



Risk factors for breast cancer among women attending the University
Hospitals in South and Central Ethiopia, a case – control study.

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List of tables

Table 1. Variables for the risk factors of breast cancer among women attending university hospitals in South and Central Ethiopia regions, 2025.....	16
Table 2. Socio-demographic characteristics of the women included in the study in selected University Hospitals in South and Central Ethiopia regions, 2025.....	22
Table 3. Reproductive characteristics of the women included in the study in university hospitals in South and Central Ethiopia regions, 2025.....	23
Table 4. Medical and Environmental related factors for breast cancer among women attending University Hospitals in South and Central Ethiopia regions, 2025.....	25
Table 5. Behavioral risk factors for breast cancer among women attending university hospitals in South and Central Ethiopia regions, 2025.....	26
Table 6. Dietary related risk factors among women attending University Hospitals in South and Central Ethiopia regions, 2025.....	27
Table 7. Clinical profile for breast cancer among women attending University Hospitals in South and Central Ethiopia regions, 2025.....	28
Table 8. McNamara and Conditional logistic regression analysis of factors associated with breast cancer among women attending the University Hospitals in South and Central regions of Ethiopia, 2025.....	30

List of figures

Figure 1. Conceptual framework to assess the risk factor of breast cancer among women attending the University Hospitals in South and Central Ethiopia regions, 2025.....	10
Figure 2. Schematic representation of sampling procedure for the risk factor of breast cancer among women attending university hospital in South and Central Ethiopia regions, 2025.....	14
Figure 3. Distribution of women with age at menarche among case and control in university hospitals in South and Central Ethiopia regions, 2025.....	24

Abbreviations and Acronym

BC: Breast cancer.

NCD: Non communicable disease.

ASMR: Age-specific mortality rate.

ASIR: Age-specific incident rate.

LMIC: Low-middle-income country.

WHO: World Health Organization.

MOH: Ministry of Health.

DALYs: Disabled adjusted life years.

BMI: Body mass index.

AOR: Adjusted odd ratio.

COR: Crude odd ratio.

Table of Contents

List of tables.....	iii
List of figures.....	iv
Abbreviations and Acronym	v
Abstract.....	1
INTRODUCTION	2
1.1. Background	2
1.2. Statement of the Problem.....	3
1.3. Rationale of the study.	6
1.4. Significance of the study.....	6
2. LITERATURE REVIEW	7
2.1 Magnitude of breast cancer	7
2.2 Factors associated with breast cancer.	9
Conceptual framework.....	11
3. OBJECTIVES	12
3.1 General objective	12
3.2 Specific Objective	12
4. METHODS AND MATERIALS.....	13
4.1. Study area.....	13
4.2 Study Design and Period.....	13
4.3 Population.	13
4.3.1 Source Population	13
4.3.2 Study Population.....	13
4.4 Eligibility criteria	14
4.4.1 Inclusion criteria	14
4.5 Sample Size Determination.....	14
4.6 Sampling procedure/Technique	15
4.7 Variables of the study.	17
4.8 Data collection tools and procedures	18
4.9 Data quality control.....	18
4.10 Operational definitions.....	19

5. Results.....	21
6. Discussion.....	33
6.1 Conclusions.....	35
6.2 Strengths and limitations.....	35
6.3 Recommendation.....	36
References	37

Abstract.

Background: In Ethiopia, breast cancer incidence is rising and has become the foremost common cancer, causing high rates of morbidity and mortality. Because of the inconsistency in findings between studies conducted in Ethiopia, and no previous study has been conducted in the study area about the risk factors for breast cancer. This study aimed to identify the risk factors for breast cancer among women attending the University Hospitals in South and Central Ethiopia regions.

Methods: An institutional-based matched case-control study was conducted among 378(189 women with BC and 189 women without BC) women attending selected university hospitals in the South and Central Ethiopia regions. Data was collected by interviewer-administered questionnaire and document review. Four University Hospitals were selected purposely based on the service they give specially chemotherapy service. Because of rare cases, cases were selected consecutively, while control was selected purposely from women visiting the selected hospitals for non-breast cancer cases based on the age of the case. A conditional logistic regression model was fitted to identify risk factors for breast cancer. The degrees of association between breast cancer and independent variables were assessed using an odds ratio (OR) at 95% CI.

Result. A total of 378 women participated in this study for a response rate of 100%. The mean (SD) age of case and controls were 41.7($\pm$ 11.13) and 41.5($\pm$ 10.8) years. Above half of women 55.5% was diagnosed at late stage and 42% had breast cancer diagnosed with distant metastasis. According to conditional logistic regression model, unemployment (AOR 3.26(1.1-11.68), age at menarche (AOR 6.4(1.94-21.2)), parity (AOR 0.33(0.07-0.9)), intensity of physical activity (AOR 4.16(1.32-13.2)), consumption of solid oil (AOR 2.9(1.11-8.66)) and intake of packed food (AOR 3.48(1.12-10.9)) was significantly associated with breast cancer.

Conclusions. This study found important risk factors for breast cancer. Therefore, there should be strong prevention work including awareness creation at the population level so that women will adopt healthier lifestyles through healthy nutrition and regular physical exercise, which might contribute to reducing the risk of developing BC. In addition, improving the early detection, and screening of breast cancer cases starting from the primary care settings for early identification and referral of breast cancer.

INTRODUCTION

1.1. Background

Breast cancer is a cancer occurs when abnormal breast cells multiply uncontrollably, forming tumors. It ranks among the three most common types of cancer globally and stands as the fifth leading cause of cancer-related deaths worldwide(1).

In 2022, an estimated 2.3 million women worldwide were diagnosed with cancer, making up 24.2% of all new cases. Sadly, this led to approximately 666,103 deaths, accounting for 15% of total cancer-related fatalities (2). Over half of all breast cancer cases and 60% of related deaths take place in low- and middle-income countries (**LMICs**) (3). For example, African countries record the highest age-standardized mortality rate (ASMR) for breast cancer, with 17.3 deaths per 100,000 people annually (4). In Ethiopia, breast cancer has become the most prevalent cancer, leading to significant morbidity and mortality. Each year, it accounts for approximately 15,244 new cases (22.6% of all cancer diagnoses) and 8,159 deaths (17% of total cancer-related fatalities) (5).

Research from various African nations and other regions has identified several factors that contribute to an increased risk of breast cancer. These include age, family and medical history, body weight, physical activity levels, alcohol consumption, and cigarette smoking. Additionally, breastfeeding, number of pregnancies (parity), menopausal status, diet, and oral contraceptive use are also recognized as influencing risk (6–10). Although breast cancer has historically been more prevalent in high-income countries, its impact has increasingly spread to low- and middle-income countries (LMICs). This shift is largely attributed to Westernized lifestyles and rapid urbanization, which have introduced various risk factors that contribute to the rising burden of the disease (11).

Reducing breast cancer incidence requires identifying and eliminating carcinogenic risks, promoting healthy lifestyle changes, implementing targeted prevention programs, and establishing population-based screening initiatives to enhance early detection and intervention.

(12). The World Health Organization (WHO) introduced the Global Breast Cancer Initiative to tackle the rising burden of the disease, which claimed an estimated 685,000 lives worldwide in 2020. Likewise, the Ministry of Health (MOH) formulated and revised a strategy aimed at reducing risk factors, promoting healthy lifestyles, and preventing and managing Non-Communicable Diseases (NCDs), including breast cancer (14).

By addressing all modifiable risk factors, the likelihood of developing breast cancer could be reduced by 30%. Of this reduction, 20-30% is linked to controllable factors, while 5-10% is associated with non-modifiable characteristics.(15). So, effective cancer prevention relies on identifying and eliminating carcinogenic risks, particularly in low- and middle-income countries (LMICs) where access to cancer and non-communicable disease (NCD) programs is often limited. Recognizing breast cancer risk factors is crucial for developing high-impact prevention strategies that benefit public health.

1.2. Statement of the Problem

In 2022, an estimated 2.3 million women worldwide were diagnosed with cancer, making up 24.2% of all new cases. Sadly, this led to approximately 666,103 deaths, accounting for 15% of total cancer-related fatalities (2). Over half of all breast cancer cases and 60% of related deaths take place in low- and middle-income countries (**LMICs**) (3).

In Ethiopia, breast cancer is the most common type of cancer, contributing to 17.7% of cancer-related deaths and 22.6% of all annual cancer cases. Each year, around 60,000 new cases are diagnosed. Additionally, findings from the Addis Ababa cancer registry indicate that breast cancer accounts for 23% of all cancer cases and 33% of cases among women (8). Breast cancer remains the most prevalent malignancy, contributing to high mortality and morbidity rates. Studies indicate that the disease has wide-ranging effects, including psychological distress for patients and their families, reduced productivity, and significant financial strain on healthcare systems (16).

In low- and middle-income countries (LMICs) like Ethiopia, limited access to breast cancer screening and treatment often leads to late-stage diagnoses. Compared to high-income nations,

this results in poorer prognoses and higher mortality rates. To address this challenge, prevention efforts should be prioritized, particularly by identifying risk factors and taking action on modifiable ones (16).

While various studies have identified different risk factors for breast cancer, they are often understudied, especially in resource-limited countries. Research across different populations shows significant variations in breast cancer incidence and mortality rates between nations, suggesting that environmental and lifestyle factors may influence disease development. In a diverse country like Ethiopia, with a large population, multiple ethnic groups, cultural practices, lifestyle differences, and geographical variations, these factors may contribute to overall health outcomes, including breast cancer risk.

Research on breast cancer risk factors in Ethiopia remains limited, with findings often inconsistent across studies, making it difficult to establish a comprehensive guideline for prevention and treatment. For instance, when analyzing reproductive factors, some studies suggest an association between age at first pregnancy and breast cancer risk, while others present mixed conclusions (17), while other do not (18). Research conducted in the Western Himalayan state suggests a link between the total duration of lactation and breast cancer risk (19), but other studies find no association (18).

