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Seroprevalence and risk factors of HBV, HIV and syphilis infections Among Pregnant women attending at Gandhi Memorial Hospital, Addis Ababa, Ethiopia.

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This is to certify that the dissertation prepared by Tamerat Messele entitled: seroprevalence and risk factors of HBV, HIV and syphilis among pregnant women attending at Gandhi memorial Hospital Addis Ababa, Ethiopia. 2021 and submitted in partial fulfillment of the requirements for the degree "Master of science in clinical laboratory sciences (Diagnostic and public Health Microbiology)"department of medical laboratory sciences complies with regulations of the university and meets the accepted standards with respect to originality and quality.

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Abbreviations

AAU	Addis Ababa University
AIDS	Acquired immunodeficiency syndrome
ANC	Antenatal clinic
ART	Anti-Retroviral Treatment
AIDS	Acquired Immune Deficiency Syndrome
CDC	Centre for disease control
DNA	Deoxyribonucleic Acid
DRERC	Departmental Research and Ethical Review Committee
ELISA	Enzyme-Linked Immune Sorbent Assay
EPI	Expanded Programmed On immunization
EQA	External Quality Assessment
HIV	Human Immunodeficiency Virus
HBV	Hepatitis B Virus
HBsAg	Hepatitis B Surface Antigen
TP	Trepanemal Palladium
RNA	Ribonucleic Acid
ANC	Antenatal Care
MSC	Master of Science
MTCT	Mother to Child Transmission
PID	Pelvic Inflammatory Disease
PMTCT	Prevention of Mother-To-Child Transmission
PREP	Pre-Exposure Prophylaxis
WHO	World Health Organization

Abstract

Background: HIV, viral hepatitis, and Syphilis infection among pregnant women have a serious outcome on maternal and newborn baby in worldwide. Sexually transmitted infections cause considerable morbidity worldwide, especially among women. and as hidden epidemics of tremendous health and economic consequence in the world.

Objective: to determine Seroprevalence & risk factors of HIV, HBV, and Syphilis Infection among pregnant women attending Gandhi Memorial Hospital, Addis Ababa Ethiopia from March to June, 30 2021.

Methods: Hospital-based cross-sectional study was conducted among 384 pregnant women from March to June,, 2021. A structured questionnaire was used to collect socio-demographic characteristics and predictors of HIV, hepatitis B, and Syphilis infections through face-to-face interviews. A venous blood sample of 5mL was collected from study participants, and then Separate serum was screened for anti-HIV, HBsAg, and Trepollema pallidum antibodies using rapid test kits and further Verified by Wanti enzyme-linked immunosorbent assay. The data were entered using Epi Info version 7.2.4 and exported to SPSS version 25, and Logistic regression analysis was used to identify predictors of HIV1/2, hepatitis B, Syphilis infections. A p-value less than 0.05 was considered statistically significant.

Results: The overall seroprevalence of HIV1/2, Hepatitis B, and Syphilis infections were (3.9%), (3.4%) and (2.3%), respectively. In multivariate analysis, The prevalence of HIV was significantly higher in More than one Sex Partners [AOR 3 95%CI (1.4 - 6.1)], [p=<0.002], and The risk for HBV infection more than one Sexual partner [4.3 95%CI (1.17- 8.3],[p=0.003]. The risk for syphilis occurrence was significantly higher among the history of More than one Sex Partners [AOR 3 95%CI (1.2 - 5.2)], [p=<0.001]. HIV co-infection was present in 23.1% and 44.4% of hepatitis B virus and Treponema pallidum positive pregnant women respectively.

Conclusion: Overall, prevalence of syphilis and HIV were relatively higher with a young women andin womenliving in Addis Ababa, HBV infection was higher only in Non educated women, More than one Sex partner is a Major predictor of STI infections. Therefore;Equal attention is Needed to HBV and syphilis infection like HIV to control further transmission and the associated morbidity and mortality .

Key Words: Sero-Prevalence ofHIV1/2, HBsAg &Syphilis, and risk factors, in pregnant women. Horizontal and vertical transmission.

1. Introduction

1.1 Background

Sexually transmitted infections cause considerable morbidity in pregnant women. STIs have an immediate impact on reproductive and child health through infertility, cancers, and pregnancy complications. In Africa, a big portion of pregnant women are affected by STIs, and it's the main explanation for maternal and perinatal morbidity. HIV, HBsAg, and syphilis infections are epidemiologically interrelated, and co-infection is common[1].Human immunodeficiency virus (HIV) infection has been one of the most important public health challenges, especially in low and middle-income countries. In many African countries, 15–30% of girls attending prenatal care clinics are infected with HIV, and pregnancy is related to various undesirable consequences for the mother & fetus [2]. in Sub-Saharan Africa 73% of individuals living with HIV and 85% of pregnant women living with HIV are receiving antiretroviral therapy in 2020. in Africa 30–45% of infants are born to HIV-positive mothers during pregnancy or delivery process [3].

Syphilis may be a bacterial STI caused by Treponema pallidum that leads to Developing countries confirm that maternal syphilis still remains a particularly important explanation for perinatal morbidity and mortality. Syphilis in European country top the list of most ordinarily reported new STD infections. Increased almost thirty percent from two thousand fifty to two thousand eighty and these Seventy-eight reporting countries, a mean of three point two persent (range 1.1% to 10.9%) of antenatal care attendees tested positive for syphilis [1][4]. Syphilis in pregnancy is that the second leading explanation for stillbirth globally and also leads to prematurity, low birth weight, death , and infections in newborns, and in Africa, approximately 20% of prenatal deaths occurred. The prevalence of syphilis infection among pregnant women in Sub-Saharan Africa is estimated to be 2.7% which represents nearly 1 million pregnancies be in danger annually [5].

Viral hepatitis is caused by five hepatotropic viruses (A through E), and it commonly affects the liver. it's a significant blood-borne, sexually, vertically and feco-orally transmitted systemic disease of which hepatitis B virus is very contagious and 100 times more infectious than HIV, transmission [6].WHO improved data show that the amount of individuals dying from hepatitis B

worldwide still remains daunting at 1.1 million per annum . (comparable to TB mortality and better than HIV mortality [7-6].

Congenital Syphilis Pregnant women who are infected with syphilis can transmit the infection to their fetus, causing congenital syphilis, with serious adverse outcomes for the pregnancy in up to eighty percent of cases. An estimated two million pregnancies are affected annually approximately twin five percent of those pregnancies end in stillbirth or miscarriage through an additional twin five percent of the newborn features a coffee birth weight or serious infection, both of which are related to an increased risk of perinatal death. Yet, there's still a general underappreciation of the magnitude of congenital syphilis [7-8]. With this background, the present study was conducted to work out the magnitude of HIV, HBsAg, and syphilis among pregnant women who attended Addis Ababa Ethiopia.

1.2. Statement ofthe Problem

HIV, HBV, and Syphilis infections are a hidden epidemics and major public health problems worldwide affecting the standard of life and causing serious morbidity and mortality, especially in women.Ethiopia ranks of a burdens STIs it affects Pregnancy women (61%) [3][5].

1.2.1.Syphilis

Global 36,000,000 individuals are infected with syphilis, out of 930,000 have probable active syphilis (contagious during pregnancy), which results up in roughly 350 000 antagonistic birth results (including organ deformities and prematurity) yearly [8]. worldwide assessed 6,000,000 current cases every year, up to a little less than half of the infants brought into the world to women with untreated syphilis stillborn or pass on from the transmination as an infant [9]. In Developing nations, T, pallidum seroprevalence goes from four to fifteen and may can cause adverse outcomes in 50–80% of pregnancies [10]. Ethiopia is among the most flawlessly awesome three sub-Saharan nations with highest numbers of adverse pregnancy outcomes attributed to syphilis, Still, Ethiopia's screening rate in ANC is under five percent [11].

1.2.2. Human Immunodeficency Virus (HIV).

HIV infection remains to be a serious public health concern, having guaranteed more than 32 million lives. what's more, 1.5 million individuals secure HIV inside the WHO African Region. out of 69% living with HIV during pregnancy hold extraordinary importance in light of the fact that numerous women are first determined to have HIV during pregnancy [12]. the new worldwide report 95–95–95 targets set by UNAIDS, we will try harder to stay away from the direst outcome imaginable of a half-million abundance HIV-related passings in Sub-Saharan Africa, expanding HIV Transmition because of HIV administration interruptions during the COVID-19 pandemic, and accordingly the easing back serious public health concernto HIV [13]. In Ethiopia, the speed of transmission increments every once in a while because of the recent development of casual attitude towards sex, degradation of traditional and indigenous value[14].

1.2.3.Hepatitis B virus (HBV)

HBV has become the foremost prevalent STI in pregnant women with approximately 15-30% of women visiting antenatal clinics are diagnosed with HBV infection. hepatitis B virus (HBV) infection could also be a serious public ill-health and explanation for disease mortality worldwide. They end in 1 million people being newly infected per day and 1.2 million people developing cancer once a year and still be a significant public health burden in terms of

mortality, morbidity, and quality of life [15]. the absolute best prevalence of HBsAg (>5%) is in Sub-Saharan Africa , East Asia, Ethiopia is found in Sub-Saharan Africa it's considered an area of high endemicity for HBV, around 10 million people were infected with HBV, and Globally, 5% of people are aware of infected by hepatitis virus [16]. in Ethiopian according to EDHS 2019, full immunization coverage is 43% and other national research reviews conducted from 2003 to August 2019 reviled that full immunization coverage was 58.92%, Unfortunately, as of 2015, only 10% of African countries had introduced HepB-BD vaccine, and it isn't yet introduced in Ethiopia so This achievement An early win within the worldwide response to hepatitis was achieved through the effective scaling from HBV vaccine. but still one of the foremost endemic countries [17].

1.2.4.HIV/HBV Co-infection

Hepatitis B virus (HBV) is more common in HIV-1-infected individuals than within the overall population because of shared risk factors for acquisition and still major global public health issues [18]. An estimated five to one-fifth of people living with HIV have chronic HBV 20% in China, one-tenth within the USA, greater than 20% in parts of Western Africa, 5% within the united kingdom , in Sub-Saharan Africa highly morbidity and mortality prevalence of HIV/HBV co-infected pregnant women in South Africa 5 fold higher HBsAg prevalence, Tanzania 2.5 fold higher HBsAg prevalence, Botswana 50% higher HBsAg prevalence, Cameroon Prevalence doesn't increase, USA eight times raises the factor of HBV co-infection, adjusting for age, ethnicity, substance use & hospital type Moreover, the prevalence of Hepatitis B virus and HIVco-infection in Africa ranges from Two to thirty point six percent with different study [19].

1.2.5. HIV/Syphilis

Syphilis and HIV infections still are public health problems within the planet, especially in developing countries. Besides, there is a better risk of developing early neurological and ophthalmic defects among infants [12][20]. it's predicted that over 1.4 million pregnant women are affected by syphilis and HIV within the planet once a year. perinatal deaths, 11% of neonatal deaths, Around the world with a high prevalence throughout Sub-Saharan Africa . Ethiopia has one of heights endemicity of syphilis/HIV in pregnant mothers. range,1.8-7.2% in Amhara regions [21].

Available studies are indicated a high prevalence of HIV, HBSAg, and Syphilis infection and Disease outcomes among Pregnant women and have an attention-getting screening of STI follow-up period. Therefore, despite the various burdens of these Sexual Transmitted infections in pregnant women, a key obstacle within the attribute of routine ANC services distribution duty-to COVID 19 Pandemic is that they need to raise the truth and quality of services.The result ofthis study was providing data on the current burden of sexually transmitted infections and fill the existing gap of information in the study settings.

1.3. Significance of the study

Sexually transmitted infections HBV, HIV, and TP, are the major causes of infection in pregnant women worldwide. The result of this study used governance, clinical encounters, health care providers, policymakers, and other concerned bodies to initiate the relevant intervention measures and concerns in pregnant women and mothers to child transmission. The goal of this study was identify the gap of associated risk factors of sexually transmitted infection including HIV, HBV, and T.palladium in pregnant women, and the study of associated factors was given the clue on how to prevent and control sexually transmitted infection in pregnant women.

Generally, this study attempts to detect the current burden of common STI infection, like HIV, HBV, and syphilis in pregnant women. so the significance of the study was:

- Identify a gap that helps to design a strategy for the prevention of HIV, HBV, syphilis infection transmission in pregnant women.
- It was providing for awareness to appointment achieve long-term protection of sexually transmitted infections in pregnant women.
- It was given clues and designs for Stack and holder health planners who are particularly devoted to the outcome of STI in pregnant women changing the behavioral development & attitudes in the potential risk factors.
- It will convey valuable information for Doctors, Healthcare Managers, and Healthcare developers about the current burden of STIs in pregnant women.
- It will help other researchers in this field to refer to this study and may also serve as a stepping stone for other researchers to conduct further study in this area.

2. Literature Review

2.1. Seroprevalenceof Sexual Transmitted Infection

Sexually transmitted infections (STIs) are increased by an alarming rate among all age groups leading to increased infant morbidity and mortality during pregnancy. This constitutes asexual health crisis across all age brackets and gender resulting in a pressing health care issue and a public health emergency worldwide. The prevalence of STIs is higher not within the general population but also in pregnant women [10].

The finding of the study conducted by *Kelle Cristiane, et.al* in Brazil the prevalence of T pallidum infection and associated factors in pregnant women overall prevalence syphilis 4.4% Risk factors such history of Abortion , sexual intercourse with History of sexual partner using injecting drugs and Blood transfusion, sharing Sharp materials, tattoo, level of education, were significantly associated with syphilis among pregnant women [22].

This finding Conducted by *Aubaneide B Guerra et.al.* in Northern Brazil the overall HIV was 0.3%, and HBV, 0.6%, past HBsAg reactive Was 9%, However, we observed a difference within those Age of the sexual partner and thus the utilization of condoms in sexual intercourse We also observed that the age of the adolescents, education and thus the age of the sexual partner was Associated with HBsAg infection [23].

A retrospective study conducted at the antenatal clinic surveillance done by *Qian Wang et al,* in China for the quantity 2011- 2018. a Study decreased from (0.076–0.039%), among registered pregnant women prevalence of HIV and syphilis over 2011–2018. this result The trend of syphilis prevalence in HIV-infected pregnant women was 1.80%. risk factors Ethnic, lower education of Primary School, occupations Antiretroviral and exposed HIV from intravenous Substance use are associated with syphilis infection [24].

A prospective study was conducted at the antenatal clinic by *Aneley G, et al,* in Islands, Data was administered from seven health centers. the overall hepatitis B seroprevalence was 13.8% the rate of HBV increase by 22 percent in Women range B/t 30-34 Age. only significant risk factors Age, ethnicity, educational, living place, no significant Associated With HBV infection [25].

on the other hand, Study Done by *Paramjit Kaur et.al* in 2017 Indian overall prevalence of STI in Pregnant Women was 22.5%. hepatitis B 6.3%, HIV 5.5%, and Syphilis 1.7%. risk factors: No formal education, poor economical status, housewife, rural Setting with more than one sex partner, Age b/t 21-30 Were Associated with STI infection [26].

This finding was conducted by *Alissa D, et. al.* in a special part of eastern Mediterranean and Middle Eastern countries HBV seroprevalence in Egypt was 3.2%, Iran 1.3, Jordan 4.3%, Libya 1.5%, Oman 7.1%, Pakistan 2%, Qatar 1%, Saudi 2.6%, Sudan 5.6%, Tunisia 4%, Turkey 2.8%, United Arab Emirates 1.5%, Yemen 10.8% [27].

The finding of the studies conducted *kafeero. HM et.al,* in 2020 in several parts of Sub Saharan Africa country, A review of STIs among pregnant women reported that the prevalence of HBV-HIV co-infection in Sub-Saharan Africa was 3.302% West Africa 5.155%, The HIV positive prevalence of HBV-HIV co-infection of 8.312%, HIV/HBV was 3.1-15%, South Africa , 3.1%, Malawi, HIV/HBV,13%, Cameroon, HIV/HBV, 0.74%, Zambia, 24%, Abuja, 4.7%, Nairobi, 0.4%, Ethiopia, HIV/HBV, 19%, HBV,7.4%, which indicates intermediate endemicity Risk factors Age, status and employment were independent factors significantly associated with the danger of HBV-HIV co-infection However: gravidity and education level not associated with HIV/HBV Co-infection [28].

The finding of another study conducted by *mwumvaneza m et.al,* in Rwanda, showed that the overall prevalence of HBV among pregnant women was 3.70%, this findinga Proportion of HIV-infection among HBsAg positive pregnant 3.7%, HBV/HIV aged 15-24 4.1%, higher among women age 15-24 years RPR positive test associated with HBV-HIV co-infection 5.0%, occupation co-infection 4.3%, However no significant differences in HBsAg prevalence age, status , education level, residence, number of pregnancies [29].

The finding of a study conducted by *Simon et al.* in Uganda Overal HBV 2.9%, This Study identified risk factors status HBV, positive associated with multiple sexual partners, blood transfusion another factor age, socioeconomic status, HIV serostatus, piercing of ears, and history of transfusion not significantly associated with hepatitis B virus infection [30].

This findings was conducted at the Edward maternity Hospital by *Mustapha B, et.al,* in the Gambia, A overall prevalence rate was 9.20% among pregnant women. This study indicated that

there was a significant association between some risk factors and HBV infection history of blood transfusion, history of intravenous drugs, previous hepatitis B infection a strong relationship between hepatitis B seropositivity [31].

This study was conducted by *Dvora. l et,al* in Cape Town, South Africa Prevalence of STI was 32%: 39% in HIV-infected women vs. 28% in HIV-uninfected Pregnant women were identified and treated syndromically in ANC risk factors: age and gestational age, HIV-infection being unmarried or not cohabiting with the fetus' father and having STI symptoms in the past three days were associated with STI diagnosis [32].

The finding of another study conducted by *Sichone, B, et al.* in Zambia overall HBV was 11(3.5%) in this Study There was no statistical difference in HIV-positive women, age, marital status, parity, residence, religion, education level, employment with HBV infection, However, this finding Being on combined antiretroviral therapy had a 91% reduced odds for HBV co-infection [33].

In a study conducted by *gilbert Ng, et al*in Tanzania, the Specific prevalence of HIV, HBV was found to be (5.0%), (5.8%), respectively. HIV, HBV & Tpallidam (17.6%),HBV in urban 3.8%. this finding of risk factors age, education, and marital status significantly associated with syphilis. However, living place toothbrush, tattoo, history of STI, Not Significance Associated with STI infection [34].

