiopia to be 800,000 by the year 2000, and the number is expected to increase to 1.8 million by 2030 (Naheed, 2010).

Breast cancer is the most common type of cancer and the most common cause of cancer-related mortality among women worldwide (Hortobagyi *et al*., 2005). It is the leading type of cancer in women and is the most common cancer among women in many parts of Africa (Parkin *et al*., 2001). South African women have a 1 in 29-lifetime risk of developing breast cancer with the age-standardized incidence rate of 30.6 per 100,000 populations. These rates vary by race, with Black women having the lowest (16.3) and White women the highest (69.4) rates of breast

cancer diagnosis (Wadler *et al*., 2011). Breast cancer is the second most often occurring cancer (cervical cancer is first) among women in Ethiopia (Bhurgri *et al*., 2007).

Sickle cell is another genetic disease, which affects millions of people worldwide. It is however, commonest among people who have ancestors from Sub-Saharan Africa, South America, Cuba, Central America, Saudi Arabia, India and Mediterranean countries such as Turkey, Greece and Italy. In the United States of America, sickle cell anemia affects about 72,000 people, most of whom have an African background (WHO, 2018). In Africa, where the greatest burden of sickle cell disease (SCD) occurs, more than 75% of sickle cell anemia (Piel *et al*., 2013), about 200,000 cases of sickle cell anemia occur; with about 150,000 children born with the disease annually in Nigeria (WHO, 2006). In Uganda, 0.7% of children had sickle cell anemia and 13.3% had the sickle cell trait (Ndeezi *et al*., 2016a).

About 450 million people suffer from mental or behavioral disorders (which are caused by changes in the genetic material) worldwide today, mental disorders are widely recognized as a major contributor (14%) to the global burden of disease worldwide (Mihiret G-Mariam *et al*., 2016). In Ethiopia, only 10% of the people with severe mental disorders ever receive effective care (Atalay Alem *et al*., 2009). Untreated mental disorders lead to disability, a substantial personal burden for affected individuals and their families, poor quality of life, human rights abuses, stigma and discrimination, poverty, decreased productivity, suffering, poor physical health and premature mortality (Atalay Alem *et al* ., 2009).

Heart disease is the number one cause of death worldwide accounting for about 30% of all causes of death globally in 2008. More people died from cardiovascular diseases than from any other cause in the recent years (WHO, 2011). The World Health Organization (WHO) estimated that 9.4 million deaths each year or 16.5% of all deaths can be attributed to high blood pressure

(Mathers and Loncar, 2006). This includes strokes and coronary heart disease (Kengne *et al*., 2013).

Asthma affects an estimated 300 million individuals worldwide (Global Initiative for Asthma, 2018). It is a serious global health problem affecting all age groups, with increasing prevalence in many developing countries, rising treatment costs, and a rising burden for patients and the community. It is associated with symptoms such as wheezing, shortness of breath, chest tightness and coughs that Vary over time in their occurrence, frequency and intensity (Moyeta Bariso *et al.*, 2020).

Healthcare professionals are a direct source of information for the patients and for the general public at large and since they hold such a pivotal role, it is imperative that the information they convey is accurate and helps in building additional awareness (Kumar *et al*., 2009). Hence, the healthcare workforce of Bahrdar and Gondare hospital was chosen as the target population of this study. The aim of this study was to investigate the level of knowledge, attitude and practice of genetic disorders among health professionals.

## 1.2. Statement of the problem

In Ethiopia where literacy rate is not that high; poverty, culture and religion play an important role for health seeking behavior. Furthermore, there is lack of a uniform information, education and communication about genetic disorders. And this makes difficult to state the exact situation about the knowledge of genetic disease, risk factors and practice in Ethiopia (Seife Teferi *et al*., 2012). The burden of genetic disorders estimated to be higher. However, the actual causes of such higher mortality and DALYs from genetic disorders were not well-understood http://www.who.int/healthinfo/global health estimates/en/.

Researches on the knowledge attitude and practice of genetic disorders among healthcare professionals (HCPs) were not conducted adequately in Ethiopia, particularly in the North-western part and did not get attention like other health issues at national, regional, or local levels. This study was thus designed to bridge this gap with a view to assess knowledge attitude and practice of genetic disorders among healthcare professionals at healthcare units in the study area for possible public health interventions to improve knowledge of health care professionals.

## 1.3. Objectives of the study

### 1.3.1. General objective

The main aim of the study was to assess the knowledge, attitude and practices of Healthcare professionals towards genetic disorders.

### 1.3.2. Specific objectives

The specific objectives of this study were:

- ✓ To determine the level of knowledge and awareness of genetic disorders by healthcare professionals.
- ✓ To assess the attitude of healthcare professionals towards genetic disorders
- ✓ To assess the practice of healthcare professionals towards genetic disorders
- ✓ To assess the factors associated with the knowledge, attitude and practice of healthcare professionals related to genetic disorders

## 1.4. Significance of the study

Information from this study would provide guidance on gaps in knowledge of health care professionals in relation to some genetic disorders and strategies on how to address them to improve knowledge of healthcare professionals about genetic disorders.

Healthcare professionals' knowledge, attitude and practices obtained from the study would be used to design interventions to improve knowledge of health care professionals and communities and develop interventions for awareness campaigns to overcome stigma, thereby improving attitudes and practices of communities towards Genetic disorders.

Information aggregated from this study would inform the study area on the status of knowledge, attitude and practices of health care professionals towards genetic disorders to improve their understanding and health services in the sector and used to help policymakers.

This study will be used as a baseline for further similar studies in the region in particular and in the country in general.

# 2. REVIEW OF RELATED LITERATURE

## 2.1. Genetic disorders

A genetic disorder is any disorder caused by an abnormality in the genetic makeup of an individual (Resta *et al*., 2006).

Most genetic disorders are the direct result of a mutation in one gene. However, one of the most difficult problems ahead is to further elucidate how genes contribute to diseases that have a complex pattern of inheritance, such as in the cases of diabetes, asthma, cancer, and mental illness. In all these cases, no one gene has the yes/no power to say whether a person will develop the disease or not. It is likely that more than one mutation is required before the disease is manifest, and a number of genes may each make a subtle contribution to a person's susceptibility to a disease; genes may also affect how a person reacts to environmental factors (Resta *et al*., 2006).

## 2.2. Genetic epidemiology

Genetic epidemiology comprises a set of principles and methods for the study of genetic factors. It is built around the 'laws', which govern the transmission of genes from parent to offspring, and their predictable and testable consequences on the occurrence of the disorder in families and in Populations (Resta *et al*., 2006).

## 2.3. Types of genetic disorders

There are a number of different types of genetic disorders (inherited) (Resta *et al*., 2006).

1. Single gene inheritance
2. Multifactorial inheritance
3. Chromosome abnormalities
4. Mitochondrial inheritance

## 2.4. Knowledge of health professionals about genetic disorders

### 2.4.1. Knoweldge of health care professionals towards diabetes mellitus

Nurses in the healthcare setting spend the most time with patients, they are better positioned to give education and offer more care to patients with type2 DM than other healthcare professionals (Odili & Oparah, 2012). In addition, nurses are usually better positioned than other healthcare professionals, such as doctors and physicians, to recommend to patients the best care practices and various measures to manage the disease. (Odili & Oparah, 2012) argued that nurses are better listeners and have better knowledge of patients with diabetes than other healthcare professionals.

### 2.4.2. Knowledge of health care professionals towards Breast cancer

According to research done in government hospitals of Addis Ababa shows that among female health professionals responding to questions on breast cancer risk factors 84.3% knew that a high dose radiation to chest was a risk factor for the development of breast cancer followed by smoking 81.1%, sex 79.1% and positive family history 77.3%. Least recognized risk factors were early onset of menarche 39.0%, first child at late age 45.3% and late menopause 50.7%. Overall assessment of their knowledge revealed that 30.7% had excellent knowledge of risk factors, 26.5% possessed very good knowledge, and 27.8% had good knowledge while 15.0% had poor knowledge about the risk factors for breast cancer assessed (Seife Teferi *et al*., 2012).

### 2.4.3. Knowledge of health care professionals towards Sickle cell anemia

A study conducted among community health workers in Nigeria indicated poor knowledge of sickle cell diagnosis in prenatal and neonatal periods. However, primary health care workers were found to have good knowledge about the nature of the disease (Adegoke *et al*., 2018).

A study carried out by Adeyemi among Nigerian female health workers revealed that doctors and nurses had a good knowledge of the complications of sickle cell disease in pregnancy as they had the most direct contact with the mothers. However, this knowledge did not translate into acceptance for termination of early pregnancies with sickle cell disease (Adeyemi, 2007).