The study conducted in Addis Ababa suggest age at menarche has a connection (8), but other studies find no association (20). The study conducted in India report an association of history of abortion with breast cancer (21), while other studies do not support this finding (20). The study conducted at Hawassa city (22) and Addis Ababa (8) , shows a connection of oral contraceptive and number of parity with breast cancer respectively, but other study conducted in Addis Ababa report no link of both oral contraceptive and number of parity with breast cancer (18). Regarding medical factors a systematic review and meta-analysis study shows there is association between diabetes and breast cancer (23), while other study show no link (20). Considering lifestyle factors, alcohol consumption; finding from prospective family study cohort show an association of alcohol consumption with breast cancer (24), while other study show there is no association (18).

Reducing breast cancer risk is a vital aspect of public health, requiring clear and comprehensive evidence. However, research on breast cancer risk factors in the country remains limited, with existing studies focusing on only a few regions. In particular, South and Central areas lack sufficient data, despite a high number of breast cancer patients undergoing treatment. This suggests that many parts of the country have not been adequately studied. Additionally, inconsistencies among previous findings highlight the need for further research, using robust methodological approaches to identify key risk factors. To address this gap, the current study aims to examine breast cancer risk factors among women receiving care at six university hospitals in the South and Central regions of the country.

1.3. Rationale of the study.

Breast cancer has emerged as a major global public health challenge and is now the most prevalent cancer in Ethiopia. Access to screening and treatment services remains limited, with referral centers only available in the capital and selected regional cities. Ethiopia's cultural diversity, varied lifestyles, and geographic differences may contribute to regional variations in breast cancer incidence and risk factors. Additionally, research on breast cancer risk factors in Ethiopia has been scarce, often focusing on small segments of the population in a few regions, leaving significant gaps in understanding.(25). Some findings on breast cancer risk factors remain inconsistent, making it challenging to establish clear prevention strategies. To bridge these gaps and reduce the incidence and burden of breast cancer, strong evidence on risk factors is essential. This study aims to identify breast cancer risk factors among patients at university hospitals in the South and Central regions of Ethiopia.

1.4. Significance of the study.

The findings of this study will identify breast cancer risk factors in Ethiopia and provide valuable evidence to support policymakers in developing effective prevention strategies. It could contribute to establishing an evidence-based approach for breast cancer prevention within the population. Additionally, it will help healthcare professionals recognize high-risk individuals, implement targeted screening and early detection measures, and ultimately enhance patient outcomes.

2. LITERATURE REVIEW

2.1 Magnitude of breast cancer

In 2022, there were 2.3 million women diagnosed with breast cancer and 666,103 deaths globally. Breast cancer occurs in every country of the world in women at any age after puberty but with increasing rates in later life (2). Over the past thirty years, the incidence and mortality rates of breast cancer have risen significantly. Between 1990 and 2016, the number of breast cancer cases has more than doubled in 60 out of 102 countries, including Afghanistan, the Philippines, Brazil, and Argentina. Meanwhile, the death rate from breast cancer has also doubled in 43 of these countries, such as Yemen, Paraguay, Libya, and Saudi Arabia (26).

The World Health Organization reports that malignant neoplasms pose the biggest global health challenge for women, accounting for an estimated 107.8 million Disability-Adjusted Life Years (DALYs). Of this total, breast cancer alone is responsible for 19.6 million DALYs (27).

The 2022 GLOBOCAN data indicates a strong positive correlation between breast cancer incidence rates and the Human Development Index (HDI). According to the findings, age-standardized incidence rates (ASIR) per 100,000 people were highest in very high HDI countries (75.6), followed by high (34.8), medium (29.7), and low HDI countries (34.1). Despite the higher ASIR in very high and high HDI nations, the age-standardized mortality rates (ASMR) were notably elevated in low and medium HDI countries, accounting for 19% and 14% of deaths, respectively. In addition to being the most prevalent cancer among women, breast cancer remains the leading cause of cancer-related deaths globally, with a total of 666,103 deaths recorded at an age-adjusted mortality rate of 13.6 per 100,000 (2).

While breast cancer incidence rates were highest in developed regions, mortality rates were disproportionately higher in Asia and Africa, accounting for 20.8% and 19.1% of total breast cancer deaths in 2022, respectively. More than half of all breast cancer cases and 60% of related deaths occurred in low- and middle-income countries (LMICs). Notably, sub-Saharan Africa had the highest incidence and mortality rates, with 26.5% and 36.7% recorded in 2022. This trend is largely linked to Westernized lifestyles, dietary shifts, and declining physical activity within African populations (2).

Breast cancer is the most frequently diagnosed cancer among Malaysian women, accounting for 31% of all female cancers. The age-adjusted incidence rate in Malaysia stands at 47.4 per 100,000 roughly half the rate observed in North America. Among ethnic groups, Chinese women have the highest incidence (59.9 per 100,000), followed by Indians (54.2 per 100,000) and Malays (34.9 per 100,000). In Pakistan, breast cancer is also the most prevalent malignancy among women, with an incidence rate of 50.1 per 100,000 (28). In the United States, breast cancer is projected to make up 26.1% of all newly diagnosed cancers in women. The age-standardized incidence rate (ASIR) is estimated to be 70.2 per 100,000, while the age-standardized mortality rate (ASMR) stands at 13% per 100,000 (29).

Breast cancer has become the most prevalent cancer in Ethiopia, with increasing incidence rates leading to significant morbidity and mortality. It accounts for 15,244 cases (22.6%) of all cancers and 8,159 deaths (17%) annually. Additionally, around 60,000 new breast cancer cases are diagnosed each year. Data from the Addis Ababa cancer registry further highlights the impact of the disease, showing that breast cancer represents 23% of all cancer cases and 33% of cancer cases among women (8). Research conducted in Ethiopia has shown that public awareness of breast cancer remains low. Many patients and their families lack proper knowledge about the disease and available treatment options. Consequently, a significant proportion between 80% and 90% of cancer cases are diagnosed at an advanced and often incurable stage (18).

2.2 Factors associated with breast cancer.

Reducing the burden and incidence of breast cancer requires a strong focus on prevention, particularly by identifying and addressing modifiable risk factors. These risk factors are categorized into four key subgroups: Social and demographic Factors include age, level of education, monthly income, residence, marital status, and employment of the patients, lifestyle factors encompass obesity, diet, smoking, alcohol consumption, and physical activity, reproductive factors include age at menarche, age at menopause, number of parity, oral contraceptive use, age at first pregnancy, history of abortion, family history of breast cancer and duration of breastfeeding, and medical history includes the presence of benign breast mass, prior history of breast biopsy, history of diabetes, and radiation exposure are risk factors associated with breast cancer.

Socio - demographic factors.

Many research indicate the risk of breast cancer increases with increasing age (18,30), many studies report rural residence as an associated factors (8,31), but other studies report there is no link (18), and systematic review and meta-analysis show that living in urban areas has been associated with an increased incidence of cancer (32), Thakur et al study indicates that people at upper socioeconomic status have an increased risk of developing breast cancer (19), some studies report being unemployed and illiterate are linked with the risk of having breast cancer (18,31,33), studies indicate that there is association between marital status and breast cancer (22, 31), while other studies show no link (18,33).

Lifestyle factors.

The systematic review and meta-analysis study conducted in Ethiopia show that BMI, diet, and physical activity are linked to breast cancer (34), other systematic reviews and meta-analysis studies indicate the association between physical activity and breast cancer (35), but a study conducted in Afghanistan found no association of BMI with breast cancer (33). Additionally, smoking (33,36), and alcohol consumption has been reported to be associated with breast cancer (24), but many studies show there is no link between of alcohol consumption and breast cancer (18,35).

Reproductive factors.

The study conducted in Afghanistan revealed that age at menarche, age at first pregnancy, and family history of breast cancer are linked to breast cancer (33). A study conducted in Hawassa found that age of menopause and use of oral contraceptive have a link with BC (22). Systemic review and meta-analysis study in Ethiopia report the link between breastfeeding with breast cancer (34). The number of parties (8), and history of abortion (21) shows an association with breast cancer.

However, the study conducted in Afghanistan found no link between breastfeeding and oral contraceptive use with breast cancer (33). The study conducted in Bangalore reports no association; between age at menarche, age at marriage, family history, and history of abortion with breast cancer (20). Additionally, other research finds no link between the number of parties and breast cancer (8).

Medical and Environmental factors.

A history of breast infections, benign breast masses, and previous breast trauma increases the risk of breast cancer (37). Studies show that radiation therapy is related to breast cancer (38). Pesticide exposure has also been reported as having an association with breast cancer (39). Additionally, studies indicate that diabetes is associated with breast cancer (23), although other study (20) show no significant link.

The inconsistency of findings among different risk factors of breast cancer between various studies is due to small sample size, lack of quality data collection, and most of the studies conducted in limited research regions, as reported from many studies. To overcome this inconsistency, it needs to conduct highly standardized methodological study.