The finding of another study conducted by *Olusola H. Ajay, et al.* in Nigeria overall prevalence of HIV was (3.3%) syphilis, (2.4%), (HIV/Syphilis) coinfection (0.3%) this finding Show HIV/Syphilis positive age group 25-29, Multiple sex partners, Employed This result higher prevalence of STI These varied findings could also be due to other factors ranging from individual age, marital status education, circumcision, sexual behavior risk factors [35].

This is another similar study Conducted by *Peter A, et al.* in Nigeria overall HIV,14(3.5) HBV was (5.5%) among pregnant women highest proportion of HBsAg above 45 years of age. this result no statistical significance difference between the women with HBsAg positive and those without the infection, concerning marital & Occupation. However, the statistically significant difference among those religions, Education blood transfusions [36].

In a study conducted by *um Abdala et al.* in Sudan, overall HBV 9.4%, and a higher rate of HBsAg was 8.5% in greater than 20, year-old women, This research identified risk factors such as a history of blood transfusion, surgical procedure, dental procedure, tattooing/traditional mark, cupping therapy, unsafe injection, cesarean section, ear piercing, jaundice, jaundice among husbands of participants, and female genital circumcision were assessed. The Statistical analysis of data revealed no significant association between the prevalence rate of HBsAg [37].

The finding of the study conducted by *Nahom F, et. al,* in Eritrea sentinel surveillance for HBV infection, overall HBsAg prevalence was 3.2% among pregnant women no significant association determined those Age, religion, living place and Monthly Income in which those with associated risk factor with marital status, low level of education, ethnicity occupation significant association with HBV infection [38].

This another similar Study Done by Sirelkhatim *M Elkheir et.al* in Maternity Hospital in western Sudan In the period from 1 August 2016 to 1 March 2017, HIV-1/2 antibodies, hepatitis B surface antigen, and Treponema pallidum antibodies was performed Seroprevalence of HIV was 1.13% hepatitis B 2.93% and syphilis 7.43%. there were no statistically significant associations between hepatitis B, syphilis, including any of the three infections and age, stage of pregnancy, gravidity, parity, previous mode of delivery, husband polygamy [39].

This Finding Done in our contrary, by *Belay M et.al* in West Harar Ethiopia the prevalence and associated risk factors of HBV infection among pregnant women. the overall prevalence of HBsAg was (6.1%) risk factors History of abortion traditional, admission to a health facility, multiple sexual partners and family liver disease were associated with hepatitis B infection among pregnant [40].

The finding of another study conducted by *kbrom et al,* in the Northern Tigray Ethiopian overall HBV rate was (11.6%) having human immunodeficiency virus (HIV) significantly associated with HBV infection. odds of HBV infection among mothers who had insufficient knowledge of HBV infection to HIV positive compared to HIV-negative mothers sharing personal care materials such as scissors, blade, toothbrush, HBV infection [41].

The finding of another study conducted by *Haile workye et al,* in Gulag south Ethiopia Over all HBV was (4.1%), the researchers tried to see whether there was a significant association with

marital status, history of hospitalization, abortion and single woman, multiple sexual partners were significantly associated with HBV among pregnant women [42].

on the other hand prospective Study conducted by *Abayneh et.al.* Gambella in South Western Ethiopia, The overall seroprevalence of HBV infection was 7.9% this finding History of abortion, occupation, and had a statistically significant association with HBsAg seropositivity. this result Show a higher odd ratio in multiple sexual partners was [AOR=17] [43].

The study conducted by *Delelegn Tsegaye et.al.* in welo Northen Ethiopian The overall prevalence of HBV (3.4%), Risk factors such as the history of multiple sexual practices, history abortion were significantly associated with HBV infection, However, age, residence, marital status statistically significant association this result Show a higher odd ratio in multiple sexual partners was [AOR=19] [44].

A retrospective study was conducted by *Getachew y ,et. al.* in sede muja northwest Ethiopia for the period January 2018-December 2019. The finding revealed that overall Syphilis Was (25.5%), Risk factors such as multiple Sexual partners and late trimester of pregnancy were found to be significantly associated with syphilis [45].

On other hand, aSimilar study was conducted by *Roble AKet, al*Jigjiga Eastern Ethiopia.The overall prevalence of HBV in pregnant Women was 78 (8.5%) the risk factor of history surgical, Contact with reactive HBV patent, sharing sharps material and having more thanone Sex partner were significantly Associated with HBVinfection [46].

The finding of another Similarly, study done by *tafese b, et al*. in Arsi Ethiopia among pregnant women the overall prevalence was HBV/TP, 2.2%, HIV 2.1%. history of a dental procedure, tattoo, multiple sexual partners significance Associated with HBV infection [47].

Furthermore, another surveillance was done by *addisu A, et al.* in Ethiopia, A total of twenty-three studies. the pooled HBV in Ethiopia, (4.75%) The prevalence of HBV infection among the included studies ranges from a minimum of in southern Ethiopia (2.3%) to a maximum of (7.9%) in Gambella Hospital, Southwestern, Ethiopia The pooled prevalence of HBV infection in Amhara, Oromia, Addis Ababa, Tigray, Harar, and Gambella regions was 4.53% 4.47% 6.02), 4.42% 5.50% and 7.90 respectively, which indicates intermediate endemicity. this finding of the

risk factor of history of multiple sexual partners [AOR=6:02] blood transfusion history, abortion body tattoo HBV infection include a history a strong association to HBV infection [48].

national Servelance report by *Siraj Hussen et al.*in 2019 Sub-Saharan Africa This pooled prevalence of syphilis among pregnant women was 2.9% East and Southern African regions had a higher syphilis prevalence among pregnant women (3.2%, and 3.6%, respectively)The prevalence of Syphilis among pregnant women in 2017 Ethiopian found to be0%,another Similarly a Study Done in 2018 Ethiopian was 7(1.8%) as well as in 2018 Addis Ababa reported was 13 (2.2%) and out of in country in 2017 Sudan report 21(5.0),another Similar Study in 2018 Sudan was 33(7.4%),moreover Zambia in 2017 a total 18097 Sample out 398(2.2)[49].

This another Study Conducted by *Kiros Tareke et,al* in 2019 Felege Hiwot Referral Hospital, Bahir Dar, northwest Ethiopia overall prevalence of Syphilis, 10 (2.6%) These risk factors including Divorced women, rural residents, history of multiple sexual partners. previous history of abortion and History of STDs However, toothbrush tattoo, Partner history of STI, Not Significance Associate with Syphilis Infection [50].

This Study Conducted by *Demeke Geremew et.al.* in 2018 Ethiopia a systematic review and meta-analysis of Seroprevalence of HIV among pregnant women a total of 13,746 participants were included in the original studies the pooled prevalence of HIV among pregnant women in Ethiopia was 5.74%. Regional analysis showed that 9.50% in Amhara, 4.80% in Addis Ababa, 2.14% in SNNP, and 4.48% in the Oromia region. Besides, six studies reported HIV-HBV co-infection and the pooled prevalence was 0.68% among pregnant women in Ethiopia [51].

on the other hand, a hospital-based study was conducted by *Rahel T et,al.* in the Jimma University Study period from April 2017 to October 2017. The overall prevalence of T. pallidum (3.7%). Two patients who were co-infected was (3.8%), Having had sex after taking alcohol risky sexual behaviors were significantly associated with STIs [52].

The Study conducted by *Abdullah Al-Mamari et al,* Hargeisa hospital in Ethio-Somali The study area was carried out from May 2018 up to December 2018. Overall, HBV prevalence was 15(31.3%) However, We found identify statistically significant p-values < 0.05 and a high relationship between HBV and some demographic and clinical risk factors such as blood transfusions, levels of knowledge about HBV infection in addition to age and marital [53].

The study Done by *Kumneger and his collegues* in Dilla South Ethiopian case-control study (64 cases and 128 controls) with one two ratio Study period from 29 January 2018 to 20 June 2018, Lower educational status, age of first sex <18 years, history of abortion and having two or more sexual partners in the past year (were significantly associated with syphilis infection [54].

This finding Conducted by *Temesgen and his collegues* in Atat Hospital, Southern Ethiopia The overall seroprevalence of hepatitis B, and HIV infections was 4.5%, 2.7% respectively. the prevalence of hepatitis B virus infections was significantly higher among patients having a history of poly-sexual practices, long time hospitalization, abortion and home delivery, HIV status, Cesarean section history [55].

In the Study Conducted by *Seblewongale and her collegues* , in Debre Berhan Ethiopian, The overall prevalence of syphilis and HIV in pregnant mothers was 7(1.8%) and 28 (7.2%) respectively. The highest number of syphilis and HIV prevalence risk factors Previous history of STD for syphilis and HIV previous history of stillbirth for syphilis and partner HIV test positive Sgnficant Associated with STI [56].

This Study Conducted by *Abenezer Molla.et.al* in wolemera Northwest Ethiopian, The overall prevalence of HIV was (2.9%) syphilis was (1.2%) were HIV-syphilis was, (0.3%) The prevalence of HIV was significantly higher among pregnant women living in urban settings, age group 25-34 and 35-49 years those who had a history of stillbirth and Having negative sexual partner protective factor for HIV Syphilis was highly prevalent in HIV positive women [57].

The Study Conducted by *Yasin A, Wabe et.al.* in 2021 Addis Ababa Ethiopia in pregnant women overall Seroprevalence of HBV and syphilis infection was found to be 4.5 % and 2.4 % respectively. Among factors assessed, only multiple sexual partners were significantly associated with seroprevalence of HBV infection. Other factors were not significantly associated with seroprevalence of syphilis and HBV infection [58].

The finding of another study conducted by *Zemenu abera et al,* in Addis Ababa Ethiopia, the overall prevalence of HBV was (2.3%), this rate of HBV this finding significantly associated with age, religion, and ethnic group, However, such as marital status , history of more than one sex partner history of blood donation, tattoo no association between HBV reactive [59].

another Similar Study Done by *fissehatsion k, et.al.* in Addis Ababa Ethiopian, seroprevalence and risk factors of HBV, HIV, and syphilis infections among pregnant women overall prevalence was 21(5.2%), 20(5%) (0%) respectively. and HIV/HBVwas (0.5%) These risk factors of monthly incomes, educational level, and multiple sexual partners were statistically associated with the positivity of STI infection in which those with age group, marital and occupational status have no statistical difference with STI infection [60].

Based on literature evidence worldwide and developing nations published different studies, a trend of STI infection highly increased and Still, serious public health problems especially in young pregnant women in our Country Ethiopian observe Significant prevalence of STI infection and published Many studies among pregnant women most of a Studies have HbsAg, The aim of Study to determine the burden of STI infection and to predict associated factors of HIV, HBV and syphilis serostatus among pregnant women.

3. Objectives

General Objective

To asses seroprevalence and risk factors of HBV, HIV, and syphilis infections among pregnant women attending Gandhi Memorial Hospital, Addis Ababa, a prospective study from March to June30, 2021.

Specific Objectives:

- To determine the Seroprevalence ofHIV infection in pregnant women.
- To determine the seroprevalence of HBV infection in pregnant women.
- To determine the seroprevalence of syphilisinfection in pregnant women.
- To identify risk factors for acquiring HIV, HBV, and syphilis among pregnant women attending Gandhi memorialhospital AddisAbaba Ethiopia.

Hypotheses

- Most pregnant women become infected with the hepatitis B virus during going to health facilities to stay in bed for seeking medical attention and repated medicals follow-up.

4. Materials and Methods

4.1 Study Area

The study was conducted in Addis Ababa capital city of the Federal Democratic Republic of Ethiopia and therefore, the major metropolitan place within the nation around Kirkos-sub-city one among the foremost overcrowded and low-income communities and consistent with a sentinel sites Surveillance study by Addis Ababa Health Bureau, the overwhelming majority of girls during this sub-city are involved in prostitutes and STI Hot spot area. Most of the Pregnant women are referred from satellite health facilities around Kirkos-sub-city. Other Pregnant women are referred from a rural area in the Oromia region. Gandhi Memorial Hospital only gynecological care and maternity services in Addis Ababa which its average service delivery 3,220 per month. Mostly referral cases in Hospital Pregnancy complications like preterm delivery, Fetal complications Stillbirth, abortion, and other related complication However, precancerous screening (Human Papillomavirus infection). also, provides health services Provision of immunoprophylaxis for infants born to infected mothers, and offering anti-retroviral therapy (ART) Service other wise laboratory Need to offering for Sexual Transmitted infection routine test and OncoE6 Cervical lesion screening for Suspected women.

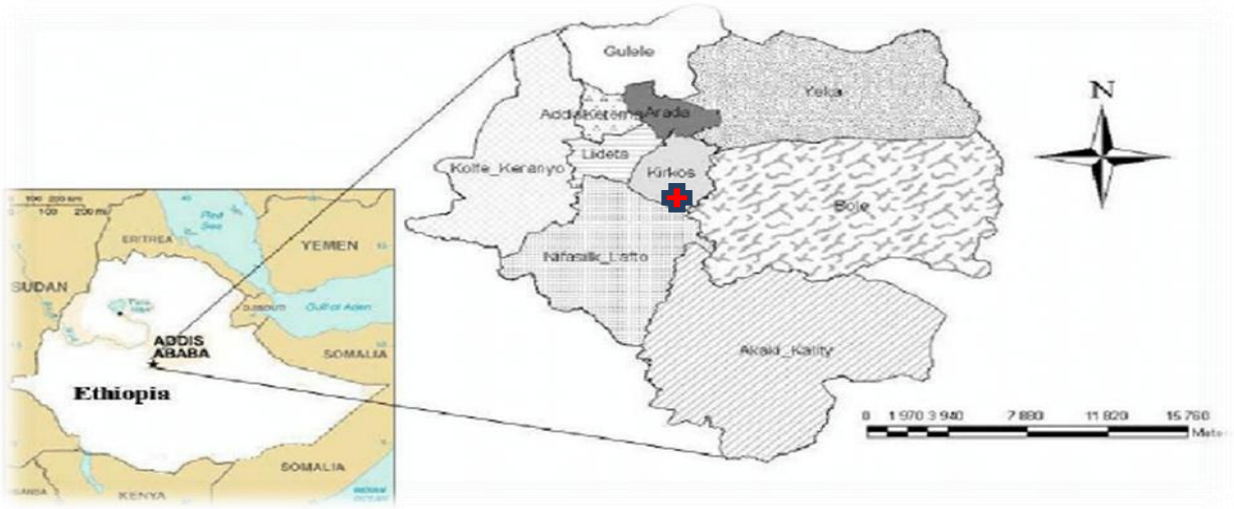


FIGURE 1 | Map of the study area

4.2 Study Design and Period

The study was conducted using a facility-based prospective cross-sectional study design, among Pregnant women attending Gandhi Memorial Hospital between March to June 30, 2021.

4.3 Population

4.3.1 Source Population

All pregnant women attending at Gandhi Memorial Hospital during the study period.

4.3.2 Study Population

The study populations were Pregnant Women who attend ANC servicesfor the current pregnancyduring the study period at Gandhi Memorial Hospital.

4.4.1inclusion Criteria

All pregnant women who are willing to give informed consent to participate in the study.

4.5. Exclusion Criteria

Those women who are unable to communicate or seriously ill at the time of data collection.

DuringSample Collection, transportation insufficient and Clotted sample not Used for Screening test.

4.5 Study Variables

4.5.1 Dependent

Seroprevalence of sexually transmitted infection HBV, HIV, T.Pallidum,Serumserostatus among pregnant women.

4.5.2 Independent

Socio-Demograpy:- Age, Marital Status, Educational status, living places, family Numbers, occupational Status.

Risk behaviors:-(Tattooing, Ear/Nose piercing,Home Delivery by TBA), Previous Tooth Extrication, Intra venous drug use.

Obstractive History:- Gestational Trimester, Gravidty, History of Abortion& Still birth.

Risk factors:- History of contact with liver disease,Patent, history of STI,HBV vaccination status, More than one Sexual Partner, Partner other women relation.

Medical History:- history of Hospital admission, history of blood transfusion, History of Surgery and Cesarean section,

4.6 Measurement and Data Collection

4.6.1 Sample Size Calculation

The sample size was determined by the single population proportion formula. The value of p is taken as (2.2%) (50%) (2.4%), from an earlier study done on the prevalence of STI (HIV, HBV, and Syphilis). and calculated by 50% the sample size was calculated using the following formula.

$$\boldsymbol{n = \ (za/2)2 \ \ P(1-P)\ 2 \over d2}$$

n = sample size requires**Zα /2 =95** % confidence level (1.96)

P = proportion of adolescents = (0.5) **d** = desired precision (5%)

According to the formula, the calculated sample size was = 263, 384, and 280. Determine the Sample size of each p-value Select the largest Sample Size was 384.

4.6.2 Sampling Method

consecutive sampling method was used the specified sample sizes are attained within the study period time.

4.6.3 Data Collection Procedure

After taking written consent from each study participant, a structured questionnaire was usedto collect the socio-demographic and risk factors of the study. Participating in data or sample collection was trained about the aim of the study in selecting study participants, data confidentiality, safety, and precautions to follow in collecting, transporting, analyzing blood samples.Then a predesigned questionnaire was wont to collect socio-demographic and other Related data by assigned nurse or phlebotomy. the info collection process was Supervised by the assigned research directorate and PI.

4.6.3.1. Sample Collection

Participants were consenting and trained interviewers (nurse-midwife and a public health officer), collected by structured questionnaire (face to face interview), and have conducted to get information regarding risk factors. After getting permission from the pregnant women, five mL of blood was collected from each pregnant woman by a trained experienced senior laboratory technologist. Serum was separated within nine hr by centrifugation of blood at 3000 rpm for 10

min. Serum samples were separated and have screened for hepatitis B surface antigen (HBsAg) using rapid test kits. And Antibodies to HIV-1/2 were tested supported the national testing algorithm and also Treponema pallidum antibodies were tested by Syphilis rapid screening test strip device.

Then All reactive/Positive samples were transferred to a nung tube and stored at -80 0C during a refrigerator b/c discordant result was repeated and until being processed by Enzyme-Linked ImmunoSorbent Assay (ELISA). Serum samples collected from Gandhi Memorial Hospital Addis Ababa were transported to the National Blood Banks Addis Ababa using cold boxes with an ice bag. Antibody HIV, hepatitis B surface antigen (HBsAg), and Syphilis from the serum of every pregnant woman were determined using ELISA consistent with the manufacturer's instructions (Beijing Wantai Enterprise Co, Ltd. China).