In a study by Armeli *et al*. (2005), people from areas of high prevalence of sickle cell disease were more likely to be aware of it. In a study by Gomes *et al*. (2011), 66.6% of professional health care workers were found to be aware of clinical manifestations of sickle cell disease. Clinical manifestations are used in screening for sickle cell disease.

### 2.4.4. Knowledge of health care professionals towards mental disorder

Studies done so far in different countries of the world (Ndetei and Khasahala, 2011) have shown there was inadequate knowledge and unfavorable attitude of nurses towards mental illness.

### 2.4.5. Knoweldge of health care professionals towards heart disease

Health workers' low knowledge of heart attack or stroke warning symptoms. Two-fifths (40.7%) of health workers were not aware of any heart attack symptoms, and only 8.5% could identify all symptoms. Chest pain was the most common known symptom (50.4%), which is close to that found in Beijing (Zhang *et al*., 2007), but higher than that in Pakistan (Jafary *et al*., 2005).

### 2.4.6. Knoweldge of health care professionals towards asthma disease

Two-thirds (68%) of participants were aware that they were suffering from asthma, surprisingly quite a few subjects (33%) were unaware of their disease. Majorities (78%) of participants were good perceivers and accurately reported their symptoms of asthma as a cough, dyspnea, chest congestion or wheeze. The rest were unable to explain their symptoms. More than 70% of the patients were aware that the lungs and airways were affected in asthma (Kosisochi *et al*., 2018).

## 2.5. Attitude of health professionals about genetic disorders

### 2.5.1. Attitude of health care professionals towards diabetes mellitus

Research shows that nurses possess the lowest attitude and perception about care of patients with Type 2 Diabetes. For instance, nurses' decisions to improve patient management and the care they offer are motivated by perceptions of seriousness of the disease. Nurses' attitudes play an important role for specialized care for certain diseases (Blaser & Berset, 2019). If they perceive a disease to be less serious, they will offer lower quality care and will be less concerned about offering care services. Given that most nurses have encountered diseases they consider deadlier than Type 2 Diabetes, there is a poorer perception and attitude among nurses of the seriousness of Type 2 Diabetes.

### 2.5.2. Attitude of health care professionals towards Breast cancer

On a study done in Riyadh, Saudi Arabia 91% have advised at least one family to undergo BC screening. About 85% believe that BC can be diagnosed by primary health care physician. About two third of the study cohort thought that their patients know about BC screening. Less than half (45.5%) were subscribed one international medical journal and only 59%were aware about Saudi guideline for BC management (Mohammed *et al*., 2014).

### 2.5.3. Attitude of health care professionals towards Sickle cell anemia

The general attitude of health workers towards sickle cell screening was found to be positive (Okwi *et al*., 2009). Half of the key informants thought attitude of health workers towards sickle cell screening was good because they sent blood samples of clients they suspected to have sickle cell for confirmatory testing. Health workers' belief towards sickle cell disease cause was reported to be due to heredity and none of them thought it was due to witchcraft, sin or punishment from God. The findings were consistent with Treadwell *et al*. (2006) who found that

respondents believed sickle cell was inherited from parents. The results were not consistent with Okwi *et al*. (2009) and Ohaeri and Shokumbi (2001) who found majority of respondents believed sickle cell disease was hereditary but a few believed it was caused by sin, witchcraft and punishment from God (Ohaeri and Shokumbi, 2001). Most health workers were thought to recommend premarital screening for sickle cell to couples although others did not. Findings were similar to that by Gbeneol *et al* where over 85% of respondent's recommended premarital screening for sickle cell for couples (Gbeneol *et al*., 2015).

The major challenges related to attitude of health workers towards sickle cell screening were found to be; limited knowledge of health workers, inadequate supplies and equipment and poor attitude of health workers towards sickle cell screening. Others were; free services only children, long turn-around time for results, and expensive screening services. These challenges could have been due to lack of policy and guidelines for sickle cell screening at health facilities hence limited resources allocated for sickle cell screening. According to AlHamdan *et al*. (2007) that screening services took a toll on human and financial resources at receptions and laboratories, that they were too expensive and Roelens *et al*. (2006) that found barriers to screening to be lack of awareness.

### 2.5.4. Attitude of health care professionals towards mental disorder

Professional qualifications (nurses who have diploma) were 2.96 times more likely to have negative attitude than those with educational level of MSc. This is supported by study in Ethiopia among nurses working in public hospitals and study done in South Africa Durban among general nurses (Mariam *et al*., 2016). The finding reveal that nurses with higher educational level will have less stigmatizing attitude than those with lower level of educational status, and professionals with increased academic level will have the opportunity to have more theoretical

knowledge about mental illness and the chance to have frequent contact with individuals with mental illness (Pelzang, 2010).

Studies also demonstrate that health professionals have negative attitudes toward some aspects of mental illness and were less optimistic about prognosis and less positive about likely long-term outcomes when compared with the general public (Ndetei and Khasahala, 2011). Health care providers have been known to stigmatize patients who use psychiatric medications or services by offering discouraging advice, disparaging remarks, and rejecting behavior. This form of discrimination may have a negative impact on patients' self-esteem and the way they seek help or adhere to prescribed medical treatments in addition, negative attitudes that manifest as apprehension or discomfort during patient interactions may lead to ineffective counseling or the lack of essential medical services (Minas and Diatri, 2008).

#### 2.5.5. Attitude of health care professionals towards asthma disease

Regarding the prognosis of asthma, nearly all (36%) believed that asthma is fatal in outcome. 64% participants believed that their disease is absolutely curable. Only 10% of the participants nurture a false belief that asthma is not controllable (Kosisochi *et al*., 2018).

## 2.6. Practice that health professionals do in genetic disorders

#### 2.6.1. Practice of health care professionals towards diabetes mellitus

According to Odili and Oparah (2012), nurses with specialized training in the care and monitoring of patients with Type 2 diabetes have a better attitude and perception towards their patients than nurses who have not received such training (Odili & Oparah, 2012). This is because they have a better understanding of the needs of such patients and good knowledge of the care activities they require. Hence, nurses' perceptions and attitudes towards care for patients with

Type 2 diabetes are greatly influenced by whether they have received specialized Type 2 diabetes training.

### 2.6.2. Practice of health care professionals towards Breast cancer

On a study From Turkey, although 81.3 % of the group reported performing BSE, only 27.3 % reported doing so monthly or once per menstrual cycle. The rate of doing BSE regularly was higher in physicians compared with nurses/midwives. The most common reasons for not doing BSE was the belief that it was not necessary and neglect (45.8 %), an idea of not having cancer in themselves (15.7%) and fear (13.3%). The rate of having a mammography at least once was 10.1% and rate of having a CBE among the health professionals was 24.8 %. The rate of having a CBE above 30 years of age (27.4%), was the same as those under the age 30 (%19.6). Mammography rate among health personnel under the age of 40 (4.6%) was less than those above 40 years of age. The most common reasons for not going for clinical examination were lack of knowledge and the belief that it was not necessary (34.0 and 36%, respectively) (Akpınar *et al*., 2011).

Research done in Lagos among Nurses identified that self-breast examination was most frequently done (89%), with 39% conducting this procedure at monthly intervals. A total of 130 (64%) participants made use of at least one method while only 13 (6%) made use of all three methods of screening. However, participants who were knowledgeable (50/155) underwent clinical breast examination more frequently than those who are not (8/49, P=0.04). This was not the case for self-breast examination or mammography. Use of all three methods was found to be more common among those who had a greater knowledge about breast cancer (Odusanya and Tayo, 2001).

### 2.6.3. Practice of health professionals towards Sickle cell

In the study by Adegoke and others in Nigeria, referral of clients to secondary and tertiary hospitals was found to be poor and unorganized. Moreover, no centre offered sickle cell screening in South Western Nigeria. Early detection, prompt referral, and provision of basic genetic counseling were believed to dispel associated myths and stigma about sickle cell disease (Adegoke *et al*., 2018).

A comparative study of genetic counseling among gynecological physicians and family planning (FP) health care workers revealed that more than a third of FP health care workers had been asked to provide genetic counseling or had referred clients on genetic diseases such as sickle cell disease (Naylor, 1975).

In a study conducted in India, majority of commoners were willing to share knowledge about B thalassemia with others compared to half of the participants from rural and urban areas (Chawla *et al*., 2017). Newborn screening services were reported to be available in districts with high burden of sickle cell trait and disease such as Gulu, Lira, Kitgum, Oyam, Tororo, Dokolo, Jinja and Kampala (Ndeezi *et al*., 2016). There was need to find out whether the newborn screening services were actually available in the district of Tororo. A report by MOH (2016b) stated that religious leaders to reduce the incidence of sickle cell disease would do premarital counseling.