Conceptual framework

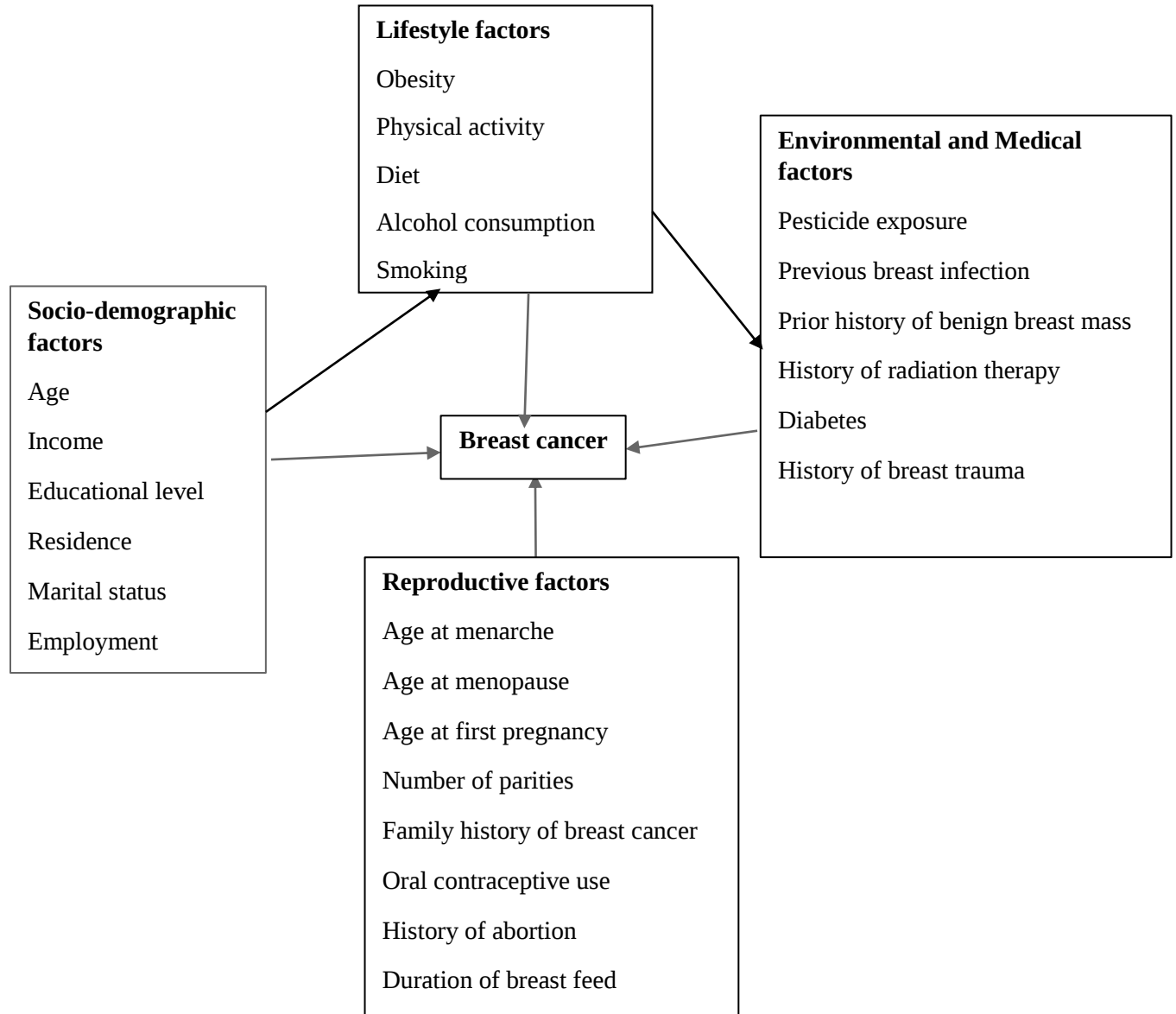


Figure 1. Conceptual framework to assess the risk factor of breast cancer among women attending the University Hospitals in South and Central regions of Ethiopia.

This conceptual framework was developed from different literature on risk factors for breast cancer among women with breast cancer (8,18–20,22,31).

3. OBJECTIVES

3.1 General objective

To assess the risk factors for breast cancer among women attending university hospitals in South and Central Ethiopia regions.

3.2 Specific Objective

- To characterize socio-demographic factors of breast cancer patients attending University hospitals of the South and Central Ethiopia regions.
- To characterize clinical profiles of breast cancer patients attending University hospitals of the South and Central Ethiopia regions.
- To assess the relationship between risk factors and breast cancer among breast cancer patients attending University hospitals of the South and Central Ethiopia regions.

4. METHODS AND MATERIALS.

4.1. Study area

The study was carried out in university hospitals located in the Southern and Central Ethiopia Regions. The Southern Ethiopia Region, with its capital in Wolayita Sodo, 340 km from Addis Ababa, has a population of 7,584,741, and is structured into zonal divisions. It is home to three university hospitals: Arbaminch University Comprehensive Specialized Hospital (AUCSH), Wolayita University Comprehensive Specialized Hospital(WSCSH), and Dilla University Teaching Hospital(DUTH).

The Central Ethiopia Region, a regional state with its capital in Hossaina, 243 km from Addis Ababa, has an estimated population of 6,657,000. The Gurage and Hadiya ethnic groups form the majority of the population. The region also has three university hospitals: Welkite University Comprehensive Specialized Hospital, Werabe Comprehensive Specialized Hospital, and Wechamo University Comprehensive Specialized Hospital.

4.2 Study Design and Period.

An institutional-based matched case-control study matched on age was conducted from March 25 to April 25, 2025.

4.3 Population.

4.3.1 Source Population

The source populations were all women with breast cancer aged 18 years old and above attending the selected university hospitals.

4.3.2 Study Population

Cases: were all women aged 18 years old and above with histologically confirmed breast cancer at selected University hospitals during the study period.

Controls: was all women aged 18 years old and above without breast cancer visited selected University hospitals for other cases during the time of study.

4.4 Eligibility criteria

4.4.1 Inclusion criteria

Women with histologically confirmed breast cancer, age 18 years old and above, and for control women with cases other than breast cancer were included in the study.

4.4.2 Exclusion criteria

Women with cancer that has metastasized to the breast from another site, those who are critically ill, and individuals with mental handicaps are excluded from the study. Additionally, women in the control group with benign breast masses were also excluded.

4.5 Sample Size Determination

The sample size was determined by using double population proportion formula for case and control study.

$$n_1 = \frac{\left(z_{\alpha/2} \sqrt{pq \left(\frac{1+r}{r} \right)} + z_{\beta} \sqrt{p_1 q_1 + \frac{(p_2 q_2)}{r}} \right)^2}{(p_1 - p_2)^2}$$

Where

n_1 = number of cases required (i.e. $n_2 = r n_1$).

n_2 = number of controls required

r = ratio of controls to cases

$z_{\alpha} = 1.96$ for 95% confidence level

$z_{\beta} = 0.84$ for 80% power

p_1 = proportion of obesity among cases

p_2 = proportion of obesity among controls

$p_1 - p_2$ = Minimum meaningful difference in proportions between case and control groups.

$$p = \frac{p_1 + r p_2}{1+r}$$

Using the assumptions of a 95% confidence interval, 80% statistical power, and an equal 1:1 ratio of cases to controls, a study conducted in Hawassa City found 25.33% and 40% proportion of obesity was present among controls and cases respectively, with determined odd ratio of 2.29, (23). The sample size was 328(164 cases and 164 controls), and after adding a 15% non-response rate, the final sample size for the study was 378(189 cases and 189 controls).

4.6 Sampling procedure/Technique

The study included all hospitals actively providing breast cancer treatment, with a primary focus on chemotherapy services. In the Central Ethiopia Region, Wechamo University Comprehensive Specialized Hospital, Welkite University Comprehensive Specialized Hospital, and Werabe Comprehensive Specialized Hospital were selected, while in the Southern Ethiopia Region, Wolayita Sodo University Comprehensive Specialized Hospital was included. Two university hospitals in the South were excluded due to the absence of established chemotherapy services at the time of data collection, and others were omitted due to limited experience in chemotherapy delivery and a low number of breast cancer cases. Since breast cancer cases were relatively rare, all women diagnosed with the disease and receiving hospital care during the data collection period were selected consecutively until the final sample size was reached. For each case, a control was deliberately chosen from non-cancerous patients within a five-year age range of the case, based on hospital visits for other conditions. The sample size for each hospital was determined using probability proportional to size, based on the average monthly patient flow recorded in hospital registration books. Thus from WSUCSH 86, WKUCSH 60, WCUCSH 100, and WRUCSH 132 participants were selected for the study.

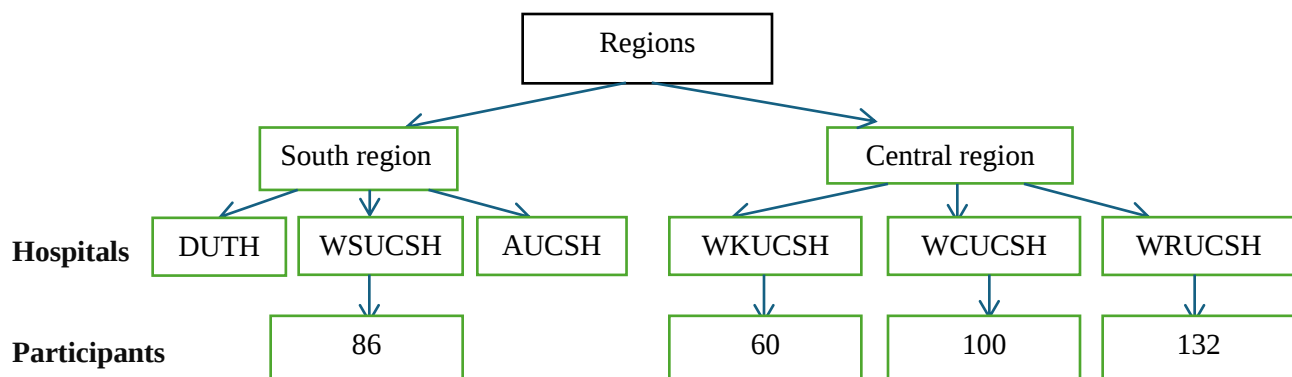


Figure 2. schematic representation of sampling procedure for the risk factor of breast cancer among women attending university hospital in South and Central Ethiopia regions, 2025.

4.7 Variables of the study.

Table 1. Variables for the risk factors of breast cancer among women attending university hospitals in South and Central Ethiopia regions, 2025.