All information collected was coded and entered to Epi Info version 7.4.3 transferred to SPSS version 25 statistical package for analysis. Study participants were characterized consistent with the variables using descriptive analyses was wont to estimate the prevalence of HBV, TP, HIV ½, infections, and selected characteristics of Pregnant the consequences of predictors on having STI infections were analyzed using logistic regression, and their effects were depicted using or adjusted for confounding. A p-value of but 0.05 was considered statistically significant for all tests.

The data was collected on variables like socio-demographic characteristics (like age, legal status, level of education, occupation, income) and history of risk factors (unsafe intravenous injection, Morthan one Sex Partner, Ear piercing, tattooing, history of contact with an infected person, Blood transfusion, Tooth extraction, surgery, and any gynecological related history) Stillbirth, Abortion, Death of Baby. Confidentiality of the knowledge given by study subjects was kept. This includes an entire description of the aims of the study of infectious agents that were screened including hepatitis B Surface Antigen (HBsAg), HIV antibody and syphilis, potential benefits, and risks blood collection procedures and assurance of confidentiality of any information given also as test results.

Work flow Design of the overall Study Procese

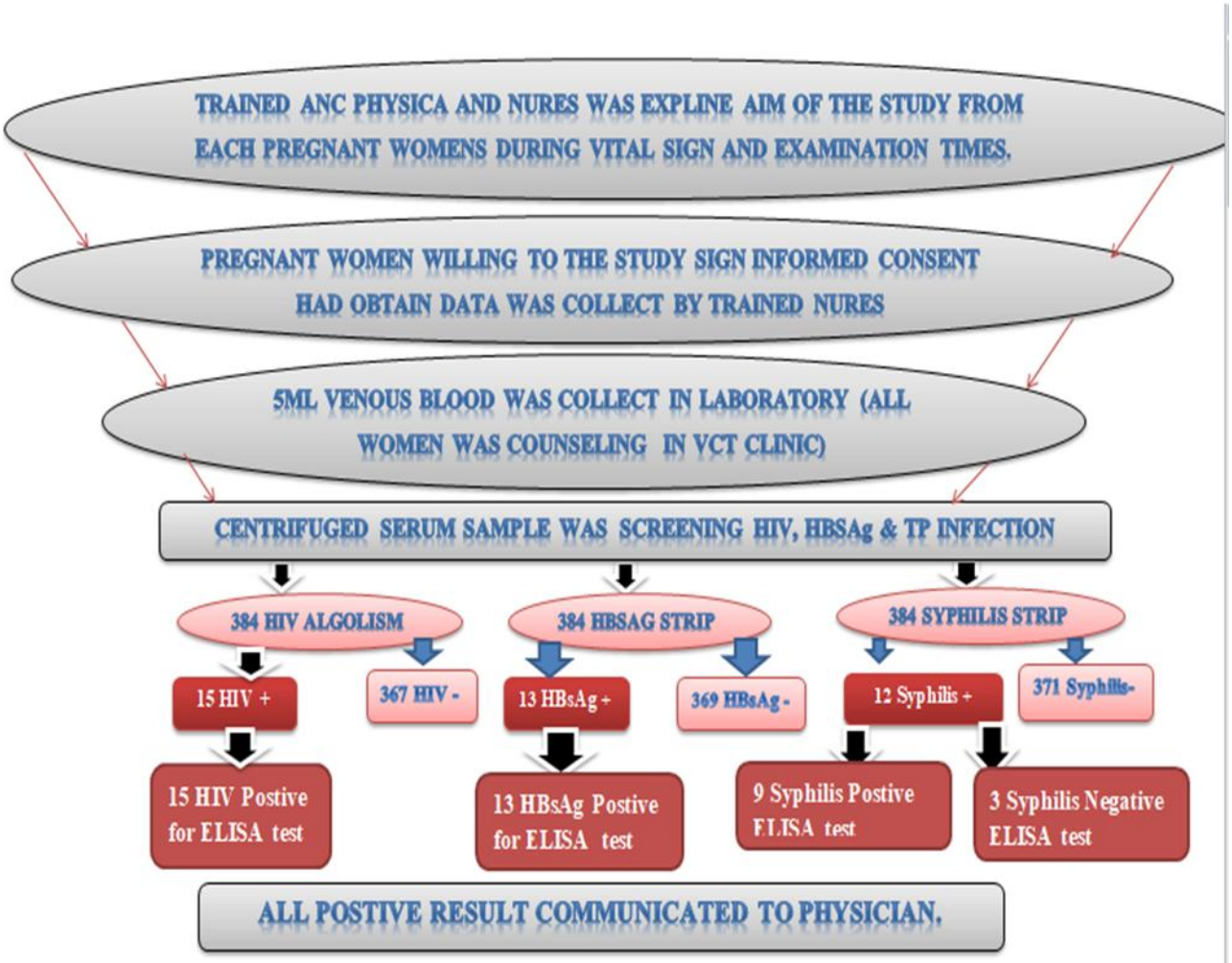


Figure-2: Work flow Design of the overall Study Plan.

4.6.3.2. HIV Testing

Assuring the Willingness of Pregnant Women and counseling by ANC Trained Nurse, and participant cometo in laboratory. HIV1/2 was screening using industrially available rapid test kits following the maker protocol and national HIV test algorithm. The national HIV test algorithm involves Three tests to verify HIV antibodies. Rapid immuno-chromatographic HIV1/2 tests the presence of HIV-1/2 antibodies within the serum decided using kits of HIV-1/2 diagnostic assay kits consistent with the manufacturer instructions. Additionally, All Positive Participants were Confirme previous Status of HIV from their medical History Sheet. of 384

Serum Sample was Screenings by the Current HIV test Algoliosm is highly sensitive and specific for detection HIV antibody. First, Add five ml of Serum, and Three drops of buffer to the STAT PACK Device, wait ten minutes out of Ninteen Samples Seen pink colors in the Devices, and control line was reactive. Then go to the Next steps positive Samples was Done by HIV1/2 ABBON test Device add one drop of serum and forty microliter buffer wait ten minutes Fifteen Samples were reactive, out of a total four positive Sample was Non-reactivates (This means Discordant),only four Samples Equal Time repeated by STAT PACK and ABBON test after reputation both Devices was Negative. The reason for the Discrepancy Maybe possibly due to Sensativity first-line testing devices has excepted false Positive results that their Higher Detection rate (sensitivity) and Might be post zone and prozone effects that may appear During Dispencing Specimens.Finally, Fifteen Samples were confirmed by the third test tie-breaker SD BIOLINE Device, Add Ten microliter Serum and four drops of the buffer after the ten minutes allSamples Was Positive. Fifteen Serums Samples has a Presence of Antibody of HIV infection further verification was Done by ELISAAnalyser [61].

Current national testing algorism of HIV

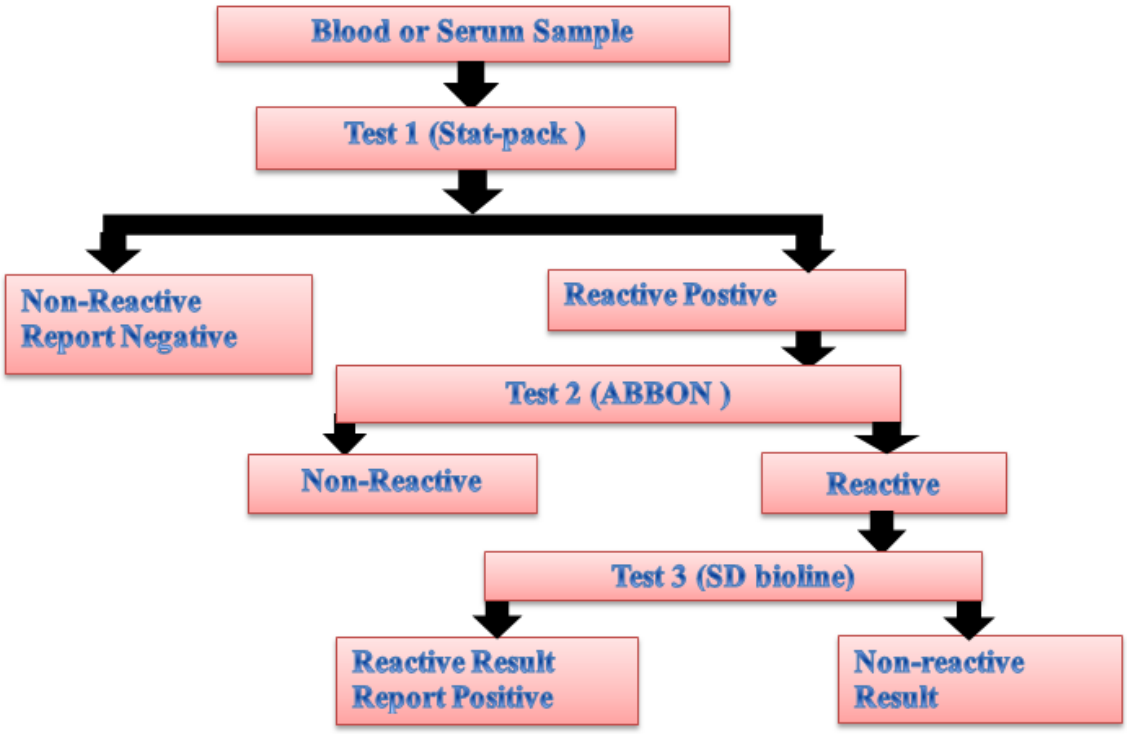


Figure-3: The current national testing algorism of HIV1/2

4.6.3.3.ConfirmHIV1/2 anti-body byWanti ELISA Testing

HIV test was performed using rapid test kits based on the national test algorithm. Three hundred eighty-four (384) out of fifteen (15) samples were positive for anti-HIV. The Presence of Antibody of HIV infection in serum was verify using ELISA according to the manufacturer's instruction (Beijing Wantai Biological Pharmacy Enterprise Co, Ltd. China), HIV 1+2 Ag/Ab ELISA is a two-step incubation, sandwich Enzyme Immunoassay kit, First, I took the Serum samples and reagent out of the Ice Bag and kept them in room Temperature be melted. Next, add 25 microliter sample diluent in each well. Then add 100ml positive and Negative controls. Then I took a hundred microliters of sample from the sample tube and added it to the fifteen wells. and Then cover the plate & incubate 60 mint at 37 o c. while the sample is incubating until the fifteen is enough conjugate working solution if I prepare after taking out the plate from the incubation after the incubation time is over and wash the wells six times with working wash solution according to wash procedure. If I wash well, I put 100 ml of the conjugate solution I originally prepared on all wells. I covered the plate & incubate it again for 30 minutes at 37oc and wash again. I then saturate it at room temperature for 30 minutes in a dark place and add 100 ml Stop Solution, Read absorbance at 450 nm within 30 minutes in ELISA reader. after Reading of Analyser all postive sample cutoff value greater than and equal to 0.400 - 0.50 The Final results of HIV infection was Positive [62]. **Notice:** Detailed ELISA procedures mention below in Annex Parts.

4.6.3.4. HBVrapid ScreeningTesting

Serum Sample was screening using one step HBsAg test Device, which is highly sensitive (98.7%) specific (98.9%) to detect antigen of HBV. Total 384 samples out of 13 were positive by HBsAg one step rapid immune chromatographic direct binding test, hepatitis B infection Done by per the manufacturer protocol. Remove test cassettes from a foil pouch, and place them on a flat surface. Three hundred eighty-four serum samples Label the test device with a women identification number. Then add one drop of a Serum waited for Ten minutes after the conjugation time is over has to Show a pink-colored control line a distinct pink-colored band Will also appear in the test region wasPositive. however,On a three Sample, Show a Strong

bright pink color on the control line and weak bright pink color on the test. I repeated the same thing and said the result was Positive.Overall, thirteenHBSAg positive sample by rapid test verified by ELISA test.This weak reaction may possibly be due to low ab titers in sera particularly in recent infections where the levels may be well below the detection limits of RDT [61].

4.6.3.5. HBSAg ELISA Test

After Screening of 384 Samples out of 13 positives for hepatitis B surface antigens (HBsAg) in serum was Confirmed by ELISA according to the manufacturer's instruction (Beijing Wantai Biological Pharmacy Enterprise Co., Ltd. China). using an ELISA based on double antibody "sandwich" immunoassay, which employs specific anti-HBsAg antibodies, a monoclonal antibody to HBsAg immobilized at the bottom of Micro Titer wells, and polyclonal Ab to HBsAg coupled with HRP as a conjugate solution.

First, I took the Serum samples and reagent out of the Ice Bag and kept them at room temperature to be melted. Next, add 20 microliter sample diluent in each well. Then add 100ml positive and Negative controls. Then I took a hundred microliters of sample from the sample tube and added it to the thirty wells. Then cover the plate & incubate 60 mint at 37 oc. while the sample is incubating until the thirty is enough conjugate working solution if I prepare after taking out the plate from the incubation after the incubation time is over and wash the wells six times with working wash solution according to wash procedure. If I wash well, I put 50 ml of the conjugate solution I originally prepared on all wells. I covered the plate & incubate it again for 30 minutes at 37oc and wash again. I then saturate it at room temperature for 30 minutes in a dark place and add 50 ml Stop Solution, Read absorbance at 450 nm within 30 minutes in ELISA reader. after reading samplesthirty Positive sample cutoff value above one based on manufacturer'sclimes the result was Positive [62].**Notice:** Detail procurers motioned Annex Part.

4.6.3.6. Syphilis Testing

Among the total 384 samples analyzed using Syphilis Rapid Test Device to detect antibodies produced against Trepollema palladium in the serum of pregnant women. Of Twelve Samples

Seropoistive for Syphilis. Rapid immunochromatographic syphilis tests advanced quality one step rapid immunochromatographic syphilis tests (Intec products, Inc., china) having T. Pallidum recombinant antigens and provide results similar to those of specific treponemal tests used. The sensitivity and specificity of the test are 99.8% and the relative specificity is 99.7%. First, three hundred eighty-four serum samples Label the test device with a women identification number Then Add two drops of a Serum and one drop of buffer Then waite 10 minutes after the time is over Seen pink-colored control line, a distinct pink colored band Will also appear in the test region was Positive. Of the Three Sample, I saw a bright pink color on the control line and bright pink color on the test repeated, the same thing and I said the result if Positive. Twelve in the first identification by rapid test Overall, I isolated twelve syphilis infections in my first diagnosis. The Presence of Antibody of Syphilis infection in serum was verified by ELISA Analyser [62].

4.6.3.7 T.pallidum/Sypilis anti-body by Wanti ELISA Testing

Syphilis was tested using a commercially available rapid test Device Among the total three hundred eighty-four (384) out of Twelve Serum samples positive for the anti-Syphilis test. The Presence of Antibody of Syphilis infection in serum was detected using ELISA according to the manufacturer's instruction (Beijing Wantai Biological Pharmacy Enterprise Co., Ltd. China), anti-syphilis ab ELISA is a solid phase qualitative enzyme immunoassay based on a sandwich principle for the detection of total antibodies (IGA, IGg, and IgM) to treponema pallidum in human serum or plasma. First, I took the Serum samples and reagent out of the Ice Bag and kept them at room temperature to be melted. Next, add 20 microliter sample diluent in each well. Then add 100ml positive and Negative controls. Then I took a hundred microliters of sample from the sample tube and added it to the Twelve wells. Then cover the plate & incubate for 30 mint at 37 oc. while the sample is incubating until the Twelve is enough conjugate working solution if I prepare after taking out the plate from the incubation after the incubation time is over and wash the wells six times with working wash solution according to wash procedure. If I wash well, I put 50 ml of the conjugate solution I originally prepared on all wells. I covered the plate & incubate it again for 30 minutes at 37oc and wash again. then saturate it at room temperature for 30 minutes in a dark place and add 50 ml Stop Solution, Read absorbance at 450

nm within 30 minutes in ELISA reader. If the ELISA test Analyser has finished Reading, the cutoff value of three samples is less than one, but the cutoff value of Nine samples is more than one, that why the reason of Discrepancy one of the mean reasons ELISA Analyser much more sensitive than rapid tests for screening of Syphilis infection and may be a new untreated infection with low antibody levels due to active seroconversion.So I reported that the Syphilis result was positive according to the Manufacturerclaim [62].

4.7 .Data Quality Assurance

4.7.1. Pre Analytical

First, the specimens were collected by trained lab technicians from Pregnant women and labeled by the Women's unique identification number. Then samples were centrifuged serum was evaluated and separated; appropriately stored until transported to the laboratory. The transported samples were stored at the optimum temperature until they were processed.

4.7.2. Analytical

The rapid cassette/strip test and ELISA kit were assessed IQC by commercial control materials. Based on the manufacturers' instructions, All blood samples Were analyzed, using Enzyme-Linked Immunosorbent Assay (ELISA) for HIV, HBsAg and Syphilis Here, the standard laboratory procedures are also followed and the results were checked by the laboratory quality officer and if any result is confirmed.

4.7.3. Post-Analytical

The results were recorded with the unique patients' identification number and errors of test results were avoided through repeatedly checking. Finally, test results of common STI were summated to Gandhi memorial hospital.

4.8. Data Analysis and Interpretation

Statistical analysis: SPSS version 25 software was used for the analysis of data. Baseline characteristics of the study participants are expressed in mean ± SD Descriptive statistics was performed to describe the demographic profile of the study participants. Cleaning was performed to check for frequencies, accuracy, and consistency, and missed values and variables. Any error identified during data entry was corrected after the revision of the originally completed questionnaire.

Tables were used to present and appraise results. The significant level was set for values of $P < 0.05$. Prevalence rates were calculated for each viral infection studied. The associations between categorical variables were assessed using univariate analysis (Pearson's Chi-square test) and the risk was expressed as Odds Ratio (OR) and 95% confidence interval (CI). A stepwise multiple logistic regression model was constructed, with the inclusion of variables with an estimated level of significance in univariate analysis lower than 0.25, to evaluate the strength of association of the different factors with HIV, HbsAg, and Syphilis seropositivity. Variables with significance levels lower than 0.05 were maintained in the final model. The results are expressed as adjusted OR and 95% CI.