### 2.6.4. Practice of health care professionals towards mental illness

Regarding to mental health training nurses who didn't take mental health training was more likely to show negative attitude than those who had training by 4.95 times. This is in line with studies done in Taiwan, Republic of Ireland and Finland where nurses with less mental health training endorsed negative and stigmatizing attitude for people with severe mental disorders

(Chambers *et al*., 2010) This is known that health training, clinical experience and increased interpersonal contact with people with mental disorders would reduce negative and stigmatizing attitude (Ndetei *et al*., 2011).

# 3. MATERIALS AND METHODS

## 3.1. General description of the study area

The study was conducted at selected primary and referral hospitals of Bahir Dar and Gondar cities. Bahir Dar is the capital city of Amhara National Regional State of Ethiopia. The town is situated at 578km northwest of Addis Ababa the capital of Ethiopia. In its absolute location, it is found 11033'15" and 11036'53" north latitude and 37021'11" and 37025'49" east longitude. The town has been the capital of Amhara National, Regional State since 1991. Currently the town covers a total area of 256.4km². It is a rapidly expanding town with commercial centers, small industries and residences in all sectors of the town. The total population of Bahir Dar was 313,997 in (CSA, 2017).

Bahir Dar lies on a very gentle slope with elevations ranging between 1783 m and 1889 m above sea level. It occupies the head stream of the Blue Nile basin. The town is situated at the southern shore of Lake Tana a freshwater lake with weak seasonal fluctuation. The area receives a maximum rainfall during the summer season (June to August) and short rainfall in the spring season (September and October). The rainy season accounts for nearly over 96% of the total annual rainfall (EMA, 2009).

Gondar was the second study area. The city is Located in the Central Gondar Zone of the Amhara Region, Gondar is north of Tana Lake on the Lesser Angereb River and southwest of the Simien Mountains. It has a latitude and longitude of 12°36′N 37°28′E with an elevation of 2133 meters above sea level. It is surrounded by the Gondar Zuria woreda. Gondar served as a strong Christian kingdom for many years. Based on the 2017 national census conducted by the Central Statistical Agency of Ethiopia (CSA), Gondar had a total population of 360,600. The majority of

the inhabitants practiced Ethiopian Orthodox Christianity (84.2%) reporting that, as their religion, while 11.8% of the population said they were Muslims and 1.1% were Protestant. The three largest ethnic groups reported in Gondar Zuria were the Amhara (88.91%), the Tigrayan (6.74%), and the Qemant (2.37%); all other ethnic groups made up 1.98% of the population. Amharic was spoken as a first language by 94.57%, and 4.67% spoke Tigrinya; the remaining 0.76% spoke all other primary languages reported. Gondar was once the home of a large population of Ethiopian Jews, most of whom emigration to Israel in the late 20th and early 21st century. Köppen-Geiger climate classification system classifies its climate as humid subtropical, bordering with subtropical highland (https://en.wikipedia.org/wiki/Gondar).

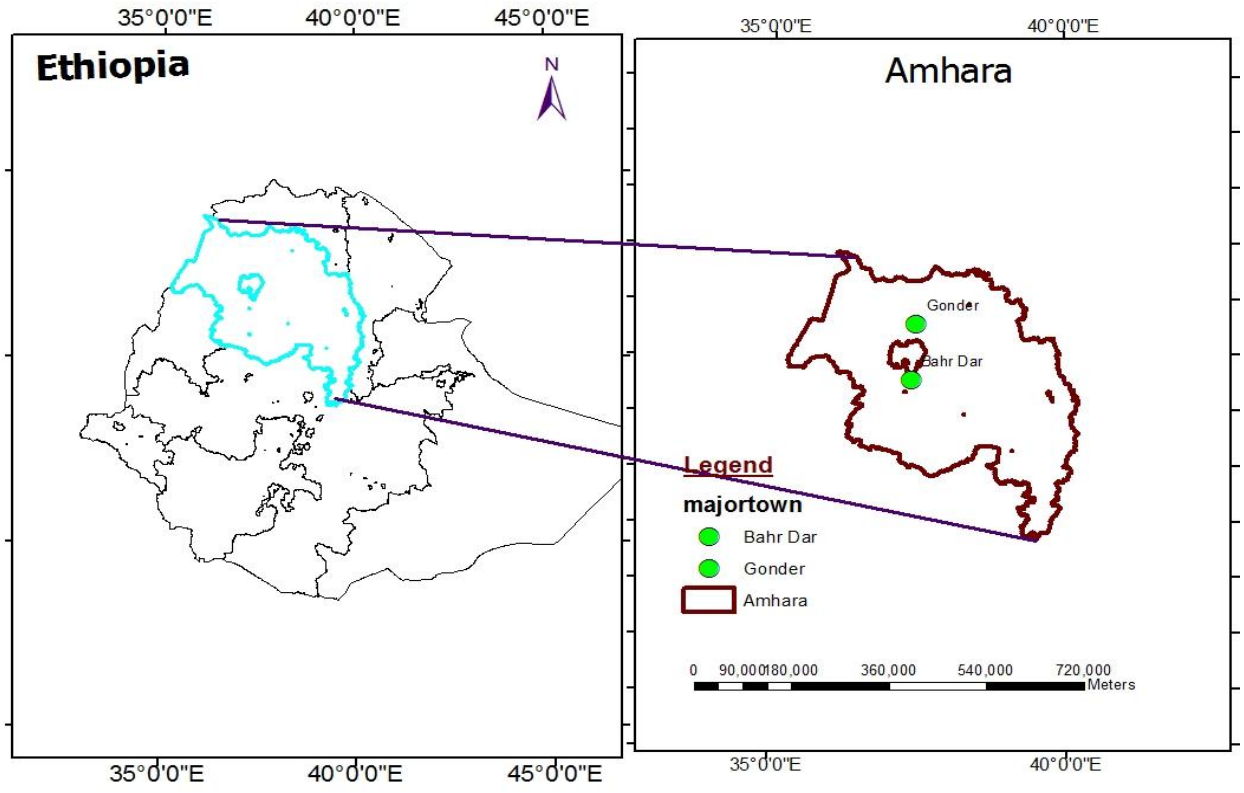


**Figure 1.** Map of the study area (*Done by: ArcGIS software with the help of shape file*

## 3.2. Study design and settings

The study was cross-sectional to determine the knowledge, attitude and practice of healthcare professionals towards Genetic disorders. Samples were collected from governmental Hospitals, which are Gondar Referral Hospital, Felege Hiwot Referral Hospital, Tibebe Gihon Specialized Hospital and Adisalem Hospital, and private hospitals, which are Gambi Teaching hospital and Dream care Hospital.

## 3.3. Sampling techniques

A random sampling technique was used to select the healthcare professionals to fill the questionnaire. The questionnaire was divided into five sections: (a) the first section requested demographic information such as age, gender and level of education (BSc, MSc/PhD), (b) the second section was used to determine the knowledge of healthcare professionals towards genetic disorders (c) the third section was employed to assess the attitude of healthcare professionals among genetic disorders and (d) the fourth section was to assess practice of health professionals towards genetic disorders (e) the fifth section was to assess the possible factors associated with knowledge and attitudes of healthcare professionals related to genetic disorder.

## 3.4. Study Population

The healthcare professionals who were available during the study period and willing to participate in the study with equal chance were included.

## 3.5. Sample Size Determination

The sample size was calculated using single population proportion statistical formula $N = Z^2 p (1-p)/d^2$ (Naing *et al.,* 2006) Where N= number of study participants which were enrolled in the study, Z = test statistics which allows us to calculate our results with 95% confidence interval, P

= proportion to be used on estimates from previous work (0.5 as there is no any previous similar work in the study area)**.** And d = the level of precision (0.05).

Therefore $N = Z^2 p (1-p))/d^2$

$N= (1.96)^2 \times 0.5(1-0.5)/0.05^2 =384$

Out of the 384 respondents, only 300 had complete information and the final complete sample size was 300.

## 3.6. Data collection

Primary data were collected using a semi-structured questionnaire. The questionnaires were prepared in English. The complete questionnaire were collected on a daily bases to check for its consistency and completeness.

## 3.7. Variables

Independent variables

- ✓ Socio-demographic variables: age group, profession, level of education, marital status, Work experience.