Variables				
Dependent variable	Independent variable			
Histologically confirmed breast cancer	Socio-demographic factors	Reproductive factors	Lifestyle factors	Environmental and medical factors
	age Family income Educational status Residence Employment Marital status	Age at menarche Age at menopause Age at first pregnancy Number of parities Family history of breast cancer Oral contraceptive use History of abortion Duration of breast feed	Obesity Physical activity Diet Alcohol consumption Smoking	Pesticide contact History of breast infection History of breast trauma Prior history of breast surgery for non-cancer lump History of radiation therapy Diabetes

4.8 Data collection tools and procedures

Data for this study was gathered using the Kobo data collection tool through interview-administered questionnaires and a review of medical documents. Six nurses and two supervisors conducted the data collection using pretested, structured questionnaires that were adapted and refined from existing published literature (8,18,22,33). The questionnaires were initially translated into Amharic and then retranslated into English to ensure consistency. The questionnaire consisted of several sections: six questions on socio-demographic characteristics, eight on reproductive factors, nine on lifestyle factors, six on environmental and medical factors, and four in the clinical profile section.

To maintain accuracy, the weight scale was calibrated to zero without any object and placed on a level surface before measurements. Height was recorded using a stadiometer fixed to the wall, with regular reliability checks on the scale. Body mass index (BMI) was calculated using the formula $BMI = \text{weight (kg)} / \text{height}^2 (\text{m}^2)$. Additionally, a trained physician conducted breast physical examinations to determine eligibility, ensuring that only patients without a breast mass were included in the study.

4.9 Data quality control.

A two-day training session was conducted for all data collectors and supervisors. The questionnaire was originally designed in English, translated into Amharic, and then retranslated into English to ensure consistency. Before the actual data collection, a pretest was conducted on 18 participants (5% of the total sample size) at WKUCSH, leading to some necessary modifications based on the findings. The data collection process was closely monitored, with daily checks for questionnaire completeness. During data cleaning, a logical checking technique was applied to identify and correct errors.

4.10 Operational definitions

- Breast cancer in 1st-degree relative; - is women who had sisters or mothers or daughters with breast cancer (18).
- Breast cancer in 2nd-degree relative: breast cancer history in the women close blood relative (18).
- Active smokers: who are current users of tobacco products or have a history of smoking within 6 months (18).
- Passive smokers: whoever has a family or co-worker who smokes a cigarette in their presence sat at a close distance for more than 15 minute (18).
- Physical activity: Physical activity of 150 minutes and less than 150 was considered as heavy, and light physical activity weekly (20).
- Alcohol drinkers: who consume 1 bottle of alcoholic drink every other day (18)..
- Body mass index (BMI) was calculated using the formula $BMI = \text{weight (kg)} / \text{height}^2 (\text{m}^2)$. A BMI of 25.0 or higher indicates overweight or obesity, while a BMI below 18.5 is classified as underweight. The ideal healthy range falls between 18.5 and 24.9 (18).
- Women were considered menopausal if they had not experienced menstruation for one year before the data collection date. Menopause occurring after the age of 55 is classified as late menopause (34).
- Vegetable intake: number of a day eating vegetable in a week (18).
- Fruit intake: number of a day eating fruit in a week (18).

4.11 Data Analysis

Before data entry and cleaning, the dataset was reviewed for completeness and consistency. To ensure accuracy, a double data entry process was conducted using Epi Info version 7.2. Afterward, the data was exported to SPSS version 27.0 for further statistical analysis. Descriptive statistics including frequencies, proportions, and cross-tabulations were used to summarize categorical data, while means and standard deviations were applied to continuous data.

As it is paired data, McNemar's test was performed to evaluate the association between independent variables and breast cancer. Variables with a p-value of ≤ 0.25 in McNemar's test were incorporated into the final conditional logistic regression model. The odds ratio for logistic regression was calculated, along with a 95% confidence interval. A p-value below 0.05 was considered statistically significant. Prior to conducting the actual data analysis, assumptions for conditional logistic regression were checked, and missing values were checked using bar charts. The robustness of the model was assessed through Likelihood ratio test techniques ($p < 0.01$).

4.12 Ethical Consideration

Ethical approval for the study was granted by Addis Ababa University College of Health Sciences and Medicine, School of Public Health. Letter of permission were distributed to each selected university hospitals in South and Central Ethiopia. Participants were provided with a brief explanation of the study's objectives and benefits before giving their informed consent. Written consent was obtained from all participants. Those who chose not to participate or wished to withdraw at any point during data collection were free to do so. To maintain confidentiality and privacy, participant information was anonymized using coded questionnaires throughout the research process.

4.13 Dissemination of the result

The findings of this research will be submitted to the Addis Ababa University, School of Public Health, Department of Epidemiology and Biostatistics. Additionally, the results will be shared with AAU, as well as other governmental and non-governmental organizations within the region and country that may benefit from the study. Furthermore, the study will be published in a scientific journal.

5. Result.

5.1 Socio- demographics Characteristics.

A total of 378 women (189 cases and 189 controls) participated in the study for a response rate of 100%. The mean (SD) age of case and controls were 41.7($\pm$ 11.13) and 41.5($\pm$ 10.8) years. Most of the participants [160(84.7%) cases and 168 (88.9%) controls] were married. A total of 55(29.1%) cases and 48(25.4%) controls have primary education. Above half 106(56.1%) of the cases and 84(44.4%) controls were rural dwellers. Above half 112(59.3%) of the cases and 102(54%) controls get monthly income below 5000ETB. Regarding employment status, 117(61.9%) cases and 103 (54.5%) controls were unemployed (Table 2).

Table 2. Socio-demographic characteristics of the women included in the study in University Hospitals in South and Central Ethiopia regions, 2025.

Variables	Case(n=189)	Control(n=189)	Total(n=378)	P - value
Marital Status				
unmarried	29(15.3%)	21(11.1%)	50(13.3%)	0.27
married	160(84.7%)	168(88.9%)	328(86.7%)	
Educational status				
Cannot read and write	46(24.3%)	44(23.3%)	90(23.8%)	0.88
Primary education	55(29.1%)	48(25.4%)	103(27.2%)	0.35
Secondary education	46(24.3%)	37(19.6%)	83(22%)	0.32
Tertiary education	42(22.3%)	60(31.8%)	102(27%)	

Employment status				
unemployed	117((61.9%)	103(54.5%)	220(58.2%)	0.16
employed	72(38.1%)	86(45.5%)	158(41.8%)	
Monthly income				
>5000ETB	112(59.3%)	102(56%)	214(56.6%)	0.25
<5000ETB	77(40.7%)	87(46%)	164(43.4%)	
Residence				
Rural	106(56.1%)	84(44.4%)	190(50.3%)	0.02
Urban	83(43.9%)	105(55.6%)	188(49.7%)	

5.2 Reproductive health related characteristics.

Among all respondents, 104 (55%) of the cases and 85 (45%) of the controls experienced their first menstrual period before the age of 13 years. Nearly one third 68 (36%) of the cases and 72 (38.1%) of the controls had their first pregnancy between ages 21 and 29. A total of 74(39.2%) cases and 67(35.2%) controls are menopausal. Among cases 25(13.2%) have one or less child, whereas 45(23.8%) of controls have one or less child. In terms of breast feeding, 16(8.5%) of the cases and 17(9%) of controls breast feeds their child more than 48 months. About one fifth, 44(23.3%) of the cases and 47 (24.9%) of the controls had a history of abortion. Twenty five (13.2%) of the cases and 19(10.1%) of the control have family history of breast cancer. More than a quarter 61(32.3%) of the cases and 56(29.6%) of the controls used oral contraceptives (Table 3).

Table 3. Reproductive characteristics of the women included in the study in university hospitals in South and Central Ethiopia regions, 2025.

Variables	Case(n=189)	Control(n=189)	Total(n=378)	P-value
Age of first pregnancy				
≤ 20	68(46%)	57(38.7%)	125(42.5%)	0.72
21 - 29	60(40.8%)	64(43.5%)	124(42.2%)	
≥ 30	19(13.2%)	26(17.8%)	45(15.3%)	
Menopausal status				
premenopausal	115(60.8%)	122(64.5%)	237(62.7%)	0.121
menopause	74(39.2%)	67(35.4%)	141(37.3%)	
Age of menopause				
< 55	64(86.48%)	58(86.56%)	122(86.5%)	0.68
≥ 55	10(13.51%)	9(13.43%)	19(13.5%)	
Parity				
2 and above	128(83.66)	123(73.21%)	251(78.2%)	0.009
1 or less	25(16.34%)	45(26.79%)	70(21.8%)	
Duration of breast feed				
> 48 month	16(10.6%)	17(10.1%)	33(10.3%)	0.8
≤ 48 month	135(89.4%)	152(89.9%)	287(89.7%)	
Abortion history				
No	145(76.7%)	142(75.1%)	287(75.9%)	0.8
Yes	44(23.3%)	47(24.9%)	91(24.1%)	

Family history of breast cancer				
No	164(86.8%)	170(89.9%)	334(88.3%)	
Yes	25(13.2%)	19(10.1%)	44(11.7%)	0.42
Oral contraceptive use				
No	128(67.7%)	133(70.5%)	261(69%)	
Yes	61(32.3%)	56(29.5%)	117(31%)	0.64