4.9. Operational Definitions

- **STIs:-**an infectious disease that is passed from one person to another through intimate sexual contact with an infected person.
- **Chronic HBV infection**:- persistent (long-term) infection with hepatitis b virus developed after six months of exposure.
- **Acute infection:-** is an active infection developed rapidly after exposure (less than six the month of exposure).
- **Co-infection:-** is the presence of dual infection concurrently.
- **HBsAg:**-is the surface antigen of the hepatitis b virus (HBV). It indicates current Hepatitis B infection.
- **Seroprevalence:** The level of a pathogen in a population, as measured in blood serum.
- **Seronegative:**-is the status of an individual who gives a negative reaction to a serological.
- **Seropositive:**-is the status of an individual who gives a positive reaction to a serological.

4.10. Ethical Consideration

The study was conducted after getting consent from the department of research and ethics committee (DREC) of medical laboratory sciences, college of health sciences Addis Ababa University. The DREC is the responsible body for permitting conducting researches in the concerned area by providing ethical clearance. Therefore an Ethical clearance was obtained from Addis Abeba public health research and Emergency management directorate approval and carry out the study on the topic of Seroprevalence and risk factors of sexually transmitted infection.

HIV, HbsAg, and TP infection among pregnant women attending Gandhi Memorial Hospital, Addis Ababa, Ethiopia. The patients were informed about the aim of the study and assured about the confidentiality of the information and the participation was sole voluntary and none of a single service from the facility missed at the time of unwillingness or withdrawal by signing the consent and assent form.

4.10.1. Dissemination of Results

After conducting the research, the results of the study were submitted to the AAU department of medical laboratory sciences in two hard copies and a softcopy by CD. Moreover, a hard copy of the results was disseminated to Addis Ababa public health Research and Emergency management directorate and other stakeholders. The results of the study were submitted to peer review journals for publication. The finding will also be communicated through presenting at scientific conferences.

5. Results

5.1. Socio-demographic and obstetric characteristics

In our Study a total of 384 Pregnant women were asked to participate in the study. All Study participants were interested in HIV1/2, HbsAg, and Syphilis tests. The age of the pregnant women who attended ANC ranged from 18-38 where the median age was 28 years and the mean age was 28.66 years with standard deviations of (+ 4.57) years. Most pregnant women were between the ages 27-33 was 216 (56.4%), Many of the pregnant women who participated in the study are the lowest source of income was 166 (43.3%%), and the majority Number of children participant categories one up to three was 191 (49.9%), Participants of pregnant women had a low level of Education (Elementary & Secondary School) was 123 (32.1%), 108 (28.2%) respectively. They are a majority of participants, Housewife who has the highest number of participating in the study was 169 (44.1%), and most of the pregnant women who participated in the study live in Addis Ababa was 284 (74.2%). The majority of those involved were married women 330 (86.2%) and the participants who had given birth before Married & Separated women were 22 (5.7%), 21(5.5%) respectively.

5.1.1. MaternalHistory

Among pregnant women who attended ANC the Majority of this Study Participants had 3rd Trimester, (60.1%), the lower participant had 1st Trimester 27 (7.0%), Moreover Among pregnant women who attended ANC Most of them 140 (36.5%) were grand multigravidae women's, and then multigravidae and Primigravidae pregnant women 128 (33.4%), 115 (30.0%) respectively. but they are nearby, Maternal History of the participants is shown in (Table1).

Table1. Friquncy of Sociodemographic characteristics of pregnant women attending in Gandhi Memorial Hospitals from March,1 to June, 30 2021.

Characteristics	Categories	Firequncy	Percentage %
Age	18-26	77	20.1%
	27-32	216	56.4%
	33-40>	90	23.5%
Monthly Income	1500	84	21.9%
	1600-2000	166	43.3%
	2100-3000	87	22.7%
	>3500	46	12.0%
Marrital Statues	Single	22	5.7%
	Marred	330	86.2%
	Separate	21	5.5%
	Widowed	10	2.6%
Number of children	1stPregnancy	90	23.5%
	1-3	191	49.9%
	4-6 < =	102	26.6%
Level of Education	Not Educated	61	15.9%
	Elementary Shool	123	32.1%
	Secondary Shool	108	28.2%
	College/University	91	23.8%
Employiment Status	Labor	82	21.4%
	Government	64	16.7%
	Business	68	17.8%
	Housewives'	169	44.1%
Iiving Places	live in Addis Ababa	99	25.8%
	NotliveinAddis Ababa	284	74.2%
Gestational Trimester	1st Trimnster	27	7.0%
	2nd Trimnster	126	32.9%
Gravity	3rd Trimnster	230	60.1%
	Prigravida	115	30.0%
	Multigravida	128	33.4%
	Grand MultiGravida	140	36.5%

5.2. Seroprevalence of HIV1/2, HbsAg and Syphilis infection.

Among the total participant, 384 pregnant women attending the antenatal clinic of the (GMH) was screened for serological evidence of HIV, HBV, and Syphilis infections (rapid test kits vs ELISA Analyser). After collecting the specimen, the Separate serum was first subjected to be Screening by New HIV Algolism and rapid test kits to detect HIV ½ and HbsAg, Syphilis Infection we investigated 15(3.9%) and 13(3.4%), 12(3.4%) respectively. However when all the Seropositive samples by first line Screening test were Confirmed to ELISA Analyzer, Accordingly the total seroprevalence of the HIV, HBsAg, and Syphilis infections was obtained from our study result was 15(3.9%)13(3.4%)9(2.3%) respectively (figure 4).

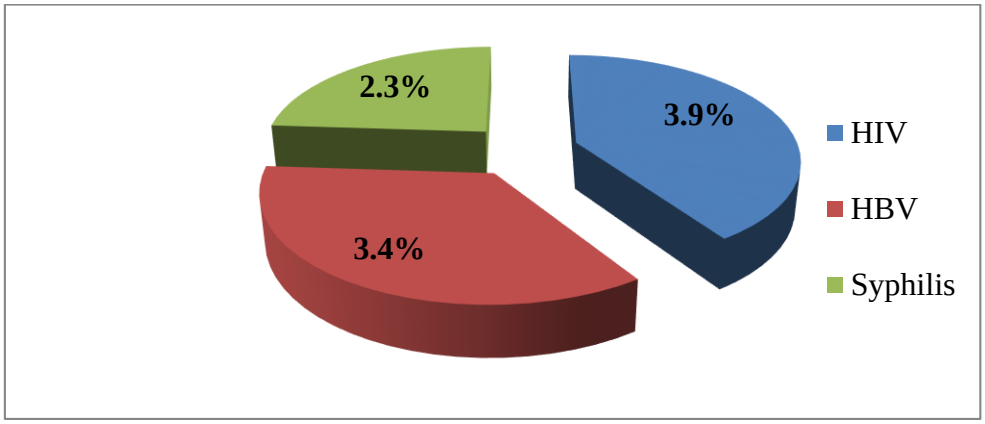


Figure-4. Sero-prevalence HIV,HBV and Syphilisin pregnant women attending at GMH, March to Jun, 2021, Addis Ababa, Ethiopia.

5.3. Sero-prevalence and Associated risk factors of HIV1/2 infections

Exposure to different risk factors for HIV1/2 infection was assessed and determined. It found that 60.0% of the pregnant women had lived in Addis Ababa and the Average respondent Age groups were 27–32 years (46.7%) and a majority of Separated Women (53.3%). Regarding the distribution of HIV seropositive based As very small Percent of pregnant women were found to be positive 1(6.7%), and had Married and low monthly incomes participants were 1(6.7), the different categories of the variables do have nil cell values. Hence, it was invisible to conduct logistic regression analysis (Tables 2).

5.4.Bivariate Analysis of HIV1/2 infection

Binary logistic regression was applied to identify crude association of demographic Variables such as Age, 18-26 [COR 2.1 95%CI (.508 - 8.700)], [p=0.030] and 27-32, [COR 788; 95%CI (.193-3.227)] [p=<0.013], Participant living in Addis Ababa, [COR 1.9; 95%CI (.683-5.687)] [P=<0.020], in Study Partcpant were Single, [COR 4.1 95%CI (1.031-8.615)], [p=<0.000], were statistically significant at less than 5% Confidence level & were found to be the associated factors of HIV1/2 infection among pregnant women (Table 2).

5.5.Multivariate Analysis of HIV1/2 infection

Then for those variable p-values <, 0.25 with binary logistic regression analysis using multinomial logistic regression was done to see independent association and to Adjusted possible confounder. According to this study 27-32 years, pregnant women were 181% times less likely to be reactive to HIV infection than 18-26 age of pregnant women [AOR 0.181; 95%CI (.017-1.972)], [p=0.016], Pregnant women living in Addis Ababa more Significance Associated with HIV infection than Not living in Addis Ababa respondents, [AOR .507; 95%CI, (.176-1.463)], [p=0.020] and Moreover at multivariate logistic regression; Single, Pregnant women Highly Significance Associated with HIV infection Compared to Widowed pregnant women [AOR; 3.1 95%CI (1.4 - 21.1)], [p=<0.000], but Widowed participant women none of the risk factors were

found to be statistically significantly associated with HIV1/2, [p=0.032] Though the prominent risk factors were Monthly Income, Number of Children's & Educational levels, Employment Statues there is no Significance association with HIV seropositive (Table 2).

Table-2. Sero-prevalence and Predictors of HIV1/2 Virus Infections among Pregnant Women Attending Antenatal Care in Gandhi Memorial Hospital from March 1, 2021 to Jun 30, 2021.

Variable	Frequency	Sero-Status of HIV1/2							
		Negative N (%)		Positive N (%)		COR 95% CI	P-V	AOR 95% CI	P-V
Age	18-26	77	20.9	5	33.3	2.103 (.508-8.700)	.030		
	27-32	208	56.5	7	46.7	.788 (.193-3.227)	.013	.181(.017-1.972)	.061
	33-40>	83	22.6	3	20.0		.741		
Marital Status	Single	20	5.4	5	33.3	.139(.031-18.6)	.000	3.148(1.470-21.10)	.002
	Married	321	87.2	3	20.0	.011(.003-.041)	.439	NA	
	Separate	21	5.7	4	26.7	2.135(.030-10.6)	.403	NA	
	Widowed	6	1.6	3	20.0		.323	NA	
Monthly Income	1500	79	21.5	5	33.3		.456	NA	
	1600-2000	159	43.2	7	46.7	.527(.063-4.417)	.354	NA	
	2100-3000	85	23.1	2	13.3	1.060(.218-5.145)	.942	NA	
	>3500	45	12.2	1	6.7	1.350(.193-9.447)	.762	NA	
Numberof children	New	84	22.8	6	40.0		.846	NA	
	1-3	185	50.3	6	40.0	1.519(.331-6.980)	.591	NA	
	4-6	99	26.9	3	20.0	1.420(.368-5.475)	.610	NA	
Level of Education	NotEducate	51	13.9	7	46.7		.005	NA	
	Elementar	123	33.4	3	20.0	8.725(1.840-41.38	.006	NA	
	Secondary	105	28.5	3	20.0	.090 (.478-1. 987)	.996	NA	
	University	89	24.2	2	13.3	1.271(.208-7.779)	.795	NA	
Employment	labor	78	21.2	4	26.7		.650	NA	
	Governme	62	16.8	2	13.3	1.376 (.377-5.014)	.629	NA	
	Business	64	17.4	4	26.7	.445 (.053-3.775)	.458	NA	
	Housewive	164	44.6	5	33.3	1.672 (.457-6.118)	.438	NA	

living	Rural	93	25.3	6	40.0		.	NA	
places	Urban	275	74.7	9	60.0	1.971(.683-5.687)	.020	.507 (.176-1.463)	.020

Abbreviation:AOR adjusted odds ratio **COR** crud odds ratio **CI**, Confidence Interval **P-Value, HIV**, Human immunodeficiency virus.
Notice:-NA not applicable refers to factors with **p-value ≥0.25** at the bivariate level which were not considered when developing theMultivariable model. The variables listed in this table are the variables that were included in the bivariate analyses.

5.6. Seroprevalence and Associated risk factors of HBsAg infections.

Among the total participant 384 pregnant women participate out of thirty HbsAg Positive, they are Majority of pregnant women were age range of 27–32 years, Separated was (53.8%), (30.8%) (46.2%) respectively. Regarding the distribution of HbsAg seroprevalence based As very small Percent of pregnant women were found to be positive (7.7) for Colleges/universities and monthly incomes (7.7), the different categories of the variables do have nil cell values Hence it was invisible to conduct logistic regression analysis (Tables 3).

5.7. Bivariate Analysis of HBsAg infection.

Binary logistic regression was applied to identify crude association of demographic Variables such as Particpant Age renge 18-26, [COR .621; 95%CI (.165-2.340)], [p=.048], 27-32 [COR=.515; 95%CI (.161-1.648)], [p=0.021], Separeted [COR=.337 (.090 -.256)],[p=0.020], Not Educate women [COR .999 95%CI (.584 -.540)],[p=0.010]. were statistically significant at less than 5% Confidence level & were found to be the associated factors of HBsAg infection among pregnant women (Table 3).

5.8.Multivariate Analysis of HBsAg infections.

Then for those variable p-value < 0.25 with binary logistic regression further analysis using multinomial logistic regression was done to see independent association and to control possible confounders.pregnant Women Age Group 27-32 years Significance Associated with HBsAg infection [AOR 1.1 95%CI (.274 - .852)], [p=.021], and Separated Women Significance

Associated with HBsAg [AOR .842 (.327-2.706)], [p=<0.002]. Not Educated [AOR .327 95%CI (.810- 2.231)],[p=.023] Pregnant women living in Addis Ababa Significance Associated with HbsAg Compared to Not living in Addis Ababa [AOR .507 95%CI (.176-1.463)], [p=.023] women, Though the difference Prominent factories were monthly Income, Number of Children and Employment Statues no Significant association with HbsAg Positive Participants. (Table 3).

Table-3..Sero-prevalence and Predictors of HBsAg Infections among Pregnant Women Attending Antenatal Care in Gandhi Memorial Hospital from March 1, 2021 to Jun 30,2021.

Variable	Categories	Sero-Status of HBsAg							
		Negatives N%		Positive N%		COR 95% Cl	P-V	AOR 95% Cl	P-V
Age	18-26	79	21.4	4	30.8	.621(.165-2.340)	.482	NA	
	27-32	208	56.2	7	53.8	1.515(.161-1.648)	.019	1.196(.274- 852)	.021
	33-40>	83	22.4	2	15.4		.507	NA	
Marital Status	Singled	21	5.7	5	38.5	3.156(.030-.819)	.367	NA	
	Marride	321	86.8	3	23.1	.024(.008-.073)	.528	NA	
	Separated	22	5.9	4	30.8	6.337(2.09-10.25)	.002	4.84(2.327-12.706)	.002
	Widowed	6	1.6	1	7.7	.632 (.092-4.350)	.405	NA	
Monthly Income	1500	81	21.9	3	23.1		.817	NA	
	1600-2000	158	42.7	5	38.5	1.747(.177-17.287	.633	NA	
	2100-3000	86	23.2	3	23.1	2.038(.244-16.993	.511	NA	
	>3500	45	12.2	2	15.4	1.057(.093-11.975	.964	NA	
No of Children	New	87	23.5	3	23.1		.832	NA	
	1-3	184	49.7	5	38.5	1.502(.327-6.898)	.401	NA	
	4-6	99	26.8	5	38.5	1.059(.259-4.328)	.936	NA	
Level of Education	NotEducated	52	14.1	6	46.2	.999(.584-.540)	.010	2.327 (.810- 2.231)	.023
	Elementary	122	33.0	4	30.8	.231 (.043-1.234)	.087	NA	
	Secondary	106	28.6	2	15.4	.672 (.120-3.751)	.651	NA	
	College	90	24.3	1	7.7	1.189 (.164-8.610)	.864	NA	
Employm	Labor	79	21.4	3	23.1		.992	NA	

entStatus	Government	61	16.5	3	23.1	.884(.223-3.511)	.861	NA	
	Business	67	18.1	1	7.7	1.145(.287-4.571)	.848	NA	
	Housewife	163	44.1	6	46.2	.376(.654-1.234	.997	NA	
living Place	Rural	90	24.3	6	46.2			NA	
	Urban	280	75.7	7	53.9	.149(.039-.569)	.245	NA	

Abbreviation:AOR adjusted odds ratio **COR** crud odds ratio **CI**, Confidence Interval **P-V** value, **HbsAg** Hepataites B Surface Anitgen Virus.**Notice**.**NA** not applicable refers to factors with **p-value ≥0.25** at the bivariate level which were not considered when developing the Multivariable model. The variables listed in this table are the variables that were included in the bivariate analyses

5.9.Sero-Prevalence of Syphilis infection in Participant Demographic Characteristics.

Among the 384 total participants 9 Seropositive Majority of the Syphilis-positive pregnant women Age 27–32 years and Separated women, living in Addis Ababa was (44.4%), (56.6%) and (66.7%), respectively. Regarding the distribution of Syphilis seroprevalence based As very small Percent of pregnant women were found to be positive (11.1%) for Married and Educational Status (11.1%), the different categories of the variables do have nil cell values. Hence, it was invisible to conduct logistic regression analysis (Table .4)

5.10. Bivariate Analysis of Syphilis infections.

Binary logistic regression was applied to identify crude association of Demographic Variables such as Age, [COR 1.5 95%CI (.174 – 2.143)], [P=<0.002], Separated [COR 2 95%CI (1.64-3.155), [p=<0.018], and women Who had living in Addis Ababa, [COR=.065 95%CI (.028 -.147)], [P=0.012], were statistically significant at less than 5% (Table 4).

5.11. Multivariate Analysis of Syphilis infections.

Then for those variable P-value < 0.25 with binary logistic regression further analysis using multinomial logistic regression was done to see independent association and to control possible confounders. Among those variables Age of respondents 26–32 years, [AOR .631 95%CI (.069-5.731)], [P=<0.003], Separated, [AOR 2.437 95%CI (1.6 – 1.991), [p=<0.002], Pregnant women

living in Addis Ababa more Significance Associated with HbsAg Compared Not living in Addis Ababa Pregnant Women [AOR .165 95%CI, (.041 - .675)], [P=<0.012] (Table .4)
were significantly associated with Syphilis seropositive. Though the different associated factors were monthly Income, Number of Children, there is No Significance association with Syphilis Sero-Positive. As only three prevalent HIV, Syphilis, and four HBsAg infection cases were detected in this study, bivariate analyses were restricted to assessing the association between HIV1/2, hepatitis B, and syphilis. Multivariate analysis to Adjusted a confounders' including any of the three infections and a predefined set of socio-demographic. statistically significant associations were found on Multivariate analyses between HIV1/2, hepatitis B, and syphilis, including any of the three prominent factors age, Marital Status, living place, and Non-edcuated pregnant Women only Statically Associated with HBsAg, More than one Sexual partner top risk factors of STI infection.