Dependent variable

- ✓ Having good or poor knowledge about genetic disorders.
- ✓ Having positive or negative attitude of informing the significance of understanding genetic disorders and their consequences to suspected cases of genetic disorders.
- ✓ Practicing or not practicing of collecting family history information from suspected cases of genetic disorder.

## 3.8. Operational definitions

**Healthcare Professionals**: Doctors, Nurses, Midwives, pharmacist, lab technicians in the study areas.

**Good knowledge:** The knowledge of the genetic disorders was assessed using 17 point knowledge scores. The respondents were asked a total of 9 true/false questions on knowledge that carried a total of 17 correct responses. Each correct response was given a score of 1 and wrong responses a score of 0. Total points to be scored were 17 and the minimum was 7.

The score for knowledge were categorized in two groups good and poor. Good knowledge was Categorized for the value greater than or equal to mean value and poor knowledge for the value less than mean value.

**Positive attitude:** Attitude was assessed by 11 questions. The questions on the responses were summed up and a total score was obtained for each respondent. The mean score was calculated and those scored above the mean and the mean score had positive attitude and scores below the mean meant negative attitude towards genetic disorders. The highest score was expected to be 25 and the lowest score to be 9.

**Good practice:** The mean score was calculated and those scored above the mean ($\geq$6.1) and the mean score had good practice and scores below the mean meant poor practice towards routinely collects family history information from patients.

## 3.9. Inclusion exclusion criteria

Inclusion criteria

- ✓ Those Health Care Professionals 20 years above having diploma, degree, masters and PhD and are working in the primary and referral health care centers.

Exclusion criteria

- ✓ Those Health Care Professionals who are unwilling to participate.

## 3.10. Data Analysis

Statistical package for social science version 21 was used for analysis and checked for missing values before analysis. Then measurement of the dependent variables: knowledge score of greater than or equal to the mean (Mean=11.3); those who answered greater than or equal to mean score (≥11.3) of knowledge questions correctly were given good knowledge score; positive score for attitude was given to those with overall score greater than or equal to the mean (mean=15.7); those who answered greater than or equal to mean score (≥15.7) of attitude questions correctly were given positive attitude score and practice score was given for those who routinely collect family history information from patients (mean=6.1). Descriptive statistics, frequencies, and cross tabulation of each independent variable with the dependent variable with their 95% confidence interval were used to see if there is any association between them. Statistical significance was declared at P-value of 0.05 and the predictors of outcome variable were identified accordingly. Those variables associated at bivariate logistic regression with significance level (P=0.25) were entered into multiple logistic regression to identify important determinants by controlling possible confounding effect.

## 3.11. Ethical Consideration

Ethical clearance was obtained from the Ethical Review Committee of Bahr Dar University, College of computational and department of Biology. A participant's written informed consent was obtained after explaining about the purpose and procedures of the study. After the ethical approval, written consent was submitted to the respective hospitals and written consent was also requested to all the participants during data collection. Those who were unwilling to participate in the study were not included in the study. To insure confidentiality names and other identifying information were not included.

# 4. RESULT

## 4.1. Socio demographic characteristics of the study participants

The socio-demographic information, which was collected included gender, age, profession, education level, marital status work experience and religion. Of the 300 healthcare professionals 177 (59.0%) were males and 123 (41.0%) were females. Among the participants, two hundred three (67.7%) were aged between 20 to 25 years. Two hundred thirty three (77.7%) of the study participants were first-degree holders. From the total study participants, 126 (42.0%) of them were nurses, 67(22.3%) Midwives, 24(8.0%) Laboratory Technicians, 26 (8.7%) Pharmacists, and 57(19.0%) were medical doctors. Most of the participants were single with 198 (66.0%) respondents, married with 93 (31.0%) respondents, and divorced with 9 (3.0%) respondents. One hundred forty nine (49.7%) of the participants had worked for one to five years, seventy three (24%) of the participants had worked for six to ten years, twenty five (8.3%) of the participants had worked for eleven to fifteen years, twenty one (7.0) of the participants had worked for sixteen to twenty and 32 (10.7%) more than twenty years, respectively. Two hundred forty-five (8.7%) of the participants were Orthodox Christians, thirty-five (11.7%) were protestants, sixteen (5.3%) were Muslims, and four (1.3%) were catholic Christians (Table 1.).

**Table 1:** Frequency distribution of socio-demographic characteristics of participants at healthcare units

| Socio demographic variables | Frequency (n) | Percentage (%) |
|---|---|---|
| Sex | | |
| **Male** | 177 | 59 |
| **Female** | 123 | 41 |
| Age | | |
| **20-30** | 203 | 67.7 |
| **31-40** | 77 | 25.7 |
| **41-50** | 15 | 5.0 |
| **51-60** | 3 | 1.0 |
| **61-70** | 2 | 0.7 |
| Education level | | |
| **Diploma** | 42 | 14.0 |
| **Degree** | 233 | 77.7 |
| **Master** | 24 | 8.0 |
| **PhD** | 1 | 0.3 |
| Marital statues | | |
| **Single** | 198 | 66.0 |
| **Married** | 93 | 31.0 |
| **Divorced** | 9 | 3.0 |
| Profession | | |
| **Nurse** | 126 | 42.0 |

| Socio demographic variables | **Frequency (n)** | **Percentage (%)** |
|---|---|---|
| **Mid wifery** | 67 | 22.3 |
| **Lab technician** | 24 | 8.0 |
| **Pharmacist** | 26 | 8.7 |
| **Doctor** | 57 | 19.0 |
| Work experience | | |
| **1-5** | 149 | 49.7 |
| **6-10** | 73 | 24.3 |
| **11-15** | 25 | 8..3 |
| **16-20** | 21 | 7.0 |
| **21-25** | 32 | 10.7 |
| Religion | | |
| **Orthodox** | 245 | 81.7 |
| **Muslim** | 16 | 5.3 |
| **Protestant** | 35 | 11.7 |
| **Catholic** | 4 | 1.3 |

## 4.2. Source of information about genetic disorders

The main source of genetic information reported by participants was the formal education 100 (33%) followed by internet, 84 (28%) mass media, 42 (14%) consultation with patient and family 40 (13%) , and symposium and seminar 34 (11%) (Figure. 3)

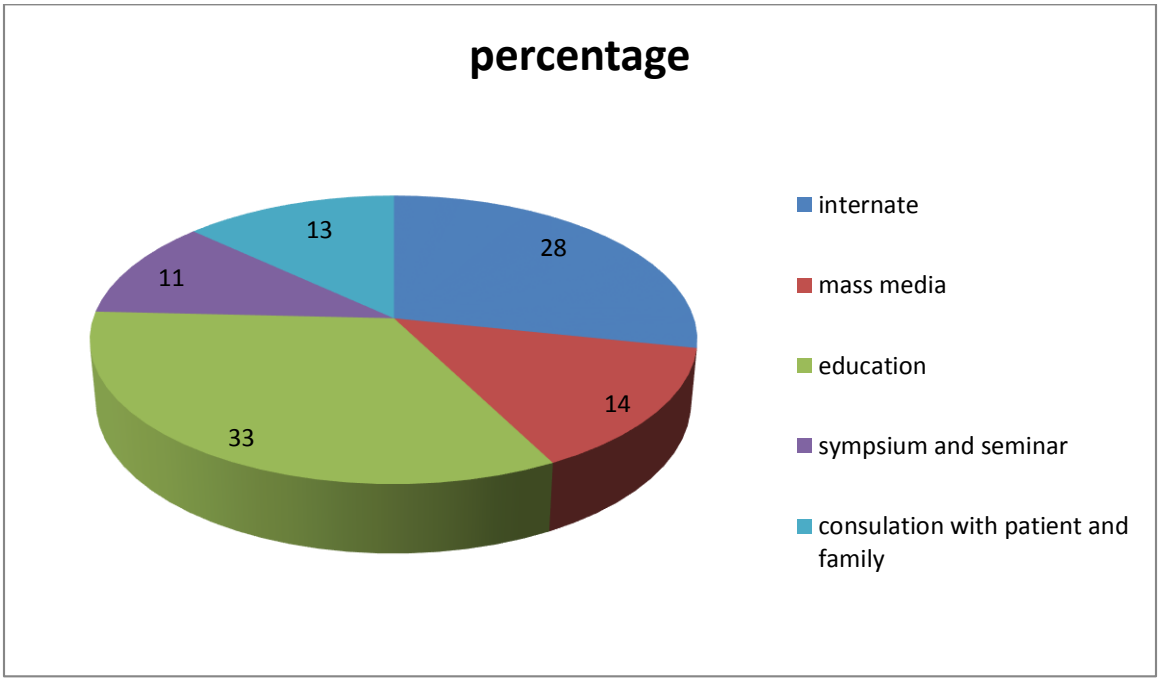


**Figure 2.** Distribution of the studied sample according to source of their knowledge about Genetic diseases.

## 4.3. Knowledge of respondents on genetic disorders

As shown in Table 2, 118 (39.3%) of the study participants looked to have good knowledge about genetic disorders. One hundred nineteen (39.7%) of the respondents mentioned future parents who are genetically related have an increased risk of having a child with a genetic disorder, 131(43.7%) of the respondents mentioned healthy parents can have a child with a hereditary disease.