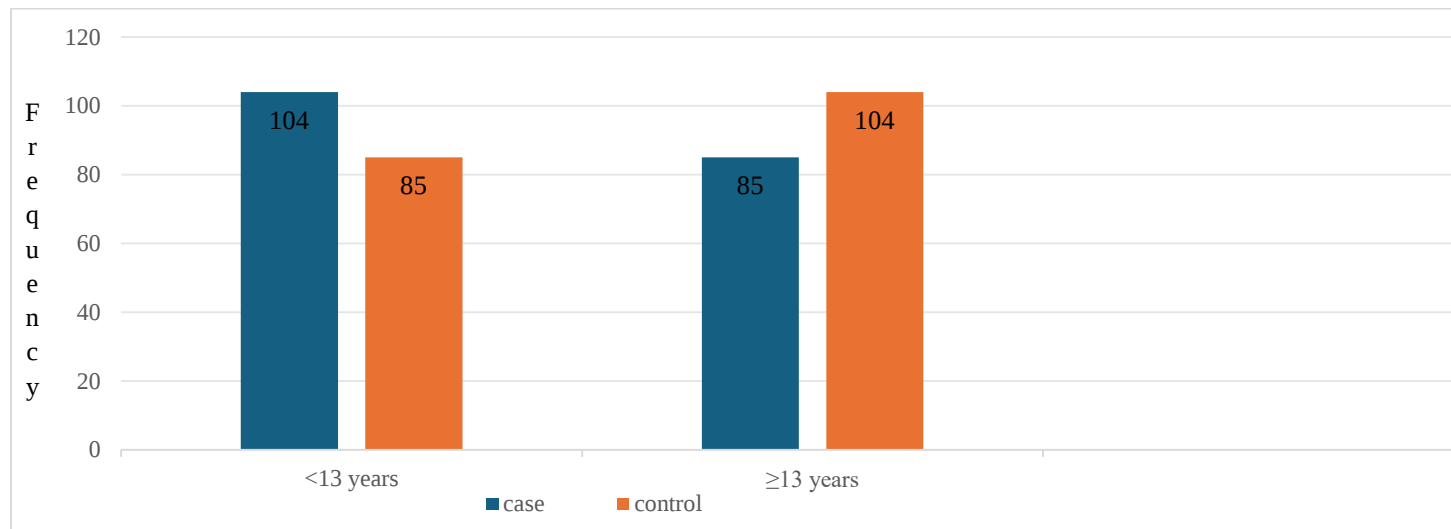


Figure 3. Distribution of women with age at menarche among case and control in university hospitals in South and Central Ethiopia regions, 2025.

5.3 Medical and Environmental related factors.

Of the total respondents, 35(18.5%) of the cases and 27(14.3%) of the controls have pesticide exposure. In total, 44(23.3%) of the cases and 22(11.6%) of the controls have history of breast infection and 22(11.6%) of the cases and 9(4.8%) of the controls had breast trauma. Those who had previous non- cancerous lump were (13.8%) among cases and 13(6.9%) among controls. Almost 3.2% of cases and 2.6% of controls had radiation therapy. Almost one fourth 43(22.8%) of the cases and 41(21.7%) of the controls had history of diabetes (Table 4).

Table 4. Medical and Environmental related factors for breast cancer among women attending University Hospitals in South and Central Ethiopia regions, 2025.

Variables	Case(n=189)	Controls(n=189)	Total(n=378)	P-value
Pesticide exposure				
No	154(81.5%)	162(85.7%)	316(83.6%)	0.33
Yes	35(18.5%)	27(14.3%)	62(16.4%)	
History of breast infection				
No	145(76.7%)	167(88.4%)	312(82.5%)	<0.01
Yes	44(23.3%)	22(11.6%)	66(17.5%)	
History of breast trauma				
No	167(88.4%)	180(95.2%)	347(91.8%)	0.03
Yes	22(11.6%)	9(4.8%)	31(8.2%)	
Previous non-cancerous lamp				
No	163(86.2%)	176(93.1%)	339(89.7%)	0.03
Yes	26(13.8%)	13(6.9%)	39(10.3%)	
Radiation therapy				
No	183(96.8%)	184(97.4%)	367(97.1%)	1
Yes	6(3.2%)	5(2.6%)	11(2.9%)	
History of Diabetes				
No	146(77.2%)	148(78.3%)	292(77.8%)	0.89
Yes	43(22.8%)	41(21.7%)	84(22.2%)	

5.4 Behavioral and dietary factors.

Of the total respondents, 33(17.5%) of the cases and 24(12.7%) of the controls have passive smoking history. Whereas, 10(5.3%) and 2(1.1%) of the cases and controls have history of active smoking. Almost one fifth 35(18.5%) of the cases, and 20(10.5%) of the controls drunk alcohol. One fourth 49(25.9%) of the cases and 29(15.3%) of the controls have BMI more than 25 kg/m². In terms of physical activity 148(78.3%) of the cases and 159(84.1) of the controls were physical active. Regarding vegetable intake, 79(41.8%) of the cases and 107(56.6%) of the controls using vegetables once or less a week. Whereas, 116(61.4%) Of the cases and 111(58.7%) of the controls take fruit once or less a week. Above half 106(56.1%) of the cases and 86(45.5%) of the controls was taking solid oil. While, 87(46%) of the cases and 68(36%) of the controls was taking packed foods (Table 5).

Table 5. Behavioral risk factors for breast cancer among women attending university hospitals in South and Central Ethiopia regions, 2025.

Variables	Case(n=189)	Control(n=189)	Total(n=378)	P-value
Passive smoking				
No	156(82.5%)	165(87.3%)	321(85%)	0.2
Yes	33(17.5%)	24(12.7%)	57(15%)	
Alcohol use				
No	154(81.5%)	169(89.4%)	323(75.4%)	0.04
Yes	35(18.5%)	20(10.6%)	55(14.6%)	
Active smoking				
No	179(94.7%)	187(98.9%)	366(96.8%)	0.04
Yes	10(5.3%)	2(1.1%)	12(3.2%)	

BMI				
18.5-24.9 kg\m2	21(11.1%)	2(1.1%)	23(6.1%)	
≤18.49 kg\m2	119(62.9%)	158(83.6%)	277(73.3%)	<0.01
≥25kg\m2	49(26%)	29(15.4%)	78(20.6%)	0.02
Physical active				
No	41(21.7%)	30(15.9%)	71(18.8%)	
Yes	148(78.3)	159(84.1%)	307(81.2%)	0.17
Intensity of physical activity				
Heavy(≥150minute)	65(43.9%)	89(54.7%)	153(49.5%)	
Light(<150minute)	83(56.1%)	72(45.3%)	155(50.5%)	0.02

Table 6. Dietary related risk factors among women attending University Hospitals in South and Central Ethiopia regions, 2025.

Variables	Case(n=189)	Control(n=189)	Total(n=378)	P-value
Vegetable intake				
Two and above	82(43.4%)	110(58.2%)	192(50.8%)	
Once or less	107(56.6%)	79(41.8%)	186(49.2%)	0.02
Fruit intake				
Two and above	73(38.6%)	78(41.3%)	151(39.9%)	
Once or less	116(61.4%)	111(58.7%)	227(60.1%)	0.67
Use of solid oil				
No	83(43.9%)	103(54.5%)	186(49.2%)	
Yes	106(56.1%)	86(45.5%)	192(50.8%)	0.04

Intake of packed food				
No	102(54%)	121(64%)	223(59%)	
Yes	87(46%)	68(36%)	155(41%)	0.2

5.6 Clinical profile of breast cancer.

From the total patients, 55.5% was diagnosed with late-stage diagnosis. 35.4% had breast cancer with T1 tumor size involved, 29.6% have N2 lymph node involved and 41.8% diagnosed with breast cancer having distant metastasis (Table 7).

Table 7. Clinical profile for breast cancer among women attending University Hospitals in South and Central Ethiopia regions, 2025.

Variables	Frequency
Stage	
Stage I	28(14.9%)
Stage II	56(29.6%)
Stage III	63(33.3%)
Stage IV	42(22.2%)
Tumor size	
T0	15(7.9%)
T1	47(24.9%)
T2	67(35.4%)
T3	43(22.8%)
T4	17(9%)

Lymph node involved	
N0	60(31.8%)
N1	58(30.7%)
N2	56(29.6%)
N3	15(7.9%)
Metastasis	
M0	63(35.2%)
M1	79(41.8%)
Mx	47(23%)

5.7. Factors associated with breast cancer.

McNemar's test revealed significant associations between breast cancer (BC) and multiple factors, including educational status, employment, residence, age at menarche, parity, history of breast infection and trauma, presence of previous non-cancerous lumps, passive smoking, alcohol consumption, active smoking, BMI, physical activity and its intensity, vegetable intake, use of solid oil, and consumption of packed food.

However, conditional logistic regression analysis identified employment status, age at menarche, parity, intensity of physical activity, solid oil consumption, and packed food intake as independent risk factors for BC. Unemployed women faced nearly three times higher odds of developing BC compared to employed women within matched pairs (AOR 3.26, 95% CI: 1.10-9.6). Women who experienced menarche before age 13 were 6.4 times more likely to develop BC than those who had menarche after age 13 within matched pairs (AOR 6.4, 95% CI: 1.94-12.34). Women engaging in light physical activity had four times higher odds of developing BC compared to those performing heavy physical activity within matched pairs (AOR 4.16, 95% CI: 1.32-9.2). The odds of BC were 2.9 times higher among women who consumed solid oil than

among those who did not consumed solid oil within matched paires (AOR 2.91, 95% CI: 1.11-8.66). Similarly, women who consumed packed food had 3.5 times greater odds of developing BC compared to those who did not consumed packed food within matched pairs (AOR 3.48, 95% CI: 1.12-10.9). On the other hand, women with two or more children had a 33% lower risk of developing BC compared to women with one or fewer children within matched pairs (AOR 0.33, 95% CI: 0.07-0.9).

Table 8. McNamara and Conditional logistic regression analysis of factors associated with breast cancer among women attending the University Hospitals in South and Central regions of Ethiopia, 2025.