Table-4. Sero-prevalence and Predictors of Syphilis Infections among Pregnant Women Attending Antenatal Care in Gandhi Memorial Hospital from March 1, 2021 to Jun 30, 2021.

Variable	Categories	Sero-Status of Syphilis							
		Negative N (%)		Positive N (%)		COR 95% Cl	P-V	AOR 95% Cl	P-V
Age	18-26	81	21.7	3	33.3	3.859 (.422-35.254	.326	NA	
	27-32	210	56.1	4	44.4	1.585(.174-14.389	.002	.631 (.069-5.731)	.003
	33-40>	83	22.2	2	22.2		.683	NA	
Marital Status	Singled	21	5.6	2	21.2		.409	NA	
	Marride	322	86.1	1	11.1	.709 (.055-9.117)	.792	NA	
	Separated	24	6.4	4	56.6	2.048(1.64-15.5)	.018	2.437(1.676-19.185)	.002
	Widowed	7	1.9	2	12.1	1.964(.182-21.207	.051	NA	
Monthly Income	1500	80	21.4	4	44.4		.274	NA	
	1600-2000	163	43.6	2	22.2	2.250(.244-20.74)	.455	NA	
	2100-3000	86	23.0	1	11.1	.828(.084-8.155)	.872	NA	
	>3500	45	12.0	2	22.2	.523(.032-8.563)	.650	NA	
Number of	New	87	23.3	3	33.3		.782	NA	

children	1-3	187	50.0	4	44.4	1.724(.282-10.558	.256	NA	
	4-6	100	26.7	2	22.2	1.070(.193-5.941)	.939	NA	
Level of Education	NotEducat	53	14.2	4	44.4		.253	NA	
	Elementar	124	33.2	1	11.1	8.036(.915-70.576	.060	NA	
	Secondary	107	28.6	2	22.2	1.488(.133-16.661	.747	NA	
	College	90	24.1	2	22.2	.841(.052-13.639)	.903	NA	
Employment -Status	labor	81	21.7	1	11.1	.509(.056-4.630)	.626	NA	
	Govermen	63	16.8	3	33.4	.655(.072-5.971)	.549	NA	
	Business	65	17.4	2	22.2	1.904(.415-8.742)	.707	NA	
	Housewiv	165	44.1	5	45.5		.408	NA	
living Place	Urban	93	24.9	6	66.7	.065(.028-.147)	.012	.165(.041-.675)	.012
	Rural	281	75.1	3	33.3			NA	

Abbreviation: Adjusted odds ratio,**(AOR)** Crud odds ratio **(COR)** Confidence Interval **(CI)**. **P**-Value.**Notice:** not applicable refers to factors with p-value **≥0.25** at the bivariate level which were not considered when developing the Multivariable model. The variables listed in this table are the variables that were included in the bivariate analyses

5.12. Risk factors for HIV 1/2 infections

The Highest prevalence of HIV 9(60.0%), Partner other women relation and 11(73.3%) more than one sex relation and other prominent factors History of STI 11(73.3) in this study the lowest prevalence of HIV ½ infection had vaginal Delivery 1(6.7%). Prevalence of HIV infection Having A total of 15(3.9%) was statistically significant at less than 5% Confidence level & was found to be the associated factor of HIV infection among women (Table 5).

5.13.Bivariate Analysis of HIV1/2 infections.

Then a Binary logistic regression was applied to identify crude association of Risk factor and obstetric Variables such More than one Sex Partners, [COR 6.571 95%CI (1.9 - 8.9)], [p=<0.003], Partner other Women Relation [COR .939 (.088 - 2.629)], [p=.013], History of STI [COR .727 95%CI (.793 - 1.808)], [p=0.023], Some risk factors by logit higher Signficance.

5.14. Multivariate Analysis of HIV1/2 infections.

Then for those variable p-values <, 0.25 with binary logistic regression further analysis using multiple logistic regression was done to see independent association and to control possible confounders. Among those variables, More than one Sex Partner, [AOR 3 95%CI (1.7 - 6.1)], [p=<0.002], Partner other women relation, [AOR .318 95%CI (.604 - 3.10)], [P=<0.034], History of STI [AOR 1.375 95%CI (.553 - 3.418)] [p=0.023], were significantly associated with HIV1/2 infection. More than one Sexual Partner Women 4 times getting HIV infection Compare to regular Sex partners Pregnant women. Other variables like a history of abortion, Tooth extraction, ear piercing, nose piercing, and surgery, Gestational weeks, Gravity, no significant association with HIV1/2 infection (Table 5).

(Table.5) Sero-prevalence and Predictors of HIV 1/2 Infections among Pregnant Women Attending Antenatal Care in Gandhi Memorial Hospital from March 1, 2021 to Jun 30, 2021.

Variable	**Categories**	**HIV ½ Status**							
		Negatives		**Positive**		**COR 95% Cl**	**P-V**	**AOR95%Cl**	**P-V**
		N (%)		**N (%)**					
Dental Extraction	No	266	72.3	12	80.0		.514	NA	
	yes	102	27.7	3	20.0	1.534(.424-5.548		NA	
Blood transfusion	No	334	90.8	13	86.7		.558	NA	
	yes	34	9.2	2	13.3	.455(.116-1.783)		NA	
History of STI	No	360	97.8	4	26.7		.023	1.375(.553-3.418)	.023
	yes	8	2.2	11	73.3	.727(.293-1.808)		NA	
Abortion	No	260	70.7	14	93.3			NA	
	yes	108	29.3	1	6.7	.054 (.031-.092)	.084	NA	
More than **1**sex partner	No	335	91.0	4	26.7		.003	NA	.002
	yes	33	9.0	11	73.3	6.571(1.98-18.96)		3.47 (1.7 –6.14)	
PartnerWome	No	352	95.7	6	40.0		.032	NA	.034

n-relation	yes	16	4.3	9	60.0	.939 (.088 – 2.629)		.318 (.604 - 3.10)	
Gestational Trimester	1st	23	6.3	4	26.7		.310	NA	
	2nd	118	32.1	3	20.0		.403	NA	
	3rd	227	61.7	8	53.3	.515(.119-25.96)	.239	NA	
Cesarean Section	No	322	87.5	13	86.7		.721	NA	
	yes	46	12.5	2	13.3	.775 (.191-3.135)		NA	
Vaginal Delivery	No	33	9.0	5	33.5		.285	NA	
	yes	335	91.0	9	60.3	1.095(.133-9.028		NA	
Condom use	yes	23	6.3	5	33.3			NA	
	I don't	345	93.8	10	66.7	.158 (.003-7.349)	.346	NA	
Gravidty	1-gravd	111	30.2	3	19.3	.883 (.156-4.982)	.888	NA	
	>2gravid	127	34.5	5	33.3	.193(.017-2.176)	.283	NA	
	>3gravid	110	35.3	7	46.7	2.420(.494-11.861)	.276	NA	

Abbreviation: Adjusted odds ratio**,(AOR)** Crud odds ratio **(COR)** Confidence Interval **(CI).P**-Value.**HIV** Human immuno deficencey virus.
Notice: not applicable refers to factors with p-value ≥0.25 at the bivariate level which were not considered when developing the Multivariable model. The variables listed in this table are the variables that were included in the bivariate analyses.

5.15. Risk factors for HbsAg infections

The Highest prevalence of HbsAg 6(46.2%) where History of Mor than one sex Partners Most of the Concerning exposure to risk factors for HbsAg positive, and History of HBV Vaccination Statues, 10 (76.9%), Hospital Admission 8(71.2%) the lowest Prevalence of HbsAg infection had a History of CS, medical Surgery 1(7.7%), the highest prevalence of HbsAg in Study were statistically significant at less than 5% Confidence level & were found to be the associated factors of HIV infection among women (Table 6).

5.16.Bivariate Analysis of HbsAg infections.

Then a Binary logistic regression was applied to identify crude association of Risk factor and obstetric Variables such More than one Sex Partner, [COR 5.188 95%CI (1.69 - 9.3)], [p=<0.000], History of Hospital Admitted [COR 2.093 95%CI (.087 - 4.429)], [p=0.047], Vaccination Status

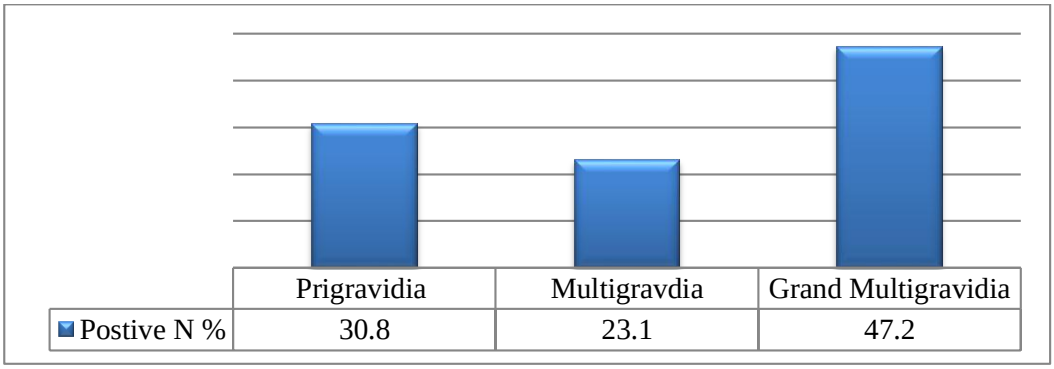
[COR 1.702 95%CI (.534 - 9.6)], [p=0.017],were Significance assocation with HbsAg.

5.17. Multivariate Analysis of HbsAg infections

then further Analysis to control the possible confounders and assess independently associated factors for HbsAg infection, multivariate logistic regression analysis was done. Seroprevalence of HbsAg remained significantly associated with More than one Sexual partner [4.391 95% CI (1.171-8.3),[p=0.003]. Hospital Admition [AOR 1.667 95%CI (.910- 3.413)],[P=0.047]. Vaccination Status [AOR .667 95%CI (.341 – .823)],[p=<.015]. were highly significantly associated with HbsAg infection, In the study, high rates of transmission of hepatitis B surface antigen are multiple Sexual activities , as well as those who had women who are going to stay in bed and seek medical attention in health facilities for medicals ward treatments. In this study most of the pregnant women were not vaccinated against hepatitis B. However history of Tooth extraction, tattooing and blood transfusion, gravidity, Gestational weeks, and history of abortion , Stillbirth was not significantly associated with HBV infections, were not Significance Associated with HIV infection (Table 6).

5. 18. Prevalence and obstetric association with HBsAg infection.

From March to June 2021, a total of 384 Pregnancy women were asked to participate in the study. Prevalence of HBsAg infection Having A total of 13(3.4%) out of 6(47.2%) Grandmltigriavida, pregnant woman HBV sero reactive but not Significance Associate, and above Prigravida Multigriavida women's 4(30.1%), 3(23.1%) respectively (Figure 6).



(Figure5**).** Distrubtion of HBsAg in Gravidia pregnant women attending at Gandhi Memorial Hospital, March 1, 2021 to jun 30 2021, Addis Ababa Ethiopia.

Table 6. Sero-prevalence and Predictors of HbsAg Infections among Pregnant Women Attending Antenatal Care in Gandhi Memorial Hospital from March 1, 2021 to Jun 30, 2021.

Variable	Category	Sero Status of HbsAg							
		Negative N(%)		Positive N(%)		COR 95% Cl	P-V	AOR95%Cl	P-V
Dentalextraction	No	271	73.2	9	76.9			NA	
	yes	99	26.8	4	23.1	.216(.327-20.33	.268		
Tattooing	No	283	76.5	10	76.9		.935	NA	
	yes	87	23.5	3	23.1	1.056(.284-3.921)		NA	
Hospital Admition	No	347	89.7	5	44.5		.047		
	yes	23	10.3	8	71.2	2.093(.087-4.429)		1.667(.910-3.413)	.047
More than 1sex partner	No	351	90.8	7	53.8		.000		.003
	yes	19	9.2	6	46.2	5.188 (1.69 - 33.95)		4.391(1.171-8.34	
Partners-otherwomen-relation	No	265	94.9	8	61.5		.324	NA	
	yes	105	5.1	5	38.5	.177(1.24-21.56)		NA	
Abortion (TBA)	No	246	71.6	9	69.2		1.00	NA	
	yes	124	28.4	4	30.8	.892(.269-2.958)		NA	
Surgery	No	324	66.5	12	92.3		.837	NA	
	yes	46	33.5	1	7.7	1.134(.342-3.756)		NA	
CesareanSection	No	323	87.6	12	92.3		.580	NA	
	yes	47	12.4	1	7.7	1.789(.227-14.069		NA	
Pervious HIV Status	No	336	99.5	12	92.3		.334	NA	
	yes	34	0.5	1	7.7	.003(.001-.020)		NA	
Gestational Trimester	1st	27	7.3	4	30.8	.219(.208-49.92)	.286	NA	
	2nd	116	31.4	2	15.4			NA	
	3rd	227	61.4	7	53.8	5.741 (.517 - 7.8)	.345		
Vaccinations Statues	yes	18	3.8	3	23.1			NA	
	No	356	96.2	10	76.9	1.702(.534- 2.296)	.017	.667 (.341 - 823)	.015

AOR adjusted odds ratio **COR** crud odds ratio **NA** not applicable refers to factors with p-value ≥0.25 at the bivariate level which were not considered when developing the Multivariable model. The variables listed in this table are the variables that were included in the bivariate analyses

5. 19. Prevalence and obstetric Risk factors for Syphilis infections

The majority of the study participants were More than one sexual partner 6(66.7%), The results also showed that, higher proportion 7(77.8%) and History of Husbands STD 5(55.6%), Previous HIV Statues 5(55.6%) the Highest Prevalence of syphilis were found in pregnant women history of more than one partner women and the lowest prevalence has Seconds Trimesters 2(22.2%) the highest prevalence of Syphilis in Study were statistically significant at less than 5% Confidence level & were found to be the associated factors of HIV infection among women (Table-7).

5.20.Bivariate Analysis of Syphilis infections.

Then a Binary logistic regression was applied to identify crude association of Risk factor and obstetric Variables such More than one sex Partner [COR 4 95%CI (1.51 - 6.3)],[p<0.001]. pervios HIV Status [COR .020 95%CI (.004-.095)],[p=<0.000]. History of husband STI,[COR .533 95%CI (.033 - 8.674)],[p=.048]. were Significance association with Syphilis infections.

5.21. Multivariate Analysis of Syphilis infections.

Then further Analysis To control the possible confounders and assess independently associated factors for Syphilis infection, Multivariate logistic regression analysis was done. Seroprevalence of Syphilis remained Highly significant associated with More than one Sex Partner, [AOR 3. 95%CI (1.2 – 5.2)], [p=<0.001], Previous HIV Status [AOR .014 95%CI (.006 -.033)], [p=<0.000], husband history of STI [AOR .833; 95%CI (.254 - 2.731)] [p=.023], were Significance associated with syphilis infection, Pregnant women who had multisexual partners three folds increased risk of getting the Syphilis infection compared to women who had regular partners. However, history of Tooth extraction, tattooing and blood transfusion, gravidity, Gestational weeks and history of abortion, Stillbirth were not significance associated with syphilis infections, and history of Delivery, Husband STI history, Maternal Weeks, were not Significance Associated with Syphilis infection (Table 7).

As only five prevalent STI cases were detected in this study, bivariate analyses were restricted to assessing the association between HIV, hepatitis B, syphilis, or a composite outcome including any of the three infections and a predefined set of socio-demographic and maternal factors. statistically significant associations were found on Multivariate analyses between HIV hepatitis B, syphilis, or a composite outcome including any of the three infections and, More than one Sex Partners, history of STI, Previous HIV Statues, husband other women relation, Hospitalization.

Table.7. Sero-prevalence and Predictors of Syphilis Infections among Pregnant Women Attending Antenatal Care in Gandhi Memorial Hospital from March 1, 2021 to Jun 30, 2021.

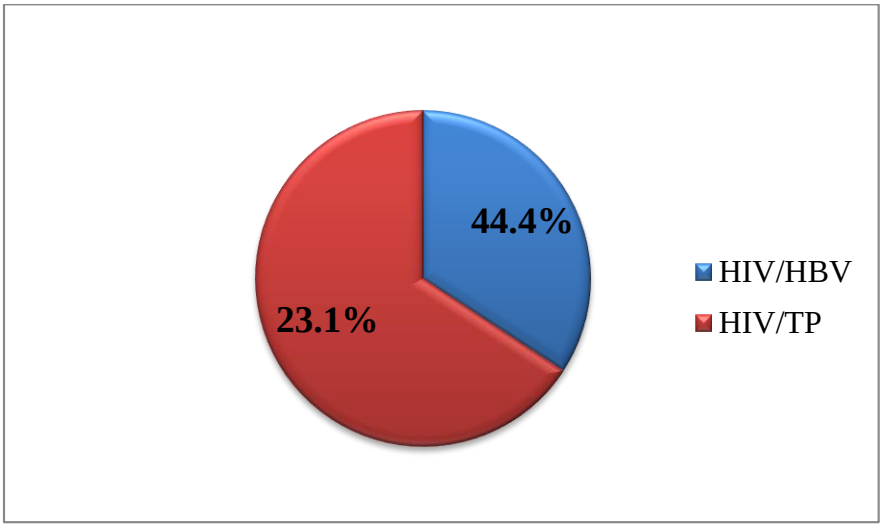
Variable	Categories	Sero-Status of Syphilis infections							
		Negative N(%)		Postive N(%)		COR 95% Cl	P-V	AOR95%Cl	P-V
Gravidity	Primigravid	112	29.9	2	22.2			NA	
	multigravid	126	33.7	4	44.4	2.669(.277-25.7	.396	NA	
	3-4 gravid	87	23.3	3	33.3			NA	
Neonatal Death	No	364	97.3	7	77.8			NA	
	yes	10	2.7	2	22.2	.146(.026-.831)	.540	NA	
Stillbirth	No	326	87.2	2	22.2			NA	
	yes	48	12.8	7	77.8	.654(1.31-36.9)	.314	NA	
History of Abortion	No	270	72.2	4	44.4		.084	NA	
	yes	104	27.8	5	55.6	.308(.0811.170)		NA	
More than one sex partners	No	336	89.8	3	33.3		.001	NA	
	yes	38	10.2	6	66.7	4.075(1.51-26.3)		3.294(1.293-5.27)	.001
Partners other Women-Relation	No	355	94.9	3	66.7		.367	NA	
	yes	19	5.1	6	33.3	.631(.354-32.072		NA	
History of STD	No	363	97.1	6	66.7			NA	
	yes	11	2.9	3	33.3	.008(.000-.132)	.493	NA	
Husband STI History	No	360	96.3	2	22.2			NA	
	yes	6	1.6	5	55.6	.533(.033-8.674)	.048	.833(.254-2.731)	.034
Previous HIV	Neg	6	1.6	4	44.4			NA	

Statues	pos	368	98.4	5	55.6	.020(.004-.095)	.034	.014 (.006 -.033)],	.045
Blood Transfusion	No	339	90.6	7	77.8			NA	
	yes	35	9.4	2	22.2	1.211(.147-9.9	.859	NA	
Gestational Trimester	1st tirmes	24	6.4	3	33.3	.911(.165-5.046)	.314	NA	
	2nd tirmes	124	33.2	2	22.2		.027	NA	
	3rd tirmes	226	60.4	4	44.4	.062(.492-15.4)	.243		

Abbrvation:-AOR adjusted odds ratio **COR** crud odds ratio **NA** not applicable refers to factors with **P-value** ≥0.25 at the bivariate level which were not considered when developing the Multivariable model.The variables listed in this table are the variables that were included in the bivariate analyses

5. 22. Co-infection Seroprevalence in Pregnant women.