One hundred twenty three (41.0%) of the respondents mentioned if a person has a genetic predisposition for a disease, this person will certainly get the disease, 124 (41.3%) of the respondents mentioned genetic diseases mostly skip a generation, 176 (58.7%) of the respondents mentioned if treated properly, genetic disease is curable (Table 2.).

**Table 2**: Knowledge of Health care professionals towards genetic disorders at health care centers.

| Statement | Frequency | Percentage |
|---|---|---|
| Future parents that are genetically have an increased risk of having a child with a genetic disorder<br>True | 119 | 39.7 |
| False | 181 | 60.3 |
| | | |
| High maternal age increases the risk of having a child with a genetic disorder | | |
| True | 109 | 36.3 |
| False | 191 | 63.7 |
| | | |
| Healthy parents can have a child with a hereditary disease<br>True | 131 | 43.7 |
| False | 169 | 56.3 |
| If a person has a genetic predisposition for a disease, this person will certainly get the disease | | |
| True | 123 | 41.0 |
| False | 177 | 59.0 |
| A disease is only heritable if more than one family member is affected | | |
| True | 146 | 48.7 |
| False | 154 | 51.3 |
| Genetic diseases mostly skip a generation | | |
| True | 124 | 41.3 |
| False | 176 | 58.7 |

| Statement | **Frequency** | **Percentage** |
|---|---|---|
| Some of the heritable disorders express themselves later in adult life<br><br>True | 109 | 36.3 |
| False | 191 | 63.7 |
| | | |
| People are genetically more related to their parents than to their brothers and sisters | | |
| True | 96 | 32.0 |
| False | 204 | 68.0 |
| | | |
| If treated properly, genetic disease is curable | | |
| True | 176 | 58.7 |
| False | 124 | 41.3 |

## 4.4. Attitude of respondents on genetic disorders

One hundred forty (46.7%) of the participants had positive attitude towards genetic disorders. One hundred forty eight (49.3%) believe family history is an important genetic risk factor for breast cancer, 119 (39.7%) believe family history is an important genetic risk factor for heart Disease, 72 (24.0%) believe family history is an important genetic risk factor for diabetes mellitus.

Among the 300 respondents, 51 (17.0%) believe family history is an important genetic risk factor for asthma, 99 (33.0%) believe family history is an important genetic risk factor for mental disorder, 148 (49.3%) believe family history is an important genetic risk factor for sickle cell diseases and 224 (74.7) believe genetic disorders are heredity (Table .3).

**Table 3:** Attitude of Health care professionals towards genetic disorders at health care centers.

| Statement | Frequency | Percent |
|---|---|---|
| Do you think family history is an important genetic risk factor for breast cancer<br>Yes | 148 | 49.3 |
| No | 152 | 50.7 |
| Do you think family history is an important genetic risk factor for Hodgkin's Lymphoma<br>Yes<br>No | 202<br>98 | 67.3<br>32.7 |
| Do you think family history is an important genetic risk factor for Heart Disease<br>Yes<br>No | 119<br>181 | 39.7<br>60.3 |
| Do you think family history is an important genetic risk factor for diabetes<br>Yes | 72 | 24.0 |
| No | 228 | 76.0 |
| Do you think family history is an important genetic risk factor for asthma<br>Yes | 51 | 17.0 |
| No | 249 | 83.0 |
| Do you think family history is an important genetic risk factor for mental disorder<br>Yes | 99 | 33.0 |
| No | 201 | 67.0 |
| Do you think family history is an important genetic risk factor for sickle cell anemia | | |
| Yes | 148 | 49.3 |
| No | 152 | 50.7 |
| Do you think that genetic disorders are heritable | | |
| Yes | 224 | 74.7 |
| No | 76 | 25.0 |

4.4.1. Knowing the relevant family history information

Among the 300 respondents, the majority of health care professionals had positive attitudes to knowing the relevant family history information from patient 142 (47.0%) of the respondents were confident followed by 123 (41.0%) were very confident, 34 (11.3%) were not very confident and 1(0.3%) not at all confident (figure 3).

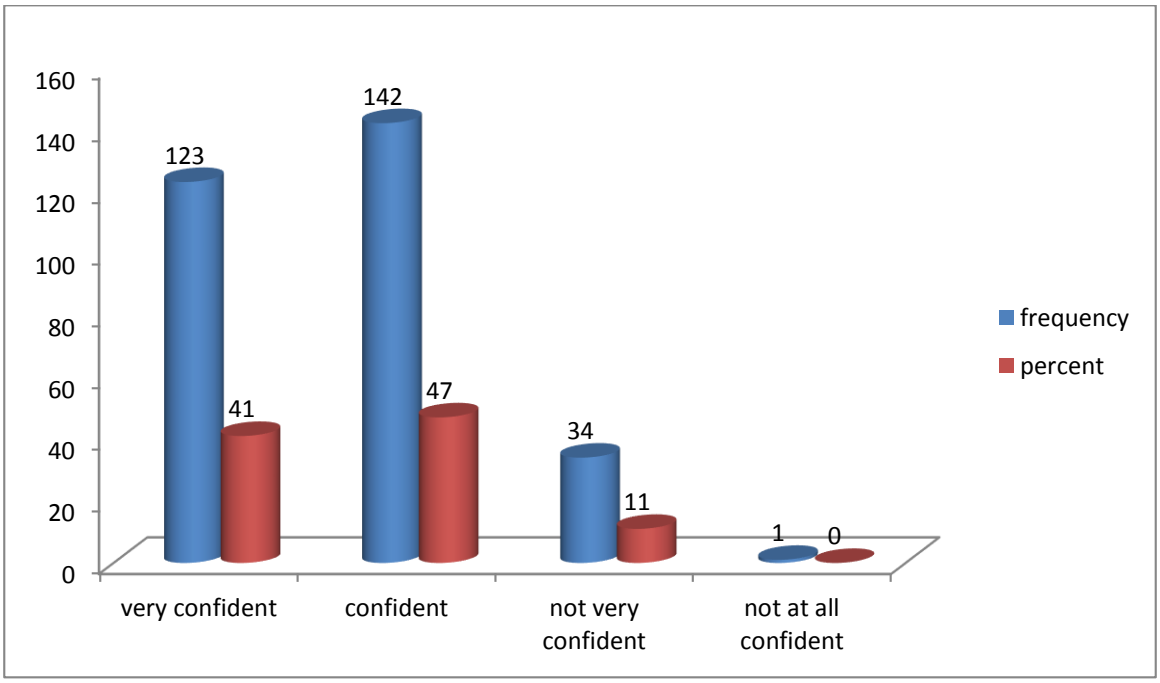


**Figure 3.** Distribution of respondents towards knowing the relevant family history information from patients

4.4.2. Reassuring patients those at low risk

Among the 300 respondents, the majority of respondents 144 (48.0%) of the respondents were confident followed by 86 (28.7%) were not very confident, 57 (19.0%) were very confident and 13(4.3%) not at all confident to reassuring patients those at low risk. (figure 4).