Variable			COR(CI)	AOR(CI)	P- value for AOR
Controls (n=189)	Case(n=189)				
Employment status	Employed	Unemployed	2.1(0.9-2.3)	3.26(1.10-9.6)	0.04
Employed	41	63			
unemployed	31	55			
Residence	Urban	rural	1.7(1.1-2.8)	1.4(0.4-4.6)	0.58
Urban	47	58			
Rural	36	48			
Age at menarche	≥13 years	<13 years	1.6(1.01-2.4)	6.4(1.94-12.34)	<0.01
≥13 years	49	55			
<13 years	36	49			

Menopausal status	Premenopausal	Menopause			
Premenopausal	111	11	2.4(0.8-11.8)	4.97(0.4-68.05)	0.23
Menopause	4	63			
Parity	2 and above	1 or less			
2 and above	100	14	0.4(0.17-0.9)	0.33(0.07-0.9)	0.03
1 or less	35	40			
History of Breast infection	No	Yes			
No	124	43	2.05(1.18-3.63)	1.5(0.45-4.8)	0.53
Yes	21	1			
History of Breast trauma	No	Yes			
No	157	21	2.44(1.08-6.03)	5.6(0.65-48.03)	0.12
Yes	10	1			
Previous non-cancerous lamp	No	Yes			
No	154	22	2.44(1.08-6.03)	0.5(0.06-4.5)	0.54
Yes	9	4			
Passive smoking	No	Yes			
No	140	25	1.56(0.8-3.13)	4.4(0.85-22.8)	0.08
Yes	16	8			

Alcohol drunk	No	Yes			
No	137	32	4.1(1.07-46.9)	1.67(0.44-6.3)	0.45
Yes	17	3			
Active smoking	No	Yes			
No	177	10	4.08(1.06-46.93)	0.64(0.04-9.8)	0.75
Yes	2	0			
BMI	18.5-24.9kg\m2	≤18.49kg\m2			
18.5 – 24.9 kg\m2	166	21	10.5(2.46-44.78)	4.6(0.32-65.9)	0.27
≤18.49kg\m2	2	0			
BMI	18.5-24.9 kg\m2	≥25kg\m2			
18.5-24.9 kg\m2	121	40	1.87(1.10-3.25)	0.7(0.22-2.23)	0.55
≥25kg\m2	21	7			
Intensity of physical activity	heavy	light			
heavy	42	34	1.26(0.77-2.09)	4.16(1.32-9.2)	0.01
light	28	25			
Vegetable intake	Two and above	Once or less			
Two and above	54	56	1.78(0.72-2.95)	1.99(0.66-6.02)	0.22
Once or less	28	51			

Intake of solid oil	No	Yes			
No	52	51	1.57(1.01-2.47)	2.91(1.11-8.66)	0.045
Yes	31	55			
Use of packed food	No	Yes			
No	75	57	1.35(0.87-2.47)	3.48(1.12-10.9)	0.031
Yes	27	30			

6. Discussion.

This study explores breast cancer risk factors among women seeking care at university hospitals in the South and Central regions of Ethiopia. The findings indicate that employment status, age at menarche, parity, physical activity intensity, consumption of solid oil, and intake of packed food are key factors associated with breast cancer.

The study showed that unemployment was significantly associated with breast cancer. This is consistent with the study conducted in Addis Ababa (18), and Bangui (31) that showed being unemployed significantly associated with breast cancer. However, one study conducted in India showed that occupation is not significantly associated with breast cancer (40). This might be due to difference in economic structure and access to health care that mitigate the impact of being unemployed. The most recognized risk factors for breast cancer are associated with reproductive health. Our study revealed that women who experienced menarche before the age of 13 had a higher likelihood of developing breast cancer. This finding aligns with research conducted in Addis Ababa, which demonstrated a significant correlation between age at menarche and breast cancer risk.(18). The study from Afghanistan (33) and Morocco also identified that age at menarche is significantly associated with breast cancer (17). This could be attributed to a woman's breast cancer risk being influenced by estrogen and progesterone produced by her ovaries, known as endogenous hormones. Prolonged exposure or elevated levels of these hormones have been associated with an increased likelihood of developing breast cancer. However, research conducted in Bangalore found no significant link between age at menarche and breast cancer risk (20). This difference may be due to variation in genetic predisposition among population and difference in life style and environmental factors that may influence how the hormone changes related to menarche affect breast cancer risk.

The study revealed a significant association between parity and breast cancer risk, showing that women with two or more children have a 33% lower likelihood of developing breast cancer compared to those with fewer or no children. This finding aligns with research conducted in Addis Ababa, which also indicated that women with fewer or no children face an increased risk of breast cancer(8). Other studies conducted in Vietnam also support this finding (10). While, other study conducted in Addis Ababa show there is no significant association between parties and breast cancer (18). This finding also supported by the studies conducted in India which show there is no significant association between number of children and breast cancer (41). This

difference may be due to statistical methods used or may be due to variation among participants selected for the study.

Our study found that women who engage in low levels of physical activity face a higher risk of developing breast cancer. This aligns with findings from research conducted in Addis Ababa, which reported that women with high levels of physical exercise have an 80% lower risk of breast cancer compared to those with low physical activity (18). Study from UK also showed that physical activity was related with a reduction in breast cancer risk (42). This is may be due to exercise reduce the level of estrogen and other hormone and decrease the likelihood of excess fat which contribute to breast cancer development.

The study identified solid oil consumption as a significant risk factor for breast cancer, with findings showing a higher risk among individuals who reported using solid oil. This conclusion is supported by research conducted in Addis Ababa, which determined that the odds of developing breast cancer were 6.7 times greater among women who consumed solid oil (18). Since saturated fat may contain additional elements that contribute to an increased risk of breast cancer, this association has been supported by studies conducted in China. Similarly, research in the United States has revealed a significant link between saturated fat consumption and a higher risk of developing breast cancer. Additionally, the study found that the use of packaged foods was strongly associated with breast cancer risk. Women who consumed packaged foods or drinks had an almost 3.5 times higher likelihood of developing breast cancer compared to those who did not. This finding is further supported by a study in Addis Ababa, which indicated that women who consumed packaged foods were three times more likely to be diagnosed with breast cancer (8). This finding aligns with studies conducted in Iran, which also identified a significant association between the consumption of packaged foods and an increased risk of breast cancer (43). This may be due to the presence of certain substances that could substantially elevate the overall risk of cancer, including breast cancer.

This study found that most of the women with breast cancer were diagnosed at late-stage. Around 56% of the women with breast cancer were diagnosed at late-stage. And this finding was comparable to the study conducted in southern Ethiopia which finds 12.2% of the women were diagnosed with stage IV breast cancer, 57.4% with stage III breast cancer (44). Other study

conducted in Addis Ababa also show 57% of the women were diagnosed at stages III and IV(45). This finding was also comparable to the studies conducted in South Africa which find about 50% and 55% of the breast cancer incidence was diagnosed at late stage (32). Unlike other studies, the study conducted in Addis Ababa, showed that the majority of patients 56(59%) of patients presented with early stage of breast cancer (46). This may be due to low awareness and limited healthcare access in rural part of the country. This study also found that around 42% of the women were diagnosed with breast cancer having distant metastasis.

6.1. Strength and limitation.

The strengths of this study included the use of a matched case control study and use of matched analysis which make groups comparable. As a multi-center study it also ensures to some extent the external validity of the findings. The possible study limitations might be the recall bias in relation to the past exposure assessment.

6.2. Conclusion.

This study found several key factors influencing the risk of breast cancer, including employment status, age at menarche, number of children (parity), physical activity levels, solid oil consumption, and packaged food intake. To mitigate this risk, robust preventive measures are essential. Increasing awareness at the community level can encourage women to adopt healthier lifestyles, focusing on nutritious diets and regular physical exercise, which may help lower their chances of developing breast cancer. Moreover, enhancing early detection and screening efforts starting from primary healthcare facilities can improve timely identification and referral of breast cancer cases, ultimately leading to better outcomes and reduced mortality rates.

6.3 Recommendations.

This research carries significant finding that provides a critical foundation for developing targeted interventions aimed at reducing the incidence of breast cancer among women. By identifying key risk factors such as use of solid oil, physical activity levels, and use of packed food. For patients, these findings offer an opportunity for informed decision-making regarding lifestyle choices and proactive health measures. Physicians can integrate this evidence into comprehensive risk assessment models, enabling more effective prevention strategies and enhanced early detection protocols. Policymakers, meanwhile, can utilize this research to inform national cancer control initiatives, strengthen public awareness campaigns, and improve the accessibility of healthcare services for timely diagnosis. Addressing these modifiable risk factors through structured health education programs and behavioral change interventions is essential in mitigating breast cancer risks and advancing public health outcomes.

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1.1 Participant Information Sheet (English version)

Introduction

Good morning /Afternoon, my name is Mr. / Ms. _____ I am working as a data collector for the Master of Public Health Student Project at Addis Ababa University. We are conducting research entitled “Risk Factors of Breast Cancer among Women attending the University Hospitals of South and Central Ethiopia”

Purpose of the study: The purpose of this study is to identify the risk factors of breast cancer.

Benefits: While there may be no direct benefit to you, the information you provide will help us to identify risk factors for breast cancer and it may also benefit all other women with breast cancer.

Risks: I may ask you questions regarding the risk factors of breast cancer, which may be personal or potentially uncomfortable. However, your responses are valuable to this research, and you may choose to skip any question you are not comfortable to answer.

Procedures: If you agree to participate, you will be asked to answer questions related to the study and some personal information. The interview is expected to take approximately 20 minutes of your valuable time, and we greatly appreciate your cooperation.

Voluntary Participation: Your participation is entirely voluntary. You have the right to choose not to take part in this study. You are free to decline or withdraw from study at any time without any consequences or penalties. If you choose to participate but later decide to stop, you are free to do so at any time.

Confidentiality: Your information will be kept strictly confidential. We will use codes rather than names and your name will not be written on this form and will never be mentioned in the report either then all data will be securely stored and accessible only to the research team. The data will not be used for any purpose other than this study.