In our Study relative percentage of HIV/HBV and HIV/TP co-infection rates, were observed. Finally, the total number of samples that were found to be reactive via the ELISA machine is depicted respectively in (figure 6). Accordingly, the total seroprevalence of HIV/HBV was 3 (23.1%) and HIV/TP 4(44.4%).



(Figure 7.) Prevalnce of Co-infections HIV/HBV and HIV/TP among pregnant women in Gandhi Memorial Hospital from March 1,2021 to jun 30,2021, Addis Ababa Ethiopian.

6. DISCUSSION

In our study, the prevalence of STI infection was 15 (3.9%), HIV1-2, 13(3.4%), HBsAg, and 9(2.3%) syphilis infection among pregnant women at Gandhi Memorial Hospital Addis Ababa Ethiopia, 2020-2021.

6. 1. HIV infection in Pregnant Women.

This study found a relatively higher prevalence of HIV infection compared to an In light of a similar study conducted 9(2.2%) [60]. This might be related to the Current pandemics, Before the COVID-19 pandemic, reductions in HIV screening, prevention, and partner services volunteer to HIV rised for a number of year. other wise May related to increasing the Capacity of the Catchment area Compared to the earlier Study. In this study, the consistency with the Ethiopia national sentinel surveillance reported in 2018-2020 in women was (3.6%) [17]. And a hospital-based study in South Africa (3.7%) [32]. On the other hand, the result of the present study is higher than the result of the national prevalence in Brazil (0.3%) [25]. Another retrospective study in China was (0.54%) [22]. and a similar study in Sudan (1.13%) [39]. This similar Study in Wolmera Oromia (2.9%) [57]. This finding is lower than the report of the study conducted in the Arsi teaching hospital Ethiopian (2.1%) among pregnant women [47] and Debre birhan (7.2%) [56]. Indian (5.5%) [26]. Tanzania (5%) [34]. Similarly, in a study conducted at Atat teaching Hospital in South Ethiopia among pregnant women, the prevalence of HIV was (2.7%) [55]. In this Study prevalence of HIV is lower in contrast to the prospective study conducted in Nigeria (8.5%) [35]. Furthermore, another systematic review was done among pregnant women in 2019 Ethiopia with a large sample size and found that in general (5.74%, 9.50%, 9.7%, 4-6%, 4.1%) in Ethiopian, Amhara, Gambella, Harer, Afar Respectively [51]. This might be The spread of HIV infection has been differed from one country to another depends on that it relies, upon way of life, particulary in our City The presence of hung quantities of business sex workers and there are low financial standard communities, bothers are it dose aggravate the spread of HIV disease.

Of the socio-demographic characteristics, active age groups, and giving birth before married had a significant association with HIV infection. This study agreed with the Ethiopian surveillance

report in 2019, where the majority (67%) of the HIV Infected age group was 20-34 and more than half (68%) of the STI Infected were women [17]. However, it is higher HIV seropositivity reported among pregnant women in Nigeria [35]. and Rwanda [29]. This was also similar to a study done in Tanzania among pregnant women where the prevalence of HIV was increased in Single women being married women [34]. Similarly, a similar finding was reported in Addis Ababa Ethiopian [50] [51]. The majority of the Similar Studies concur with the outcome. This could be young women go through huge advances in way of life and lack of maturity or theyhave a sexual opportunity.

In this study, the factor significantly associated with HIV infection was the residential setting [p=<0.020]. This finding agrees with the Ethiopian national surveillance result, in which pregnant women living in an urban area are 3 times more likely to develop HIV infection compared to those having women in rural areas [51]. This result is also similar to the study done in South African [32]. And also another similar finding in Nigeria [35]. However, it is much higher than HIV seropositivity reported among pregnant women in Tanzanian [34]. And wolmera Oromia [57]. And similar Hospital-Based Study in Arsi Ethiopian [47]. In our study area, there is a higher HIV prevalence, this might be urba area higher internal migration from a different rural countries and Most of women's their not education may be easily unable to find a job. They are forced to become sexual workers.

Our current findings also show that the prevalence of HIV infection is significantly increased with a history of relationship between partners [p=0.023]. and women history of STI [p=<0.023].This finding is similar to the study finding in India [26]. Also, this is similar to the study in Rwanda [29]. another similar study Conducted in Tanzania [34]. This may in Developing countries some Religious & Cultural Sprites accept more than one marriage, it has main risk factors of HIV transmission, or he has repeated sex exposures with other women besides his wive.

Another prominent factors' history of More than one Sex Partners Three times getting a risk of HIV infection [p=<0.002]. Compared to those who have regular partners women, our finding is consistent with pooled Prevalence of a similar study in Addis Ababa, Ethiopia [51]. Another similar study was conducted in Nigeria [35]. On other hand, a similar study was conducted in

Atat South Ethiopian among pregnant women [55]. However, it is higher HIV seropositivity reported among pregnant women in Debre birhan Ethiopian [46]. This may be having unhabits sexual practices with numerous sexual partners among youth womens. what's more, Young women with MSPs are more averse to utilize a condom.

6. 2. Syphilis infection in pregnant women.

In this study, the seroprevalence of syphilis among pregnant women in the current study was (2.3%). Our finding is much more high compared to the seroprevalence of syphilis among pregnant women conducted in 2014 by Fissehatsion k, Addis Ababa Ethiopia was 0(0%) [50]. This finding similar to hospital-based studies in Addis Ababa Ethiopia was (2.4%) [58]. in our finding may indicate as there has been an increased prevalence of syphilis infection in general populations. Our finding is also similar to the prevalence conducted at Asella eastern Ethiopian (2.2%) [47]. The finding of the current study is consistent within the 2019 Sub-Saharan Africa systematic review among Pregnant Women conducted by Siraj Hussen et al. was (2.9%) [49]. This result is also in line with the prevalence reported in Bahir Dar, northwest Ethiopia (2.6%) [50]. On other hand, a Similar Study was Done in Nigeria (2.4%) [35]. in our study The similar prevalence of syphilis among pregnant women in 2018 Arsi Ethiopian was 13(2.2%) [34]. this finding was lower than the prevalence of syphilis in 2018 Sudan was (7.4%) out of 444 pregnant women a syphilis-reactive result [39]. In another Similar Study, out of 661 attendees, 29(4.4%) women tested positive for syphilis in Brazil [24]. And in our country Study Done in Jimma (3.7%) [52]. And also a higher prevalence of syphilis among pregnant women in 2017 Debre birhan Ethiopia was (1.8%) [56]. Similar to China (1.8%) [22]. And Debre Birhan Ethiopian (1.80%) [56]. and Bahir Dare (2.6%) [50]. another retrospective study in Wolmera Ethiopian (1.2%) [57]. Compared to similar studies, there is a higher prevalence in Indians (1.7%) [25]. The inconsistencies of syphilis among various population inside and outside Ethiopia may be an impression of sexual practices and behavior of the general public, an awareness about syphilis, and furthermore unique in the lab procedure utilized in the detection of Syphilis infections.

In this study, the factor significantly associated with Syphilis infection was women in Urban areas. [p=<0.012] higher Syphilis infection. This result is consistent with Addis Ababa and Nigeria (2.4%), (2.4%) respectively [35]-[51]. This result is also similar to the study was done in Bahr dar where among rural and urban women [50]. However, in this result, the study disagreed

with the condacted rural area of Jimma (3.7%) [52] Assella [47] and Sedi muja [45] in Ethiopian countries. This might be The burden of syphilis needs to be better characterstics in terms of different regions.

Separate pregnant women were found to have twice the chance of getting syphilis infection [p=<0.002] than married women. in our study agree with Debre birhan [55]. and Sedi muja [45] Oromia Ethiopian regions. This finding is similar to a study conducted in 2019 felage Hiwot Behardar [50]. and another Hospital-based study in Nigeria [36]. However, it is different from the reports among single women in Addis Ababa [48]. China [22]. This might be Separated women's high tendency of sex contacts with a Dfferent Men or Maybe exposed to infected parents after divorce.

In this study, the factor significantly associated with Syphilis infection was More than one sexual participant also had a 3 times higher chance to develop Syphilis infection [p=<0.001] Compared to regular sexual partners. This study agrees with a similar hospital-based study in Addis Ababa Ethiopia [58] [60] [58]. This was similar to Nigeria [35]. Debre Berhan [46]. Bahr Dar [50]. Jimma [52]. on other hand, a Similar Study was agreed upon within the 2019 Ethiopian public health Institute report [17].This might be a multiple sex partner women They may drug use and Alcohols use transactional sex of partners and parent or both are sexual exposure with other sex partnership higher chance of getting Syphilis infection.

Another factor associated with the appearance of HIV Status having HIV Positive Woman was syphilis infection. Being not infected with syphilis become a protective factor for HIV among pregnant woman [AOR .014; 95%CI (.006 -.033)]. This result is in agreement with the Systemic review in Sub-Saharan Africa Studies where HIV prevalence was relatively higher among Syphilis positive women both in urban and rural settings than to Syphilis negative women [49]. Also, this is similar to the study in Nigeria [35] Brazil [24] China [22]. among pregnant women. Our finding is comparable to the finding reported from Oromia wolmera Northen Ethiopian [57]. This finding agreed with general knowledge among HIV and syphilis co-infection share comparative risk factors and syphilis facilitate the obtaining and transmission of Syphilis infection and if there is better management for AIDS patients, decreased to Syphilis infection [7].

The current result also shows that the prevalence of Syphilis infection is significantly associated with Hasbund history of STI [p=0.034]. our finding is similar to a study done in Sudan [37]. this study has a similar finding in South Africa [32]. Another study was conducted in the regional Ethiopian countries of our country in Jimma [50] and Hargeisa [53] Ethiopian rigonal countrys. and also another case-control study in Dilla Southern Ethiopian [54]. Maybe in our country, some religious and ethnic acceptance of Men weding more than one woman's this spiritual habit risk of getting Syphilis infection or by means of cheating with the other women.

6. 3. HBsAg infection in Pregnant Women.

This study observed an unstable Prevalence of Hepatitis B infection compared to a previous study by *kinfe. F* was 20(5%) [60]. and another study done by *zemenu. t,* The decrease in HBV was (2.3%) [59]. In our finding, the burden of HBV infection increased aging was 13(3.4%). This finding was similar reported in welo Ethiopian (3.4%), [44] Eritrea (3.2%), [38] Egypt (3.2%), [27] Eastern Medi terranean (3.3%), [27] Zambia (3.5%) [33]. Rwanda [3.7%] This also the study higher than hospital-based study in 2020 Addis Ababa Ethiopia was (4.5%) [58]. Additionally, the finding of the study is higher than the Systematic Review report from Yemen (10.8%), [27]. and Islands (13.8%), [23] Tanzania (5.8%) [34]. The finding of the current study is lower than the study conducted in Ethiopia's systematic review twenty-three studies. Gambella, Amhara, Oromia, Addis Ababa, Tigray, Harar and Gambella regions were (4.53%) (4.47%) (4.42%) (5.50%) (7.90%), [48]. On the other hand, different parts of the Ethiopia region carried out hospital-based studies on those in Tigray (11.6%) [41] Harer (6.1%), [40] Gulag (4.1%), [42] Gambella (7.9%) [43] Debre Birhan (8.5%), [46] Hargesa (31.3%) [53] Atata (4.5%) [55]. and also similar studies carried out in different parts of the world were island (13.3%), [23] Northern Indian (6.3%), [26] Gambia (9.20%) [31] Nigeria (5.5%), [36] Sudan (9.4%) [37]. In This Study, the prevalence was higher than the studies reported from Northern Brazil (0.6%) [25] Uganda (2.9%) [30] Saudi Arabia (2.6%) Turkey (2.8%) Iran (1.3%) [27]. The widespread disparities in Ethiopia and somewhere else, Might be laboratory procedural techniques in the detection of HBV infection, levels of awareness about risk factors of HBV transmission, financial status, and sample size.

Of the sociodemographic characteristics, active age groups and Separated women had a significant association with HBsAg. This finding is similar to the study conducted on an island

where the higher magnitude of HBV is associated with age groups 24-35 years old [23]. This was also similar in the cross-sectional study conducted in Addis Ababa, Ethiopia [59]-[60]. in our finding similar to the study conducted in Uganda [30]. This was also similar in the study conducted in 2020 Bishofitu, Ethiopia where the risk of HBV increases as separated pregnant women [47]. However, the chance of developing HBV infection in Single & divorce is higher than that in their counterparts [48]. HBV infection being higher in young's women may be due to their greater exposures and interaction in society as compared to aged women or via risk-taking sexual behavior.

Not educated Women was another significant risk factor for HBV infection [p=0.033].This Similar finding agreedin low level of knowledge of pregnant Women on HBV infection could raise the rate of MTCT of the HBV infection [41]. This is supported by a study conducted in Nigeria [35] and another similar study in Nigeria [36] Indian [26] Cameron [32] Eritrea [38]. on the other hand, a similar study was Done in 2020 Tigray, Northern Ethiopia [41]. In our Study Most of the affected women were housewives trailed by everyday wage workers, The rate was least in-administration holders which may be because of their mindfulness in regards to the transmission of the illness and immunization.

In this study, the history of hospital admitted women was 0.067 times less likely to be reactive to HBV infection [P=0.047], than those of non-adminted women. This finding is similar to a study finding in Uganda [30]. another similar study was done in the Ethiopian country Debre Markos [46] Gambella [43] Hareargn [53]. Gulag region by Haile workye et al. [42]. This might be a significant factor of hepatitis B infection either from liver Disease Patent to a healthcare worker or both. a previous study revealed that only a large percentage of healthcare workers in our study setting were vaccinated, but currently the trends of immunizations are not sustainable due to lack of HBV globulin availability [50]. This might be these women have been exposed to HBV infection through contact with health professionals or their follow up of patients with liver disease.

In our study, pregnant woman no HBV vaccination Status Significance Associated with HBsAg infection 18(3.8%) [p=0.015]. than vaccinated woman, This finding is Consistent With Previous Study Addis Ababa 20(5%) [60][58], Debra marikos 20(1.8%) [46]. Indian 4.5% [26] and

Uganda 9(2.6%) [30]. Might be Information Not adequately provided to the Community that hepatitis B is a vaccine-preventable disease and in our Study area health workers and pregnant women HBV vaccination Coverages is 0% due to lack of availability of HBV vaccine.

Pregnant women More than one Sexual Partner had 4 times . more likely to have obtained HBV infection than regular sex partners. This finding was similar to Saint paul's Referral Hospital, Addis Ababa [58], and another hospital-based study in Indian [26], Nigeria [35][36]. Therefore, in our country, most of the study's findings also showed that acquisition of HBV infection is significantly higher among participants involved in multiple sexual partner's welo [44] Harar [40] Gulag [42] welo [44] Debre markos [46] Hargeisa [53]. On the other hand, a systematic review of 253 studies conducted in Ethiopia by Abayneh t et al, More than one sex partner was 17 times higher risk of being seropositive for HBV infection among pregnant women [43]. This finding is similar to The current study conducted by addisu A, et al. The 6 times risk of getting HBV infection among pregnant women [48]. The association between more than one sex partners and hepatitis B positivity Maybe women not need to take necessary care including limiting the number of sex partners or safe sex practices and condom use behavior.

6. 4. HIV-Syphilis Co-infections.

In our study showing HIV and Syphilis co-infection, this similar finding agreed with Tanzania [34]. reported among pregnant women attending ANC. However, this is another similar study in Northern Brazil [25]. and China [22] Indian [26]. this was also reported among pregnant women attending ANC in Debre Berhan and Arsi Oromia Wolmera Ethiopian [47][56][57]. and another hospital-based Study conducted in Tanzania [34] and a Similar Study in Nigeria [35]. These findings are similar to different Studies, Might be a higher risk of dual infection due to financial status, regional and cultural practices, and sexual behaviors of Society. and also Maybe a poor clinical ART Service Managements.

6. 5. HIV-HBV co-infections.

Our study observes dual infection of HBV and HIV Dual infection, This finding agreed with the World Health Organization report in sub-Saharan Africa (South Africa Malawi Cameroon Zambia Abuja Nairobi and Ethiopia) [28]. Another hospital-based study study was conducted in

Rwanda among pregnant women by mwumvaneza m et al. [29]. Our study is similar to a rural hospital in Nigeria by Olusola H. Ajay, et, al [35]. in our country, a hospital-based Study was conducted in Arsi by tafese b, et al [47], and a study was done in Zambia [33] South Africa [32] Tanzania [34]. and another Similar finding in Northen Brazil [25]. Indian [26]. This finding was agreed within 2019 Globally report, the prevalence of HIV-HBV co-infection in Africa is the greatest burden [20]. This might be in this study area present higher numbers of Immuno compromised womens because HIV postivepatients higher chance of getting Syphilis infection and Maybe the behavior of sexual practice without condoms of a Community.