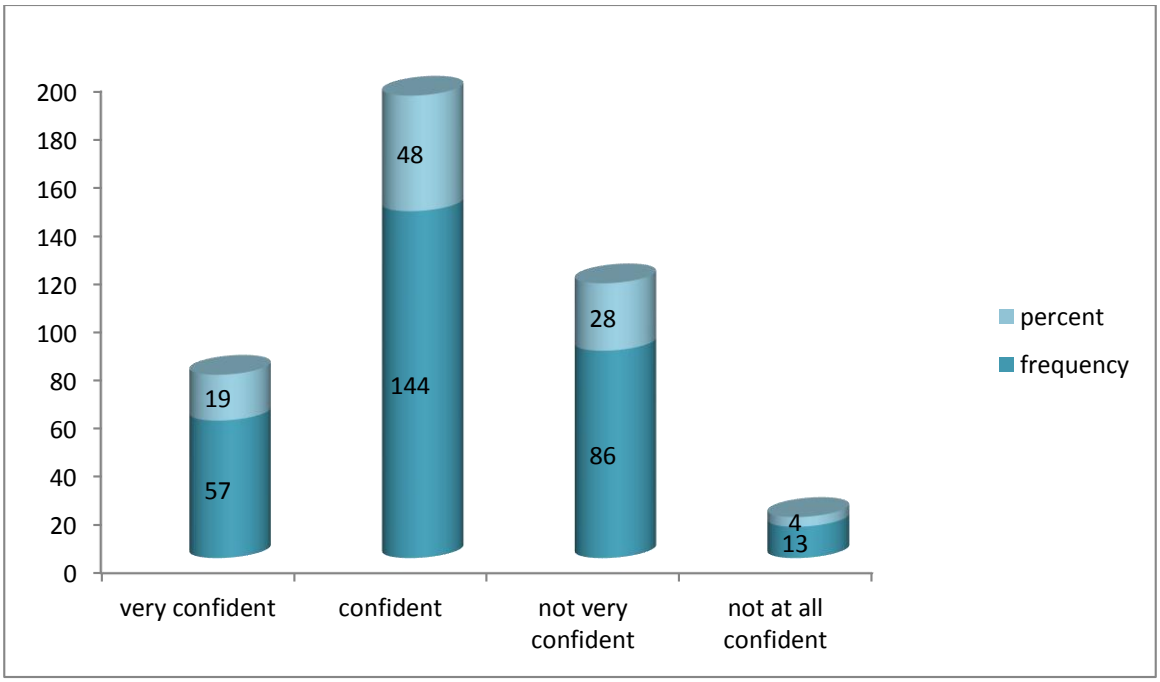


**Figure 4.** Distribution of respondents towards reassuring patients those at low risk.

4.4.3. Advising the patients on possible signs or symptoms of a disease

Among the all participants, the majority of participants had positive attitudes to advising on possible signs or symptoms of a diseases 146 (48.7%) were confident followed by 100 (33.3%) were very confident, 49 (16.3%) were not very confident and 5 (1.7%) not at all confident (figure 5).

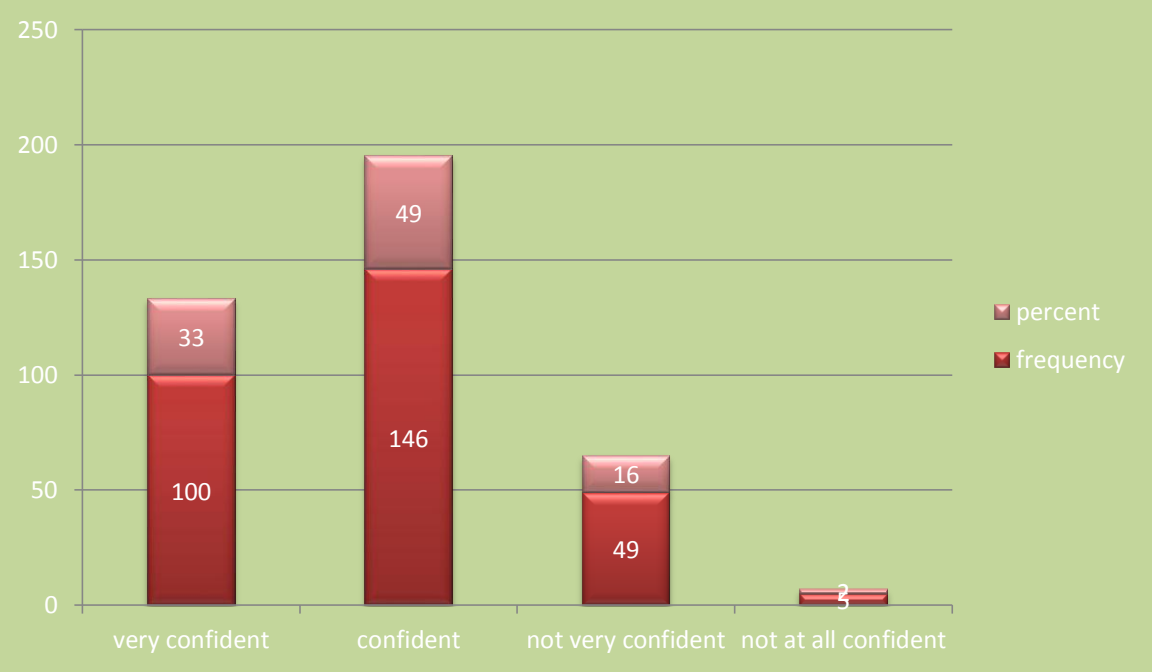


**Figure 5.** Distribution of respondents towards Advising on possible signs or symptoms of a disease

## 4.5. Practices of Genetic disorders by health care professionals

Among 300 respondents, 276 (92.0%) routinely collect family history information from patients, the most commonly cited conditions, in this section, were Breast cancer 79(28.6%), sickle cell 27(9.7%), heart disease 26 (9.4%), asthma 21(7.6%), Diabetes 65(23.5%), Mental disorder 45(16.3%), and Hodgkin's lymphoma 13(4.7%).

Health professionals collect this information from the patient during new patient registration 259 (93.8%), 17 (6.1%) at well woman/man clinic or appointment and 189 (68.4%) not used standard template, protocol or form to collect family history information (table .4).

**Table 4:** Practice of Health care professionals towards genetic disorders at health care centers.

| **Statements** | **Frequency** | **Percent** |
|---|---|---|
| In your role as healthcare professionals, do you routinely collect family history information from patients? | | |
| Yes | 276 | 92.0 |
| No | 24 | 8.0 |
| When do you routinely collect family history information? | | |
| At new patient registration | 259 | 93.8 |
| At well woman/man clinic or appointment | 17 | 6.1 |
| To which disorders do you collect family history information? | | |
| Breast cancer | 79 | 28.6 |
| Sickle cell | 27 | 9.7 |
| Heart disease | 26 | 9.4 |
| Asthma | 21 | 7.6 |
| Diabetes | 65 | 23.5 |
| Mental disorder | 45 | 16.3 |
| Hodgkin's lymphoma | 13 | 4.7 |
| Do you use a standard template, protocol or form for collecting this information? | | |
| Yes | 87 | 31.5 |
| No | 189 | 68.4 |

## 4.6. Factors associated with knowledge, attitude and practice of genetic disorders

Cross tabulation and logistic regression, analysis was carried out to determine the association between independent variables and the knowledge, attitude and practice of genetic disorders among the study participants. Sex, age, and profession were significantly associated with knowledge of study participants on binary logistic regression while profession and age remained significant in multivariate logistic regression.

In a multivariate logistic regression analysis, Professionals who are Doctors were 5.186 times more likely to know about genetic diseases compared to those who are Nurses, [AOR=5.186; 95%CI (2.469-10.894 P=0.000)]. Those who are aged 41-50 were 3.688 more likely to know about genetic disorders compared to those aged 20-30 years, [AOR= 3.688; 95%CI (1.085-12.528 P=0.036)].

**Table 5:** Association between socio-demographic factors and Knowledge of genetic disorders on health care professionals

| Variables | Mean knowledge Of Genetic disorders | | COR(95%CI) | p-value p<0.25 | AOR(95%CI) | p-value p<0.05 |
|---|---|---|---|---|---|---|
| | Poor Knowledge | Good Knowledge | | | | |
| **Sex** | | | | | | |
| Male | 112 | 65 | 1 | | | |
| Female | 70 | 53 | 1.305(0.816-2.087) | 0.267 | | |
| **Age** | | | | | | |
| 20-30 | 128 | 75 | 1 | | 1 | |
| 31-40 | 47 | 30 | 1.089(0.635-1.868) | 0.756 | 1.057(0.581-1.921) | 0.857 |
| 41-50 | 5 | 10 | 3.413(1.124-10.365) | 0.030* | 3.688(1.085-12.528) | 0.036* |
| 51-60 | 1 | 2 | 3.413(0.304-38.283) | 0.320 | 6.316(0.446-89.413) | 0.173 |
| Above 61 | 1 | 1 | 1.707(0.105-27.687) | 0.707 | 1.809(0.082-40.021) | 0.707 |
| **Profession** | | | | | | |
| Nurse | 79 | 47 | 1 | | 1 | |
| Midwifery | 53 | 14 | 0.444(0.223-0.886) | 0.021* | 0.461 (0.226-0.943) | 0.034* |
| Lab | 16 | 8 | 0.840(0.334-2.114) | 0.712 | 0.480 (0. 159-1.451) | 0.194 |
| Pharmacist | 15 | 11 | 1.233(0.523-2.906) | 0.633 | 1.068 (0. .416-2.738) | 0.892 |
| Doctor | 19 | 38 | 3.362(1.740-6.494) | 0.000* | 5.186 (2.469-10.894) | 0.000* |

Factors like sex, profession, work experience and knowledge were significantly associated with attitude towards genetic disorders on binary logistic regression while profession, work experience and knowledge remain significantly associated on multivariate logistic regression.