Whom to Contact: I hope I have clarified the purpose of the study and if you have any questions that are not clear for you about the study you are welcome to ask me at any time. If you need any further information or explanation regarding this study, you can contact the principal investigator of this study. Here is his contact in detail:

Name of the investigator: Amanuel Gezahagn
Phone No: +251904764958
Email: gezahagnamanuel531@gmail.com)

1.2 Consent form

I understand the purpose of this study and have been provided with information about the research. This study has been explained to me in a language I understand, and I have had the opportunity to ask questions which have been answered to my satisfaction. I consent voluntarily to participate in the study, and I understand that my participation is voluntary and that I have the right to withdraw from the study at any time without any consequences.

Are you willing to participate in this study?

1. Yes ----- Continue to the next page

2. No ----- Skip to the next participant

Participant

Signature_____ Date_____

Interviewer

Name_____ Signature_____

Questionnaires number_____

Date of interview _____ starting time _____ Completed time_____

Questionnaire in an English version

**A questionnaire prepared by Addis Ababa University College of Medicine and Health Science
Department of Epidemiology and Biostatistics on risk factors of breast cancer among women
attending selected University hospitals in South and Central Ethiopia.**

Part 1: Questioners that will be used to assess Socio-demographic Variables.

S/No	Questions	Response
------	-----------	----------

1	How old are you?	-
2	What is your marital status?	1. unmarried 2. Married
3	What is your educational status?	1. illiterate 2. litrate
4	What is your employment status?	1. employed 2. unemployed
5	What is the monthly income of the family (Ethiopian birr)?	1. <5000ETB 2. ≥5000ETB
6	Where is your Residence?	1. Urban 2. Rural

Part 2: Questioners that will be used to assess the reproductive factors.

S/NO	Question	Response
1	What is your Age at menarche?	1. <13 2. ≥13
2	What is your Age at first pregnancy?	1. ≤20 2. 21-29 3. ≥30
3	What is your Age at menopause in years?	1. <55 2. ≥55
4	What is the total duration you lactate your child?	1. ≤48 months 2. >48 months
5	Do you have a history of abortion?	1. Yes 2. No
6	Do you have a Family with a history of breast cancer?	1. Yes 2.No
7	Do you have a history of oral contraceptive use previously?	1. Yes 2.No
8	How many children do you have?	1. 1 or less 2. 2 and above

Part 3 **Questioners that will be used to assess environmental and medical factors.**

No	Question	Response
1	Do you have a history of Pesticide exposure?	1. Yes 2.No
2	Do you have a history of breast infection?	1. Yes 2.No
3	Do you have a history of breast trauma?	1. Yes 2.No
4	Do you have a Prior history of breast surgery for a non-cancer lump?	1. Yes 2.No
5	Do you have a history of radiation therapy?	1. Yes 2.No
6	Do you have a history of Diabetes?	1. Yes 2.No

Part 4. Questionnaire that will be used to assess behavioral and lifestyle factors.

No	Question	Response
1	Have you ever been exposed to others smoking a cigarette at home or in the workplace for at least 15 minutes?	1. Yes 2.No
2	Have you ever drunk an alcohol?	1. Yes 2.No
3	Do you smoke cigarettes, or have you ever smoked cigarettes within the last six months?	1. Yes 2.No
4	BMI	1. ≤ 18.49 2. $18.5-24.99 \text{ Kg/m}^2$ 3. $\geq 25 \text{ Kg/m}^2$
5	Physical activities	
	Does your work involve carrying or lifting loads, digging or construction work, cleaning the house, washing without a washing machine, and brisking walking for at least 10 minutes continuously?	Yes No
	If yes to the above question, in a typical week, how many days do you do as part of your work?	Number of days
	How much time do you spend doing the task at work	Hours minute

	on a typical day?	
	Do you use walking to work, shopping, to market, to place of worship for at least 10 minutes continuously to get to and from places?	Yes No
	If yes to the above question, in a typical week, on how many days do you walk for at least 10 minutes continuously to get to and from places?	Number of days
	How much time do you spend walking for travel on a typical day?	Hours minute
	Do you do any sports, fitness, or recreational (leisure) activities like running, brisk walking, and others for at least 10 minutes continuously?	Yes No
	If yes to the above question, in a typical week, on how many days do you do the activities for at least 10 minutes continuously to get to and from places?	Number of days
	How much time do you spend doing the activities?	Hours minute
	How much time do you usually spend sitting with friends, watching television, or reclining on a typical day? It does not include sleeping time.	Hours minute
	What is the total intensity of physical activity in a week?	Light (less than 150 minutes) Heavy (greater than 150 minutes)
6	Diet	
	How many times do you take vegetables a week?	1. Once or less a week 2. More than once a week
	How many times do you take Fruit in a week?	1. Once or less a week 2. More than once a week

	Do you take an intake of solid oil?	1. Yes 2.No
	Do you take an intake of packed food?	1. Yes 2.No

Part 5: Questioners that will be used to assess the clinical profile of the participants.

No	Questions	response
1	What is the Stage during diagnosis?	A. 0 stage B. Stage I C. Stage II D. Stage III E. Stage IV F. Unknown
2	What is the primary tumor size during diagnosis?	A. T0 B. T1 C. T2 D. T3 E. T4 F. unknown

3	Lymph node involved	A. N0 B. N1 C. N2 D. N3 E. unknown
4	Distant metastasis during diagnosis	A. M0 B. M1 C. unknown

መጠይቅ በአማርኛ እትም

1.1 የተሳታፊ መረጃ ወረቀት (አማርኛ ትርጉም)

መግቢያ

እንደ ምን አደሩ/አመሹ ስሜ አቶ / ወይዘሮ _____ በአዲስ አበባ ዩኒቨርሲቲ የህብረተሰብ ጤና ተማሪዎች ፕሮጀክት ማስተባበሪያ መረጃ ሰብሳቢ ሆኜ እየሰራሁ ነው። " በደቡብ እና በመካከለኛው ኢትዮጵያ በተመረጡ የዩኒቨርሲቲ ሆስፒታሎች ውስጥ የምከታተሉ ሴቶች ላይ ለጡት ካንሰር የሚያጋልጡ ሁኔታዎች" በሚል ርዕስ ምርምር እያደረግን ነው።

የጥናቱ ዓላማ- የዚህ ጥናት ዓላማ ለጡት ካንሰር የምያጋልጡ ሁኔታዎችን ለመለየት ነው።

ጥቅሞች፡- ምንም እንኳን ለእርስዎ ምንም ቀጥተኛ ጥቅም ላይኖር ቢችልም የምታቀርቧቸው መረጃዎች እኛን ለካንሰር የምያጋልጡ ነገሮችን ለመለየት ያስችለናል በተጨማሪም ለሎች በጡት ካንሰር የተያሰሩትን ልጠቅም ይችላል።

አደጋዎች፡- ስለ ካንሰር ምርመራ እና ስለምያደርኩት የሕክምና ተሞክሮ ጥያቄዎች ልጠይቁት እችላለሁ እሱም በግል ወይም በቀጥተኛ ላይመሹት ይችላል። ይሁን እንጂ የእርስዎ ምላሾች ለዚህ ጠቃሚ ናቸው።

ሂደቶች፡- ተሳትፎ ለማድረግ ከተስማሙ ከጥናቱ ጋር የተያያዙ ጥያቄዎችንና አንዳንድ የግል መረጃዎችን እንድንመልሱ ይጠየቃሉ። ቃለ ምልልሱ እስከ 20 ደቂቃ ያህል ውድ ጊዜ ይወስዳል ተብሎ ይጠበቃል። ስለ ትብብሮት በእጅጉ እናመሰግናለን።

በፍቃደኝነት ተሳትፎ፣ የእርስዎ ተሳትፎ ሙሉ በሙሉ በፈቃደኝነት ነው። በዚህ ጥናት ላለመካፈል የመወሰን መብት አለዎት ። ምንም ዓይነት መዘዝ ወይም ቅጣት ሳያስከትል በማንኛውም ጊዜ ከጥናቱ የመውጣት ወይም የመውጣት ነፃነት አለዎት ። ተሳትፎ ለማድረግ ከወሰኑ በኋላ ግን ለማቆም ከወሰኑ በማንኛውም ጊዜ ይህን ለማድረግ ነፃ ነዎት።

ማን ጋር ይገናኛሉ? የጥናቱን ዓላማ ግልጽ እንዳደረግሁ ተስፋ አደርጋለው እና ስለጥናቱ በተመለከተ ማንኛውም ያልገባዎት ወይም ጥያቄ መጠየቅ ከፈለኩ በማንኛውም ጊዜ መጠየቅ ይችላሉ። ይህን ጥናት በተመለከተ ተጨማሪ መረጃ ወይም ማብራሪያ ካስፈለገዎት የዚህን ጥናት ዋና መርማሪ ማነጋገር ይችላሉ ። በዝርዝር ማግኘት የምችሉበት ሁኔታ የሚከተለው ነው፡-

የአጥኝው ስም፡ አማኑኤል ገዛሦኝ
ስልክ ቁጥር፡ +251904764958
ኢሜይል gezahagnamanuel531@gmail.com)

1.2 የስምምነት ቅጽ

የዚህን ጥናት ዓላማ ተረድቻለውም ስለ ምርምሩ መረጃ ተሰጥቶኛል። ይህ ጥናት መረዳት በምችለው ቋንቋ ተገልጾልኛል። ጥያቄዎች የመጠየቅ አጋጣሚ አግኝቼአለሁ እነሱንም አጥጋብ በሆነ መልኩ ተመልሶልኛል። በጥናቱ ለመሳተፍ በፈቃደኝነት እስማማለሁ፤ እንዲሁም ተሳትፎ በፈቃደኝነት እንደሆነና ምንም ዓይነት መዘዝ ሳይደርስብኝ በማንኛውም ጊዜ ከጥናቱ የመውጣት መብት እንዳለኝ ተገንዝቤያለሁ።

በዚህ ጥናት ለመካፈል ፈቃደኛ ነዎት?