7. Limitation

- Since this is often a hospital-based cross-sectional study, the reported prevalence of HIV, HbsAg, and syphilis won't reflect the particular burden of the disease at the community level. This study could be vulnerable to responder recall and interviewer bias regarding the prominent factors.
- However, this study has some limitations. The molecular DNA test is better for diagnosing occult hepatitis but it has not been done in this study, which may underestimate the prevalence of HBV among pregnant women.

8. Conclusion and Recommendation

8.1 Conclusion

In general, HIV, hepatitis B surfaces antigen, and Syphilis remains significant public health problems in our study area. this study shows a Higher prevalence of STIs among pregnant women at Gandhi Memorial Hospital Public Health Institutions, even though there is an Increase trend from the 2014 Study. HIV and T. Pallidem have higher, and a trend of HBsAg is unstable for previous Studies. In this finding pregnant women acquired HIV/HBV and HIV/Syphilis co-infection study among pregnant women whose age categories are 18-25 and 26-32 years old. In our study higher rates of transmission of Sexual Transmission infection for those who are pregnant women with Marital Status (Single & Separated) participants. Affording to the multivariate logistic regression analysis in this study, history of STI, Partner other women's

relationship, and Previous history of HIV are found to be the risk factors associated with Syphilis infection. and also Not educated women, history of Hospital Admitted, not vaccinate women were found to be predictors of HBV infections, Husbands' history of STIs, was found to be the common risk factor for HIV infections,More than one Sex partner is a Major predictor of Three STI infections.

8. 2. Recommendation

Based on the evidence of our study the following recommendations shall be forwarded to the Ministry of Health and other stakeholders working in the health sector to develop prevention strategies of:

- Early diagnosis and immediate public health response to HIV infection is warranted even in the very difficult situations like COVID-19 pandemic.
- There shall be an Emphasis on awareness to young women on STI risk behavioral change and screening partner follow-up and notification for exposure to STI and treatment should be given.
- Syphilis and HBV infection screening for All HIV-positive pregnant women is vital
- more research is needed on the factors associated with HIV, HBV, and syphilis.
- Information should also be provided to the public that hepatitis B is a vaccinepreventable disease. Massive awareness and vaccination programs are required to reduce the future burden of HBV from the Ethiopian population.

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10. ANNEXES

10.1 Annex 1. Information Sheet and Informed Consent (English Version)

Research project: Seroprevalence of, sexually transmitted infections. (HIV, HBV & TP) in Gandhi Memorial Referral Hospital, Addis Ababa, Ethiopia;

Sponsoring organization: Addis Ababa University, College of health sciences.

Principal investigator: Tamerat Messele (BSc). In medical laboratory science, Diagnostic and public health Microbiology MSc candidate)

Advisors: Mr. Kassu Desta (Ph.D. Fellow),

Introduction

Dear participants you are kindly requested to take part in this research project as a study participant voluntarily. Read the information provided in this sheet carefully and then respond freely and voluntarily to what the investigator interviews you.

the objective of the research project:

This information sheet is prepared by the investigator and the advisors at AAU for a project with the objective of Seroprevalence of, sexually transmitted infections. (HIV, HBV& TP)

In Gandhi memorial referral hospital, Addis Ababa, Ethiopia;

Procedure

First of all, I would like to say thanks in advance for your cooperation and consent to participating in this study. Moreover; I requested you politely to read or listen attentively to provide relevant information about the study and if there is any confusable information or question which isn't clear regarding the study please don't hesitate to ask freely. If you are fit for the study draw 5 ml of blood samples to be was collected for only the laboratory investigation of (HBV, HIV, and TP) test and face-to-face interview for additional questions.

Benefits from participation

Study participants not yet having any financial incentives or other inducements being participated in this study. However, those positives for either of these common STIs (HIV, HBsAg, and syphilis) were contacted with the physician in the hospital for Treatment, Immunization, and Follow-Up. Furthermore, This Study Provided Baseline Information or Data For Nationwide To Develop Health Programs For Health Policy And Gave A Strategic Means of SeroPrevention For Such Sexually Transmitted Infections.

Risks and Complication

Other than minor bleeding from the site of venipuncture when they give a sample, there are no considerable risks to the study subjects being they participate in the study. Venipuncture is a routine clinical practice for blood sample collection and can stop by pressing cotton on the site of puncture within a short period. Additionally, the amounts of blood collected were too little which is 5 ml (1 to 2 teaspoon) blood only.

Confidentiality

To maintain the confidentiality of participants' information, their names were not given and the samples had coded. Participants were not prohibited to stop or withdraw at any time from the study. Only interested participants can retrieve their laboratory results using their code number and the information can only be accessed through the physician. The physician was responsible for the interpretation of the results and providing treatment. No personnel information has been disclosed to a third party or will not appear in any report from this study.

I sign my signature below to confirm that I take over the responsibility for the scientific Ethical and technical conduct of the research project and for the provision of progress reports for all stakeholders of the research project.

Tamerat messele (PI)

Signature: _____ date: _____

Note: if you have any questions about this study, you should feel free to ask now or at any time throughout the study by contacting: PI Address: Tamirat Messele: department of medical laboratory sciences, Department of Diagnostic and Public health microbiology, college of health sciences, Addis Ababa University, Addis Ababa, Ethiopia.

E-Mail: Messeletamirat@Gmaile .Com Tel.: +251 922-53-00-5910.2. Informed Consent

I, (Full Name) ……...……

Hereby voluntarily authorize the researcher to interview me and consent to him to

Obtain information that is relevant to his research topic on Seroprevalence of STI,(HBV, HIV andTP infections) and identifying the possible risk factors among pregnant women attending Gandhi Memorial Hospital, AddisAbaba, Ethiopia, 2021 I understand that as a participant, my privacy was maintained and the information obtained in this research was used in a manner that protects with guaranteed confidentiality, respect, and personal rights.

I am aware that participating in this study is voluntary and i haven't obligated to answer every question asked of me and that i may withdraw my consent at any time without disadvantage to myself or others. I am informed that the information collected in this study was strictly confidential and for this study only.

Signature of participant …… date……..
Signature of data collector……. Date……

10.3. Annex 2: Questionnaire (English Version)

Questionnaire to "Determine Seroprevalence of HBsAg, HIV1/2 & T, Pallidom infections and isolated the possible risk factors among pregnant women attending Gandhi Memorial Hospital, Addis Ababa, Ethiopia 2021.

Facility Name _____ Year _____

Participant Code _____ Ward_____

Participants Address (Sub City) _____Telephone _____ Signature_____

Data Collector Name_____Date_____Signature_____

Questionnaire Code Number_____

Part-I: Socio-Demographic Information (Circle) Of Study Participants

1. Age _____ Circle)

   A) 18-25 B) 26-33 C) 33-40

2. Marital Status Married Circle)

   A) Singel B) Married C) Separate D) Widowed

3. Family Monthly Income

   A) Less Than 1000 ETB B) 1000 To 1500ETB C) 1600 To 2000ETB D) 2500ETB

4. Number of children Circle)

   A) one up to Three B) four-six C) Seven up to nine D) Above >teen

5. Materinal Level of Education ;(Circle)

   (A) No formal Education (B) 1-8 (C) 9-12 (D) College and University

6. What Is Your Employed Status? (Circle)

   A) labor B) Government Employed C) Business

   D) HousewiveHousewive

7. Pregnat Women living Places:

A) live in Addis Ababa B) Not live in Addis Ababa

Part II: - Clinical and physical characteristics of the Pregnancy Women's

8. Have you ever been exposed to any of the factors/causes of STIs Which of the following did you do? (Circle)

- o intravenous Drug Substance use a) no b) yes
- o More than one Sexual Partner: a) no b) yes
- o Ear/Nose piercing in jewelry Shop: a) no b) yes
- o Tattooing: a) no b) yes
- o You have had contact with people who have been exposed to any STIs or hepatitis B virus: a) no b) yes

9. Did you ever considered any of these medical or Clinical Procedures or life-saving procedures?

- o Blood transfusion: a) no b) yes
- o long Time Hospital admission: a) no b) yes
- o Tooth extraction: a) no b) yes
- o Surgery: a) no b) yes
- o Cesarean section a) no b) yes
- o Homes Delivery (TBA) a) no b)yes

Pregnancy status;

10. How many children did you have before your current pregnancy (Gravity)? (circle)

A) Pregravida

B) Multigravida

C) Grandmulti gravida

10.1. current Stages of a Pregnancy ----------?

11. Did you have a history of sexually transmitted diseases? (circle)

A) Yes B) no

If yes for question number "11" what type of STI?

A) HIV B) HBV C) Syphilis D) Others

12. Your husband's STI has been investigated ?

A) YES B) no c) unknown

13. Have you ever had a pregnancy-related problem? (circle)

A) Yes B) no

If you say yes to question 13, what is the problem? (circle)

A) abortion/miscarriage

B) Stillbirth

c) obstructed labor

D) Ectopic pregnancy

F) Death of a baby while in the uterus G) edam H) others (mention) ……

13.1. Previous Mode of Delivery

A) Vaginal Delivery

B) Vacuum extraction Delivery

C) Episiotomy

D) Forceps delivery

E) Cesarean section

14. Have you ever had a pregnancy-related problem, for how many……

15. Did you know that you have been vaccinated against the hepatitis B virus? (circle)

A) yes B) no

HIV status

A) Positive B) negative C) unknown

17. How many sex partners have you had?

A) one b) Two c) Three d) Above 3

Yes if yes, use a condom?

A) Always b) Sometimes c) I don't know

18. Have you ever shared Cosmetics sharp Materials?

A) Yes b) I don't know

if say Not use, Condom The reason of I don't use Condoms?

A) Satisfactions B) Religious C) Marriages

Final serology result (laboratory findings) (circle);

1. HIV-1/2

A) Positive B) negative

2. Hepatitis b virus (HBsAg)

A) Positive B) negative

3. Syphilis; anti-treponema palladium/syphilis test

A) Positive B) negative

10.4. Annex 3: Information Sheet (Amharic Version)

2.1. የተሳታፊወችመረጃቅጽ

አዲስአበባዩኒቨርሲቲ፤የጤናሳይንስኮሌጅ፤ጤናሳይንስት/ቤት፤የህክምናላቦራቶሪሳይንስዲፓርትመንት

አርእስት፡
በአዲስአባባከተማ፣የጋንዲመታሠቢያሆስፒታል፤የኤችአይቪቫይረስ፤የሔፓታይተስቢቫይረስናየአባላዘርበሽታስርጭትበወ
ላድእናቶችብሎምዋናዋናለስረጭቱምክንያትየሆኑመተላለፍያዘዴዎቻቸውንለማወቅናለማጥናትየታሰበጥናት፡፡

አጠቃላይመረጃ
በጥናቱበመሳተፍዎከልብእያመሰገንከመወሰንዎበፊት፡-
ይህንንቅጽበትከክልአንብበውተረድተውትወይምሲያነቡምሆነሲያደምጡግልፅያልሆነልዎትንነገርበሙሉነፃነትመጠየቅይ
ችላሉ፡

መግቢያ

በግብረሥጋግንኙነትየሚተላለፉበሽታዎችእንደነኤችአይቪቫይረስ፤ሔፓታይተስቢቫይረስ (የጉበትቫይረስ)
ናየአባላዘርበሽታበአሁኑግዜበዓለማችንበተለይምእንደነአፍሪካናኤስያየመሳሰሉታዳጊአገሮችከፍተኛጉዳትእያደረሱያሉበሽታዎች
ሲሆኑመተላለፍያዘዴዎቻቸውምክእናትወደልጅወይምልቅበሆነግብረሥጋግንኙነትከሰውወደሰውስርጭታቸውእየጨመረእንዲ
ሄድአድርግዋል፡፡እነዚህበሽታዎችከከፍተኛየስርጭትዓቅማቸውበተጨማሪበወላድእናቶችየሚያደርሱቱንጉዳትመጠኑከፍያለከ
መሆኑየተነሳከማህተጸንውጭእርግዝና፤የጉበትካንሰር፤ውርጃናየመሳሰሉችግሮችየሚያስከትሉበሽታዎችናቸው፡፡በመሆኑምየእነ
ዚህንበሽታዎችበእናቶችላይያለውንስርጭትማወቅታካሚዎችንበአግባቡለማከምናለመከታተልብሎምየሀገርንምሆነየግለሰቦችን
ያለአግባብወጭናየሞትመጠንለመቀነስበሚደረገውርብርብየበኩሉንከማበርከትበተጨማሪበሐገርአቀፍደረጃወደፊቱለሚካሔ
ዱጥናቶችመሰረትለመጣልወሳኝየሆነሚናአለው፡፡በዚህምመሰረትይህንጥናትበማድረግላይእንገኛለን፡፡

የጥናቱአላማ
የጥናቱአላማበግብረሥጋግንኙነትየሚተላለፉበሽታዎች፤የኤችአይቪቫይረስ፤የሔፓታይተስቢቫይረስናየአባላዘርበሽታበወላድእና
ቶችያለውስርጭትብሎምዋናዋናለስረጭቱምክንያትየሆኑመተላለፍያዘዴዎቻቸውንለማወቅናለማጥናትየታሰበነው፡፡

ለጥናቱተሳታፊዎችያለውልዩጥቅም
በጥናቱለሚሳተፉፍቃደኛተሳታፊዎችምንምአይነትየገንዘብክፍያየለውም::
ነገርግንየጥናቱውጤትለሆስፒታሉስለሚሰጥበሽታውየተገኘባቸውተሳታፊዎችከሚመለከታቸውየጤናተቋሙባለሙያዎችጋርበ
መነጋገርአስፈላጊየሆነህክምና፣ክትባትእናክትትልማድረግይቻላሉ፡፡
በጥናቱተሳታፊዎችላይያለውጉዳትእናተዛማጅችግር
በዚህጥናትላይበመሳተፍዎሊደርስብዎየሚችልአንድምጉዳትአይኖርም፡፡ለዚህጥናትየምንጠቀምበትየደምናሙናከክንድዎየሚወ
ሰድሲሆንመጠኑምከ 5 ሚሊሊትር (ከ 1 -2 የሻይማንኪያ) ያልበለጠበተጨማሪም 3-5
ሚሊሊትርየሽንትናሙናነው፡፡
ይህምከመጠነኛስሜትበስተቀርበጤናዎላይምንምአይነትጉዳትአያደርስም፡፡
የመረጃሚስጥራዊአጠባበቅ

የሚሰጡትመረጃበጥናቱወቅትምሆነከዛበኃላባሉትጊዜያትሙሉበሙሉሚስጥራዊነቱየሚጠበቅናመረጃውምየሚያዘዉበስምሳይ ሆንበመለያቁጥርነው::በጥናቱላይእያሉበፊለጉትጊዜየማቆምወይምየማቋረጥመብትአለዎት::
ይህመረጃበጥንቃቄየሚያዝናመረጃውንበፊለጉጊዜሊያገኙየሚችሉይሆናል::በመጨረሻምየደምናሙናውውጤትምለተቋሙተ ልኮተገቢውንህክምናየሚያደርጉናየጥናቱምውጤትለሚመለከተውአካልለጥናቱአላማብቻየሚገለፅይሆናል::

ያስታውሱ:ስለዚህበጥናትማንኛውምጥያቄካልዎትበማንኛውምጊዜከዚህበታችበተጠቀሱትአድራሻዎችመጠየቅይችላሉ::

የዋናተመራማሪውአድራሻታምራትመሰለአዲስአበባዩኒቨርሲቲ፤የጤናሳይንስኮሌጅጤናሳይንስት/ቤት፤የህክምናላቦራቶሪሳይንስ ዲፓርትመንት፣አዲስአበባ፣ኢትዮጵያኢ-ሜይል፣ Messletamirat@Gmail.Com ስልክ :+251 9 22-53-00-59

10.5. Annex 4: Informed Consent (Amharic Version)

በግብረሥጋግንኙነትየሚተላለፉበሽታዎች፤የኤችአይቪቫይረስ፤የሔፓታይተስቢቫይረስ (የጉበትቫይረስ) ናየአባላዘርበሽታበወላድእናቶችያለውስርጭትብሎምዋናዋናለስረጭቱምክንያትየሆኑመተላለፍያዘዴዎቻቸውንማጥናት” በሚልርዕስለይበተመለከተበሚደረገዉጥናትላይለመሳተፍመሆኑየጥናቱዓላማናጥቅምተገልጾልኛል::በመጠይቁላይየምሰጠዉየ እኔሙሉመረጃምሆነየደምናሙናውጤቴበሚስጥርእንደሚያዝተነግሮኛል::በተጨማሪምበጥናቱዉስጥያለመሳተፍመብቴእደሆ ነናበማንኛዉምጊዜከጥናቱበራሴዉሳኔመዉጣትእንደምችል፤በዚህምምክንያትምንምአይነትመጉላላትእንደማይደርስብኝበሚገባ ተረድቻለሁ::
ስለዚህሁኔታዉንበሚገባበማጤንበፈቃደኝነትበምርምሩላይለመሳተፍለተመራማሪዉፈቃደኝነቴንሰጥቻለሁ::በተጨማሪምየም ሰጠዉየደምናሙናለኤችአይቪቫይረስ፤የሔፓታይተስቢቫይረስ (የጉበትበሽታ) ናየአባላዘርበሽታምርመራዎችብቻእንደሚዉልተነግሮኝተስማምቻለሁ::ማንኛዉንምያልገባኝንነገርየመጠየቅዕድልተሰጥቶኝበ ሚገባቋንቋመልስአግኝቻለሁ::በተጨማሪምየሁሉምየላብራቶሪምርመራዉጤቶችለተቋሞችእንደሚሰጥናዉጤቴንማወቅከፈለ ኩማግኘትእንደምችልተነግሮኛል::

እኔ _____ የተባልኩግለሰብይህንሁሉበማገናዘብምርምሩላይስለኔ መረጃእናየደምናሙናለመስጠትተስማምቻለሁ::

ፊርማ _____ ቀን _____

መረጃዉንያስረዳዉአካል _____ ፊርማ_____

10.6. Annex 5: Questionnaire (Amharic Version)

በአዲስአበባዩኒቨርሲቲ፤የጤናሳይንስኮሌጅ፤ጤናሳይንስት/ቤት፤የህክምናላቦራቶሪሳይንስዲፓርትመንትይሕመጠየቅለተሳታፊዎች (ስለወላድእናቶች) አጠቃላይመረጃናለበሽታው (የኤችአይቪቫይረስ፤የሔፓታይተስቢቫይረስናየአባላዘርበሽታ)ስርጭትመንስኤየሆኑትንምክንያቶችለማወቅየሚደረግመጠይቅነው::

መጠይቁንየሚያስሞላውበጥናቱጊዜየተመረጠው(ችው) ነርስሲሆንመጠይቁየሚሞላውጥናቱበሚከሄድበትቦታነው::

እባክዎን ለጥናቱ መሳካት ያግዘን ዘንድ ጥያቄዎችን በጥንቃቄ እንዲሞሉልን በትህት ናእንጠይቃለን::

የተቋሙስም----------ዓ.ም. ---------- የተሳታፊውመለያቁጥር----------ዋርድ---

አድራሻ (ክፍለ-ከተማ)----------

የዳታሰብሳቢውስም---------- ቀን---------- ፊርማ----------

I. የተሳታፊውንአጠቃላይመረጃበተመለከተየሚሞላእባክዎንትክክለኛውንመልስይምረጡ

1. እድሜ --------

2. የጋብቻሁኔታ

ሀ) ያገባችለ) ያላገባችሐ) የተፋታችመ)ባሏየሞተባት

3. የትምህርትደረጃ.