In multivariate logistic regression HCP who were Lab technical are 4.015 times more likely to have positive attitude than nurses, [AOR=4.015; 95%CI (1.419-11.361 P=0.009)]. Those participants who have work experience of six to ten years are 4.284 times more likely to have positive attitude towards genetic disorders than those who have 21-25 years work experience, [AOR=4.284; 95%CI (1.491-12.308 P= 0.007)]. HCP who have good knowledge were 2.234 times more likely to have positive attitude than those having poor knowledge, [AOR=2.234; 95%CI (1.283-3.889 P=0.005)] (Table .6).

**Table 6:** Association between socio-demographic factors and Attitude of genetic disorders

| Variables | Mean Attitude Of Genetic disorders | | COR(95%CI) | p-value p<0.25 | AOR(95%CI) | p-value p<0.05 |
|---|---|---|---|---|---|---|
| | Negative Attitude | Positive Attitude | | | | |
| **Sex** | | | | | | |
| Male | 104 | 73 | 1 | | | |
| Female | 56 | 67 | 1.705(1.072-2.711) | 0.024* | | |
| **Profession** | | | | | | |
| Nurse | 75 | 51 | 1 | | 1 | |
| Midwifery | 34 | 33 | 1.427(0.786-2.592) | 0.242 | 2.005 (1.041-3.860) | 0.037* |
| Lab tech | 6 | 18 | 4.412(1.639-11.874) | 0.003* | 4.015 (1.419-11.361) | 0.009* |
| Pharmacist | 8 | 18 | 3.309(1.338-8.184) | 0.010* | 3.037 (1.138-8.103) | 0.027* |
| Doctor | 37 | 20 | 0.795(.415-1.523) | 0.489 | 0. 598 (0.284-1.257) | 0.175 |

| Variables | Mean Attitude Of Genetic disorders | COR(95% CI) | p-value<br>p<0.25 | AOR(95 %CI) | p-value<br>p<0.05 | |
|---|---|---|---|---|---|---|
| **Work experience** | | | | | | |
| 1-5 | 78 | 71 | 2.731(1.153-6.468) | 0.022* | 3.048 (1.143-8.124) | 0.026* |
| 6-10 | 35 | 38 | 3.257(1.295-8.194) | 0.012* | 4.284 (1.491-12.308) | 0.007* |
| 11-15 | 11 | 14 | 3.818(1.241-11.752) | 0.020* | 2.705 (0.709-10.330) | 0.145 |
| 16-20 | 12 | 9 | 2.250(0.693-7.306) | 0.177 | 2.482 (0.694-8.877) | 0.162 |
| 21-25 | 24 | 8 | 1 | | 1 | |
| **Knowledge** | | | | | | |
| Poor | 182 | 60.7 | 1 | | 1 | |
| Good | 118 | 39.3 | 1.750 (1.096-2.793) | 0.019* | 2.234 (1.283-3.889) | 0.005* |

There was no variable significantly associated with practice of genetic disorders on binary and multivariate logistic regression.

## 4.7. The relations between knowledge and attitudes among Health care professionals

**Table 7:** Pearson Correlation Coefficients between knowledge and attitudes among Health care professionals

| **Correlations** | | | |
|---|---|---|---|
| | | Knowledge | Attitude |
| Knowledge | Pearson Correlation | 1 | .192** |
| | Sig. (2-tailed) | | .001 |
| | N | 300 | 300 |
| Attitude | Pearson Correlation | .192** | 1 |
| | Sig. (2-tailed) | .001 | |
| | N | 300 | 300 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

Pearson's Correlation Coefficient test; all correlations are significant at the .01 level. Table 7 displays the p-values and correlation coefficients obtained from the correlation analysis. The result indicates that there was statistically significant and had positive relationship between knowledge and attitude (0.192) with 0.01 level of significance.

# 5. DISCUSSION

## 5.1. Knowledge of health care professionals towards genetic disorders

The most commonly cited conditions, in this section, were Breast cancer, sickle cell, heart disease, asthma, Diabetes, Mental disorder, and Hodgkin's lymphoma.

This study has revealed that 39.3 % of the study participants were knowledgeable which is less than the study among Nurses in university hospitals of Addis Ababa (57.8%) of them were Knowledgeable about breast cancer and breast cancer screening. The reason for this could be breast cancer cases mostly go to teaching referral hospitals to get medical care. For this reason, health professionals working in these areas have higher exposure to breast cancer cases and have a better knowledge (Semarya Berhe Lemlem *et al*., 2011). Also, this finding was unexpected, when compared with the report among Nurses in Lagos, Nigeria, where the nurses were found to be very knowledgeable about risk factors but lacked adequate knowledge about cancer risk estimation (Odusanya and Tayo, 2001).

Health care professions in this study reported knowledge of breast cancer less often (39.3%) of the HCP had good knowledge. This was similar to the findings from one study in Nigeria (Alkhasawneh, 2007). Whilst other studies have reported nurses' knowledge about risk factors of breast cancer to be high (Awodele *et al*., 2009).

Health care professions in this study reported knowledge of sickle cell less (39.3%) often had good knowledge. The findings were contrast to that by Gomes *et al*. (2011) where around two-thirds of health workers had knowledge about sickle cell manifestations used in screening for sickle cell disease.

Most of the health care professionals were aware of sickle cell disease and to have an understanding of the disease and the major source of information was gotten from their teachers (school curriculum) the result not support by (Bazuaye and Olayemi, 2009), where they found that media and friends, are the primary sources of health information for young women and men of all ages.

In this study (39.3%) of respondent had good knowledge of diabetes this was similar finding, Ikombele found in his study that no respondent had good knowledge and 92.6% of respondents had poor knowledge of the benefits of exercise, weight loss and healthy diet (Ikombele, 2011 ).

This study had demonstrated lower level of knowledge regarding diabetes. The prevalence of knowledge was lower compared to studies done in Pakistan and Saudi, which were 60% and 77% respectively (Naheed, 2010).

Increasing age was significantly associated with knowledge. This finding was supported by other different literatures (West and Goldberg, 2002) .

In this study (39.3%) of respondent had good knowledge about asthma diseases this finding was not consistence with (Moyeta Bariso Gare *et al*., 2020).

In this study (39.3%) of respondent had good knowledge about mental illness this finding was not consistent with (Mihiret G-Mariam *et al*, 2016) two hundred (50%) health workers have adequate knowledge towards mental illness. Also, show differences with the study done in Jimma zone about 89% of the respondents were knowledgeable about mental health problems (Chikaodiri, 2009). The possible reason might be socio cultural difference, the sample size and profession difference that was 135 nurses were participated during the study done in Jimma zone.

The proportion of doctors who reported that they were knowledgeable about mental disorders was higher than that of nurses this finding was consistence with (Mihiret G-Mariam *et al*, 2016)

## 5.2. Attitude of health care professionals towards genetic disorders

In this study One hundred forty (46.7%) of the participants had positive attitude towards breast cancer which is less than the study among female health profession in university hospitals of Addis Ababa where 55.8% of the participants had positive attitude towards breast cancer (Wurjine *et al*., 2017).

The general attitude of health professionals towards sickle cell diseases was found to be negative. The findings were not consistent with Okwi *et al* that health workers had good attitude towards sickle cell screening (Okwi *et al*., 2009).

Health care professionals' belief towards sickle cell disease cause was reported to be due to heredity and none of them thought it was due to witchcraft, sin or punishment from God. This they related to the knowledge they had about sickle cell disease. The findings were consistent with (Treadwell *et al*., 2006) who found that respondents believed sickle cell was inherited from parents. The results were not consistent with (Ohaeri and Shokumbi, 2001) and (Okwi *et al*., 2009) who found majority of respondents believed sickle cell disease was hereditary but a few believed it was caused by sin, witchcraft and punishment from God (Ohaeri and Shokumbi, 2001).

In this study the attitude of health care professionals towards diabetes diseases was (46.7%).This finding was not similar to those of studies done in South Africa at Mamelodi Hospital in which the majority of respondents (92.7% and 51.6% respectively) had positive attitude towards lifestyle modifications (Ikombele, 2011).