1. አዎ ----- ወደ ቀጣዩ ገጽ ይቀጥሉ

2. አይደለሁም ----- ወደ ቀጣይ ተሳታፍ አለፍ

ተሳታፊ

ፊርማ _____ ቀን _____

ቃለ ምልልስ ጠያቅ

ስም _____ ፊርማ _____

የጥያቄዎች ቁጥር _____

የቃለ መጠይቅ ቀን _____ መነሻ ሰዓት _____ ተጠናቀቀ _____

መጠይቅ በአማርኛ እትም

በአዲስ አበባ ዩኒቨርሲቲ ህክምና እና ጤና ሳይንስ ኮሌጅ የኤፒዲሚዮሎጂ እና ባዮስታቲስቲክስ ትምህርት ክፍል በደቡብ እና በመካከለኛው ኢትዮጵያ በተመረጡ የዩኒቨርሲቲ ሆስፒታሎች ውስጥ የምክታተሉ ሴቶች ላይ ለጡት ካንሰር የሚያጋልጡ ሁኔታዎችን አስመልክቶ የተዘጋጀ መጠይቅ።

ክፍል 1: የሶሺዮ-ዲሞግራፊ ተለዋዋጮችን ለመገምገም የሚያገለግል መጠይቅ።

ተ/ቁ	ጥያቄዎች	ምላሽ
1	እድመዎት ስንት ነው?	-
2	የጋብቻ ሁኔታዎ እንዴት ነው?	1. ያላገባ 2. ያገባ
3	የትምህርት ደረጃዎ ምን ያህል ነው?	1. ተማር 2. ይልተማር
4	ሥራዎት ምንድን ነው?	1. የግል ስራ 2. ተቀጣሪ
5	የቤተሰቡ ወርሃዊ ገቢ ስንት ነው (በኢትዮጵያ ብር)?	1. <5000 (የኢትዮጵያ ብር) 2. ≥5000 (የኢትዮጵያ ብር)

6	መኖሪያዋ የት ነው?	1.ከተማ 2.ገጠር
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ክፍል 2፡ የመራቢያ ሁኔታዎችን ለመገምገም የሚያገለግሉ ጥያቄዎች።

ተ/ቁ	ጥያቄዎች	ምላሽ
1	የወር አበባ ማየት የጀመሩት ወቅት ዕድሜዎ ስንት ነው?	1. <13 2. ≥13
2	የመጀመሪያ እርግዝናዎት በስንት ዕድሜዎ ነው?	1. ≤20 2. 21-29 3. ≥ 30
3	የወር አበባ ያቆሙት ጊዜ ዕድሜዎ ስንት ነው?	1. <55 2. ≥55
4	ልጅዎን የሚያጠቡት አጠቃላይ የቆይታ ጊዜ ስንት ነው?	1. ≤48 ወራት 2. >48 ወራት
5	ከዝህ በፍት ጽንጽ ተቋርጦት ያውቃሉ?	1.አዎ 2.አይ
6	የጡት ካንሰር ህመምትኛ ቤተሰብ አለዎት?	1.አዎ 2.አይ
7	ከዚህ ቀደም በአፍ የምወሰደው የወሊድ መከላከያ ተጠቅመው ያውቃሉ?	1.አዎ 2.አይ
8	ስንት ልጆች አሉዎት?	1. 1 ወይም ያነሰ 2. 2 እና ከዚያ በላይ

ክፍል 3 የአካባቢ እና የህክምና ሁኔታዎችን ለመገምገም የሚያገለግሉ ጥያቄዎች።

ተ/ቁ	ጥያቄዎች	ምላሽ
1	ከዝህ በፍት ለፀረ-ተባይ ንክኪ ተጋልጠው ያውቃሉ?	1.አዎ 2.አይ
2	የጡት ኢንፌክሽን ታመው ያውቃሉ?	1.አዎ 2.አይ
3	ከዝህ በፍት ጡቶት ላይ አደጋ ደርሶበት ያውቃል?	1.አዎ 2.አይ
4	ካንሰር ላልሆነ እብጠት የጡት ቀዶ ጥገና አድርገው ያውቃሉ?	1.አዎ 2.አይ
5	የጨረር ሕክምና ተደርገው ያውቃሉ?	1.አዎ 2.አይ
6	የስኳር በሽታ ታሪክ አለዎት?	1.አዎ 2.አይ

ክፍል 4. የባህሪ እና የአኗኗር ሁኔታዎችን ለመገምገም የሚያገለግል መጠይቅ

ተ/ቁ	ጥያቄዎች	ምላሽ
1	ለሎች ሰዎች ሲጋራ ስያጨሉ በተዘዋዋር ለጭሉ ተጋልጠው ያውቃሉ?	1.አዎ 2.አይ
2	የአልኮል መጠጦችን ጠጥተው ያውቃሉ?	1.አዎ

		2.አይ
3	ከዝያ በፍት ወይ ባለፉት ስድስት ወራት ውስጥ ሲጋራ አጨስዎ ያውቃሉ?	1.አዎ 2.አይ
4	BMI	1. $\leq 18.49 \text{Kg/m}^2$ 2. $18.5-24.99 \text{Kg/m}^2$ 3. $\geq 25 \text{Kg/m}^2$
5	አካላዊ እንቅስቃሴ	
	ሥራህ ሽክሞችን መሸከም ወይም ማንሳት፣ መቆፈር ወይም የማንባታ ሥራ መሥራት፣ ቤት ማጽዳት፣ ያለ ማጠቢያ ማሸን መታጠብና ቢያንስ ለ10 ደቂቃ ያህል በፍጥነት በእግር መጓዝን ይጨምራል?	1.አዎ 2.አይ
	ከላይ በተገለጸው ጥያቄ ላይ አዎን የሚል ከሆነ በሳምንት ውስጥ በሥራህ ውስጥ ስንት ቀን ትሠራለህ?	የቀን ብዛት
	በአንድ የተለመደ ቀን በሥራ ቦታህ ሥራውን በማከናወን ምን ያህል ጊዜ ታሳልፋለህ?	ሰዓት ደቂቃ
	ወደ ሥራ፣ ወደ ገበያ፣ ቢያንስ ለ10 ደቂቃ ወደ አምልኮ ቦታ በእግር በመሄድ ወደ ቦታዎች ና ከቦታ ቦታ ለመድረስ ትጠቀማለህ?	1.አዎ 2.አይ
	ከላይ ለተነሳው ጥያቄ አዎ ከሆነ፣ በሳምንት ውስጥ፣ ወደ ቦታዎች ለመድረስና ለመድረስ ቢያንስ ለ10 ደቂቃ ያህል ያለማቋረጥ በእግራችሁ የምትሄዱት ስንት ቀን ነው?	የቀን ብዛት

	በአንድ የተለመደ ቀን በእግር ለመጓዝ ምን ያህል ጊዜ ታጠፋለህ?	ሰዓት ደቂቃ
	ስፖርት፣ የአካል ብቃት፣ ወይም የመዝናኛ (መዝናኛ) እንቅስቃሴዎች እንደ ሩጫ፣ በፍጥነት የእግር ጉዞ፣ እና ሌሎችንም ቢያንስ ለ 10 ደቂቃዎች ያለማቋረጥ ታደርጋለህ?	1.አዎ 2.አይ
	ከላይ በተጠቀሰው ጥያቄ ላይ አዎ ከሆነ፣ በሳምንት ውስጥ፣ ወደ ቦታዎች ለመድረስና ለመድረስ ቢያንስ ለ10 ደቂቃ ያህል ያለማቋረጥ እንቅስቃሴውን ታደርጋለህ?	የቀን ብዛት
	በዚህ ሥራ ምን ያህል ጊዜ ታሳልፋለህ?	ሰዓት ደቂቃ
	አብዛኛውን ጊዜ ከጓደኞችህ ጋር ቁጭ ብለህ ቴሌቪዥን በመመልከት ወይም በቀን ውስጥ በመቀመጥ ምን ያህል ጊዜ ታሳልፋለህ? የእንቅልፍ ጊዜንም አይጨምርም ::	ሰዓት ደቂቃ
	በሳምንት ውስጥ ያለው የአካል ብቃት እንቅስቃሴ ምን ያህል ነው?	ቀላል (ከ150 ደቂቃ በታች) ከባድ (ከ150 ደቂቃ በላይ)
6	አመጋገብ	
	በሳምንት ስንት ጊዜ አትክልቶችን ይወስዳሉ?	1.በሳምንት አንድ ጊዜ ወይም ያነሰ 2.በሳምንት ከአንድ ጊዜ በላይ
	በሳምንት ውስጥ ስንት ጊዜ ፍሬፍረ ይወስዳሉ?	1.በሳምንት አንድ ጊዜ ወይም ያነሰ 2.በሳምንት ከአንድ ጊዜ በላይ
	ጠጣር ዘይት ይጠቀማሉ?	1.አዎ 2.አይ

	የታሸገ ምግብን ይጠቀማሉ?	1.አዎ 2.አይ
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ክፍል 5: የተሳታፊዎቹን ክሊኒካዊ ፕሮፋይል ለመገምገም የሚያገለግል ጥያቄ።

ተ/ቁ	ጥያቄዎች	ምላሽ
1	በምርመራው ወቅት ካንሰሩ ያለው ደረጃ?	A. ደረጃ 0 B. ደረጃ I C. ደረጃ II D. ደረጃ III E ደረጃ IV F. ያልታወቀ
2	በምርመራ ወቅት የመጀመሪያ ደረጃ ዕጢ መጠን?	A. T0 B. T1 C. T2 D. T3 E. T4 F. ያልታወቀ
3	ካንሰሩ ምን ያህል የሊንፍ ኖዶችን ያካተተ ነው	A. NO B. N1 C. N2 D. N3

		E. ያልታወቀ
4	በምርመራው ወቅት የኢትዮጵያ ሚኒስቴር ደረጃ?	A. M0 B. M1 C. ያልታወቀ