In this study, One hundred forty (46.7%) of the participants had positive attitude towards mental illness this finding was not consistence with (Mihiret G-Mariam *et al*, 2016) two hundred twelve (52.5%) have favorable attitude towards mental illness. Also show differences with the study done in Maldives the attitude toward the mentally ills among nurses are generally positive attitude even when the respondents took limited amount of training (Mandal and Prakash, 2014).

Those health care professions those with work experience 6-10 years were 4.2 more likely to have favorable attitude towards mental illness compare to those with work experience less than 5 years. This result showed similarity from Zambia study which showed most of health care providers (81.1%) have been working for more than five year showed good attitude and experienced in dealing with mental ill persons. However, the findings were not consistent with the other study (Mihiret G-Mariam *et al*, 2016) nurse those with work experience 0-5 years were 3.6 compare to those with work experience greater than 10 years.

In this study, some of the respondents believed that family history is an important risk factor for breast and chronic diseases (heart, asthma, diabetes, sickle cell). The findings were consistent with the other study (Bankhead *et al*., 2001).

In order to provide an accurate risk assessment and give reassurance or advise as appropriate health care professionals feel that they need more information about familial conditions to be able to manage patients confidently. The findings were consistent with the other study (Bankhead *et al*., 2001).

In this study the relations between knowledge and attitudes among Health care professionals wer e statistically significant and had positive relationship between knowledge and attitude (0.192) with 0.01 level of significance.

## 5.3. Practices of health care professionals towards genetic disorders

In this study 276 (92%) of practice of health care professionals reported that they collect family history information as a matter of routine. The health professionals that routinely take information about family history, most activity occurs in new patient hospitals. The findings were consistent with (Bankhead *et al*., 2001)

In this study, family history of breast cancer is the most commonly collected in all hospital settings. The findings were not consistent with the other studies (Bankhead *et al*., 2001) family history of heart disease was the most commonly collected

In this study, family history of the patients collected routinely by the health professionals in this survey frequently were in apposition where a family history was obtained but they were not sufficiently well informed to deal with the issue appropriately. The findings were not consistent with (Bankhead *et al*., 2001) the majority of nurses reported using computer systems and computer templates to manage patients information.

# 6. CONCLUSION AND RECOMMENDATION

## 6.1. Conclusion

This study has revealed that the knowledge, attitude and practice towards genetic disorders was poor among health professionals working in the studied health care centers.

Age and profession were significantly associated with Knowledge of the HCP towards genetic disorder. While, Profession, work experience and knowledge were significantly associated with their attitude.

There was no variable significantly associated with practice of genetic disorders on binary and multivariate logistic regression.

## 6.2. Recommendation

Based on the result obtained in this study the following recommendations are forwarded:

**Federal and regional health offices level:** A standard screening guide line needs to be prepared and needs to be implemented in all health facilities.

There should be regular training programs in order to keep the professionals updated about genetic disorders.

**Health Professionals level:** Health providers (nurses, midwives, lab technntians and pharmacists) should also read more and update themselves regularly.

**Researchers:** Researchers should conduct further studies at different levels.

**Research institute**, **university** and **NGOS** that done research about the awareness of the population about genetic disorders.

**The government**s assign at least one genetic counselor in each hospitals.

Generally, collaboration is needed between different sectors in order to make reduce genetic disorders.

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# 8. APPENDIXES

## 8.1. Questionnaire

**Bahir Dar University**

**College of Science**

**Department of Biology**

**Post-Graduate Program**

### Questionnaire for "Assessment of knowledge, Attitude and Practice of Genetic disorders by Health professionals"

**Identification**

**Name of the healthcare unit_____**

**Name of the department_____**

**Address: _____**

**Introduction**

Hello, my name is Tigist Misganaw. I am here on behalf of the research team of **Bahir Dar** University of the biology department. I would like to investigate the level of understanding, attitude and the status of practice towards genetic disorders by healthcare professionals. To get this information, we are administering this questionnaire in this healthcare unit. The results from this project will be used to help policymakers, health care professionals and other responsible bodies to improve their understanding and health services in the sector. This questionnaire has some questions about your knowledge, attitude and whether you have been practicing treatment of genetic diseases or not. What you tell me will be kept strictly confidential.

# Socio demographic characteristics

**Please put those symbol for your choice** ✓

1. Gender male ☐ female ☐
2. Age 20-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ above 60 ☐
3. Education level diploma ☐ degree ☐ master ☐ PHD ☐
4. Marital status single ☐ married ☐ divorced ☐
5. Job nurse ☐ midwives ☐ laboratory technician ☐ pharmacist ☐ doctor ☐
6. Work experience 1-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ above 21 ☐
7. Way of obtaining genetic knowledge Internet ☐ Mass media ☐ formal education ☐ Symposium and seminar ☐ Consultation with patient and family ☐
8. Religion Orthodox ☐ Protestant ☐ Catholic ☐ Muslim ☐

## Knowledge of Genetics on Health Profession

| № | Question | True | False |
|---|---|---|---|
| 1 | Future parents that are related have an increased risk of having a child with a genetic disorder | | |
| 2 | High maternal age increases the risk of having a child with a genetic disorder | | |
| 3 | Healthy parents can have a child with a hereditary disease | | |
| 4 | If a person has a genetic predisposition for a disease, this person will certainly get the disease | | |

| | | | |
|---|---|---|---|
| 5 | A disease is only heritable if more than one family member is affected | | |
| 6 | Genetic diseases mostly skip a generation | | |
| 7 | Some of the heritable disorders express themselves later in adult life | | |
| 8 | People are genetically more related to their parents than to their brothers and sisters | | |
| 9 | If treated properly, genetic disease is curable | | |

## Attitudes and beliefs

10. Do you think family history is an important genetic risk factor for breast cancer

Yes ☐ no ☐

11. Do you think family history is an important genetic risk factor for Hodgkin's Lymphoma

Yes ☐ No ☐

12. Do you think family history is an important genetic risk factor for Heart Disease

Yes ☐ No ☐

13. Do you think family history is an important genetic risk factor for diabetes

Yes ☐ No ☐

14. Do you think family history is an important genetic risk factor for asthma

Yes ☐ No ☐

15. Do you think family history is an important genetic risk factor for mental disorder

Yes ☐ No ☐

16. Do you think family history is an important genetic risk factor for sickle cell

Yes ☐ No ☐

17. Do you think that genetic disorders are heritable?

Yes ☐ No ☐

18 If someone consulted you with worries about their family history of one genetic disease, how confident would you feel regarding the following?

| | Question | Very confident | Confident | Not very confident | Not at all confident |
|---|---|---|---|---|---|
| A | Knowing what is the relevant family history information to collect | | | | |
| B | Reassuring those at low risk | | | | |
| C | Advising on possible signs/symptoms of a Disease | | | | |

# Practices

19 In your role as healthy care professionals, do you routinely collect family history information from patients? Yes ☐ No ☐

20 When do you routinely collect family history information

i at new patient registration Yes ☐ No ☐

ii At well woman/man clinic or appointment Yes ☐ No ☐

iii not collect Yes ☐ No ☐

21 If yes, for which disorders?

i Breast cancer ☐

ii Sickle cell anemia ☐

iii Heart disease ☐

iv Asthma ☐

v Diabetes ☐

vi. Mental disorder ☐

vii. Hodgkin's Lymphoma ☐

22 Do you use a standard template, protocol or form for collecting this information?

Yes ☐ No ☐

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Science College
The Graduate, Research
& Community Services V/Dean
Bahir Dar University
Bahir Dar – Ethiopia

Wisdom at the source of the Blue Nile

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ቁጥር: **PGRCSVD/102/2012**
ቀን: 08/07/2012

**Ethical Clearance Approval Form**

Applicant's Name: Tigist Misganaw

| | |
|---|---|
| Research Title | Assessment of knowledge, attitude and practices of genetic diseases: On health professionals study in Bahir Dar, Ethiopia |
| Researcher (s) Name (s) | Tigist Misganaw |

Thank you for submitting your application for ethical clearance, which was considered at the College of Science Research Ethics Committee meeting on 17 March 2020. The committee has reviewed your ethical application, issues pertaining to participants, consent form, debriefing, and relevant questionnaires.

The researcher should keep the confidentiality of the identity of research participants and data that will be obtained from them. Any serious adverse events or significant changes which occur in connection with this study and /or which may alter its ethical consideration must be reported immediately to the committee for a possible ethical amendment.

We are therefore pleased to inform you that the College's Ethical Clearance Committee has approved your study from an ethical point of view.

With kind regards

Dr. Tsegaye Kassa Gogie
P.G.R.C.S. Vice Dean

CC//
- Dean office
- The Graduate, Research and Community Services V/Dean
- Biology Department

**College of Science**