ሀ) ያልተማረችለ)1ኛደረጃሐ) 2ኛደረጃመ) 3ኛደረጃ

4. የስራሁኔታ

ሀ) የመንግስትስራለ) የግልስራሐ) የግልተቀጣሪመ) ስራየሌለውሠ) ሌላካለ

(ይጥቀሱ)---------

5. ወርሀዊገቢ (በብር) ----------

IIበኤችአይቪቫይረስ፤ሔፓታይተስቢቫይረስናበአባላዘርበሽታለመያዝዋናዋናወሳኝ የሆኑትምክንያቶች::

6.ከሚከተሉትውስጥለየትኞቹተጋልጠውያውቃሉ? (ከአንድበላይመልስመመለስይቻላል)

ሀ) ስለታምነገሮችመጠቀም (መዋስ) ለ) ከአንድበላይየትዳርወይምየፍቅርጓደኛ

ሐ) ጀሮመበሳትመ) ንቅሳት (ጥቁራት) ሠ) በበሽታውከተያዘሰውጋርመነካካት

7.ከሚከተሉትሕክምናዎችየትኞቹተጠቅመውያውቃሉ? (ከአንድበላይመልስመመለስ

ይቻላል)

ሀ) ከሌላአካልበደምልገሳደምመቀበልለ) ተኝቶመታከም

ሐ) የጥርስሕክምናመ) ቀዶጥገናሕክምና

ሠ) በመሳርያመሸናት

III.ከጤናናከእርግዝና (ከማህጸን) የተያያዙጥያቄዎች

8.የእርግዝናሁኔታ

ሀ) የመጀመርያእርግዝናለ) ሁለተኛእርግዝናሐ) ሦስተኛእርግዝናመ) ከአራት በላይእርግዝና

9.በግብረ- ሥጋግንኙነትከሚተላለፉበሽታዎችተጋልጠውያውቃሉ;

ሀ) አዎለ) አላውቅም

10.በተራቁጥር 9 መልስዎአዎከሆነለምንዓይነትየግብረ-ሥጋግንኙነትበሽታተጋልጠው ያውቃሉ;

ሀ) ለኤችአይቪቫይረስለ) ለሔፓታይተስቢቫይረስ (የጉበትቫይረስ)

ሐ)የአባላዘርበሽታመ) ለሌላ

11.የትዳርአጋርዎስለግብረ-ሥጋግንኙነትበሽታተጋልጠውያውቃሉ;

ሀ) አዎለ) አያውቅም

12. ከእርግዝናየተያያዙችግሮችአጋጥመዎትያውቃሉ;

ሀ) አዎለ) አያውቅም

13.በታራቁጥር 12 መልስዎአዎከሆነከሚከተሉትየትኞቹአጋጥመውትያውቃሉ?

ሀ) ውርጃለ) የሞተልጅመውለድሐ) Obstructed Labour መ) ከማህጸን ውጭእርግዝና

ሠ) በቀዶጥገናመውለድሰ) በማህጸንውስጥየሞተልጅረ) እብጠትሸ) ሌላ

14.በተራቁጥር 13 ያጋጠመዎትችግርካለለስነትግዜ (ቁጥሩንያስቀምጡ) ----------

15.የክትባትሁኔታ

ሔፓታይተስቢቫይረስተከትበውያውቃሉ? ሀ) አዎለ) አላውቅም

16.የኤችአይቪቫይረስሁኔታበደምውስጥ

ሀ) አለለ)የለምሐ) አላውቅም

17. ምንያህልየጸታዓደኞችኖረዎትያውቃል?

ሀ) 1 ለ) 2 ሐ) 3 መ) 3 በላይ

መልስሽአዎከሆነኮንዶምተጠቅመዋል?

ሀ) ሁልጊዜለ) አንዳንድጊዜሐ) አላውቅም

18. የውስጥሱሪእንዲሁምየሽንትቤትመታጠቢያወትንበጋራተጠቅመውያውቃሉ?

ሀ) አዎለ) አላውቅም

10.7 Annex 6: Standard Operating Procedure (Sop) For Blood Sample Collection

Sample Collection, Storage, and Transportation.

1) Label tubes with the client's identification number

2) Explain the blood drawing procedure to the client and reassure her.

3) Wear rubber gloves and make the client in a comfortable position.

4) Prepare the vacationer tube and needle

5) Tie the tourniquet around the arm of the client just above the bend in the elbow. The The tourniquet should be positioned 7.5cm to 10cm above the puncture site.

6) tell the client to clench her fist

7) Using the tip of the index finger examine the phlebotomy site, feel the vein, and decide Exactly was to place the puncture

8) Disinfect the phlebotomy site by swabbing the skin in small outward circles with an alcohol swab or cotton wool soaked in isopropyl alcohol. Do not touch the prepared puncture site with your fingers after disinfecting the skin.

9) Insert the needle directly into the vein and withdraw peripheral blood of approximately 4 ml in the EDTA vacationer tube of the syringe

10) tell the client to open his/her clenched fist

11) Release the tourniquet

12) Withdraw the needle from the vein and cover the puncture site cotton swab and hold (or Have the subject hold) the pressure at the puncture site for 3 minutes or until adequate Hemostasis is visible.

13) Properly discard the used materials in a safe container and tell the subject to do so if Handled the cotton swabs to stop the bleeding.

14) Shipment of the samples from the collection site to the area of analysis should strictly Adhered with proper packaging, labeling, and maintenance at 2-8 °c by using a cold chain.

15) Keep the samples in the refrigerator at 2-8°c or frozen at -20 °c according to the storage

10.8. Annex 7: Standard Operating Procedure for HIV Testing Algorism

(A). Stat Pack

Principle:-stat pak rapid test for antibody to human immunodeficiency virus (HIV) (colloidal gold device) employs a chromatographic lateral flow device in a cassette format. Colloidal gold conjugated recombinant antigens corresponding to HIV-1 (gp120, gp41) and HIV-2 (GP-36) are

dry-immobilized at the end of the nitrocellulose membrane strip. HIV 1+2 antigens are bound at the test zone (t) and antibodies are bound at the control zone (c). When the specimen is added, it migrates by capillary diffusion rehydrating the gold conjugate.

Procedure

1. Collect test items and other necessary lab supplies.
2. Remove the device from the package and label the device with a client identification.
3. Collect approximately 5ml of a Serumusing a new disposable loop.
4. dispense the Serumin the center of the sample well.
5. Add 3 drops of buffer holding vial vertically over the sample well.
6. wait for 10 minutes before reading the result.
7. Read and record the result and other pertinent info on the worksheet

Interpretation

- **Positive:** (reactive) lines of Pink Colour appear in both the control and test areas.
- **Negative:** (none reactive)line appears in the control area and no line in the test area.
- **Invalid:** no line appears in the control line area. do not report the invalid result. Repeat the test with a new test device even if a line appears in the test area.

(b) ABON

Principle:-abon™ HIV 1/2/o tri-line human immunodeficiency virus rapid test device is an immunochromatographic rapid diagnostic test for the discriminatory detection of HIV-1 and HIV-2 antibodies in human serum, plasma, capillary, and venous blood.

Procedure

1. Allow the kit to reach room temperature

2. lay the devices on a clean flat surface and label each device with the appropriate patient information/id.

3. Take the whole blood specimen with a 50 µl transfer pipet until mark line. And add drawn specimen (about 50 µl) on the specimen well (s) of the test device, for serum or plasma specimens: hold the dropper vertically and transfer 1 drop of serum or plasma (approximately 25 µl) to the specimen well (s) of the test device

4. Add two drops (approx. 80 µl) of buffer to sample port for whole blood and 1 drop of buffer (approx. 40) for serum/plasma specimen

5. allow 10 min. From the time of buffer addition for the reaction to occur, the result should be read immediately after the end of 10 minutes incubation time but is stable for further 10 minutes. Don't read the result after 20 minutes.

Result interpretation

- **Non-reactive**: a line in the control region 'c' line only indicates a non-reactive test result.
- **Reactive**: a line of any intensity forming in the test region 't1' line, 't2' line, or both '
- t' lines plus a line in the control region, indicates a reactive result.
- **Invalid**: no line appears in the control region.

(C). SD Bioline HIV ½

Principle:-HIV 1/2 3.0 kit is a rapid, qualitative test for the detection of antibodies to certain isotypes (IGg, IGM, IGA) specific to HIV-1 including subtype-o and HIV-2 simultaneously in human serum, plasma, or whole blood.

Procedure

1. Allow the kit to reach room temperature

2. Lay the devices on a clean flat surface and label each device with the appropriate patient information / Id.

3.using the dropper, transfer 20µl mark for whole blood, for serum/plasma add 10µl using mico-pippet to the sample well of the test device without trapping bubbles

4. Dispense four drops of the buffer without trapping bubbles in the sample well (s) for whole blood, plasma, and serum.

5. Start the timer. Read the test result at 10 minutes.

6. Don't interpret the result before 10 & after 20 minutes you may get an incorrect result.

Result interpretation

- **Non-reactive**: the line (band) in the control region (c) and no band in test1and test
- **Reactive**: a line of any intensity forming in the test region 1, 2 or both 1and 2 plus a line in the control region indicates a reactive result.
- **Invalid:**-no line in the control region (c); incorrect procedural techniques are the most likely reasons. Difficulties may be encountered with certain samples: incomplete migration, highly viscous sera, presence of fibrin. Review the procedure and repeat the test after re-centrifuging the sample.

10.8.1 Annex 7.1: SOP for Screening HIV Test Using ELISA Kit

PrincipleoftheProcedure:

HIV 1+2 Ag/Ab ELISA Is a Two -Step Incubation,Sandwich Enzyme Immunoassay Kit, Which Uses Polystyrene Microwell Strips Pre-Coated With Recombinant HIV Antigens (Recombinant HIV-1 Gp41, Gp120, And Recombinant HIV-2 Gp36) And Anti-HIV (P24) Antibodies.

Procedure

1. Add 25 ml Sample Diluent in each well.
2. Add 100 ml Negative Control in each well (3).
3. Add100 ml absorbance of postive control (Pc) 1 in D-1 well and Pc-2in E1wells.
4. Add 100 ml Sample in each well Starting from F-1up to 15
5. Applay cover seal.
6. Incubate at 37oc ± 2 oc for 60 min ± 2 min.
7. Samples was incubating prepare working Wash solution and working conjugate as Specfied in preparation of reagent.
8. Take out the plate from the incubater after the incubation time is over and wash the well 6 time with working solution according to wash prcedure give in previous section(wash procedure)
9. Add 100ml of working conjugate Solution in each well.
10. Apply cover seal.
11. incubate at 37oc ± 20c for 30 min ± 2 min.
12. Aspirate and wash as described in step no 8.
13. Add 100 ml of working Substrate Solution in each well.
14. incubate at room T^{o} 20-30oc for 30 min.
15. Add 100ml of stop Solution.
16. Read result at 450 nm within 30 mintes in ELISA READER.
17. Check negative and positive QC controls absorbance are within the acceptable range

Interpret the result;

- Postive Result greater than 0.400 -0.50 is reactive.
- Negative Resultless than 0.150 Non-reactive

10.9. Annex 8: Procedures (Standard Operating Procedure) and Principles forHBsAg

Principle

whole blood, plasma, or serum specimen is added directly to the sample pad. As the test sample flows through the sample pad, the labeled antibody-dye conjugate binds to HBsAg forming an

antibody-antigen complex. **Quality control:-** to ensure assay validity, a procedural control bar is incorporated in the assay device and is seen in the window labeled "control".

Procedure

1. Removetest cassettes from a foil pouch, and place it on a flat surface

2. Label the test device with a patient identification number

3. Use the sample of either serum /plasma or whole blood: add 40 µ1 of a sample (precision pipette) to the sample area first and then slowly instill 1 drop (40 µ1) of sample diluents to the sample area(if applicable). Direct contact of the diluents bottle with the sample area should be 4.the results can be seen within 2-3 minutes with strong positive samples. Please do not interpret the test result after 15 minutes. Do record the result on cassettes.

5.Remove test cassettes from a foil pouch, and place it on a flat surface

Nb: refer to manufacturer instructions

Result Interpretation

Negative: one pink line appears in the control line, showing the test has been Carried out correctly. There was no line in the test region

Positive: in addition to a pink colored control line, a distinct pink colored bandWill also appear in the test region.

Invalid: a total absence of color in both regions.

10.9.1. Annex 9: Sop for Screening HBsAg Test Using ELISA Kit.

Principle

- HBsAg is Detected using an ELISA based on double antibody "sandwich" immunoassay which employs specific anti-HBsAg antibodies, monoclonal antibody to HBsAg immobilized at the bottom of micro titer wells, and polyclonal ab To HBsAg coupled with HRP as conjugate solution. During the assay existing HBsAg in the specimen will react with these ab to form an "ab-HBsAg-Ab+ HRP" immune-complex.

Procedure

1. Add 20 ml Sample Diluent in each well.
2. Add 100 ml Negative Control in each well (3).
3. Add 100 ml absorbance of postive control (Pc) 1 in D-1 well and Pc-2 in E1wells.
4. Add 100 ml Sample in ech well Starting from F-1
5. Applay cover seal.
6. Incubate at 37oc $\pm$ 2 oc for 60 min $\pm$ 2 min.
7. Samples was incubating prepare working Wash solution and working conjugate as Specfied in preparation of reagent.
8. Take out the plate from the incubater after the incubation time is over and wash the well 6 time with working solution according to wash prcedure give in previous.
9. Add 50ml of working conjugate Solution in each well.
10. Apply cover seal.
11. incubate at 37oc $\pm$ 20c for 30 min $\pm$5 min.
12. Aspirate and wash as described in step no 8.
13. Add 50 ml of working Substrate Solution in each well.
14. incubate at room T^o 20-30oc for 30 min.
15. Add 50ml of stop Solution.
16. Read result at 450 nm within 10 mintes in ELISA READER.

Interpret the result;

- Postive control greater than one is reactive.Shode be Postive
- Negative control less than one Non-reactive Shode be Postive

11.10. Annex 11: Procedures (Standard Operating Procedure) and Principles for Syphilis

Principle of syphilis rapid device quality control stability frequencypreparation internal kit control 2 to 8 QC for each runs N.

Procedure

- Remove test cassettes from a foil pouch, and place it on a flat surface
- Label the test device with a patient identification number
- Add 2 drops (50 ml) of a serum to the sample well.
- Add 1 Drop of buffers (40 ml).
- Test results was read after 10 minutes.

Interpretation of Result

Positive:- test was shown by a pink line in both the control and test areas.

Negative:- test was shown by a pink line in the control area only.

11.1 Annex 12: Standard Operating Procedure Syphilis Using ELISA Test Kit:

Principle

the anti-syphilis ab ELISA is a solid phase qualitative enzyme immunoassay based on a sandwich principle for the detection of total antibodies (IGA, IGg and IgM) to treponema pallidum in human serum or plasma. The micro well plate is coated with recombinant antigens for T.pallidum.

Procedure

1. Add 20 ml Sample Diluent in each well.
2. Add 100 ml Negative Control in each well (3).
3. Add 100 ml absorbance of postive control
4. Add 100 ml Sample in ech well Starting from F-1
5. Applay cover seal.
6. Incubate at 37oc $\pm$ 2 oc for 60 min $\pm$ 2 min.
7. Samples was incubating prepare working Wash solution and working conjugate as Specfied in preparation of reagent.

8. Take out the plate from the incubater after the incubation time is over and wash the well 6 time with working solution according to wash prcedure give in previous.
9. Add 50ml of working conjugate Solution in each well.
10. Apply cover seal.
11. incubate at 37oc $\pm$ 20c for 30 min $\pm$ 5 min.
12. Aspirate and wash as described in step no 8.
13. Add 50 ml of working Substrate Solution in each well.
14. incubate at room T^o 20-30oc for 30 min.
15. Add 50ml of stop Solution.
16. Read result at 450 nm within 10 mintes in ELISA READER.

Interpret the result;

- Postive control greater than one is reactive.Shode be Postive
- Negative control less than one Non-reactive Shode be Postive
- is nonreactive

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Addis Ababa UNIVERSITY
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Date: 05/03 / 2021

Ref.No. MLS/024/21

Departmental Research and Ethics Review Committee (DRERC) decision

Meeting No: 016/2021

Protocol number: DRERC/616/21/ MLS

Protocol title: Seroprevalence and Risk Factors of HIV,HBV and Syphilis Infections Among Pregnant Women Attending Gandhi Memorial Hospital Addis Abebe, Ethiopia

Principal investigators: Tamerat Mesele

Institute: AAU-CHS CLS

Elements reviewed [√] Attached [ ] Not attached

Review of revised application [ ] Yes [√] No

Date of previous review: _____

Decision of the meeting: [√] **Approved** [ ] Approved with recommendation

[ ] Approved on Condition (Major revision) [ ] Disapproved

Obligation of the PI-

1. Should comply with the standard international and national scientific and ethical guidelines
2. All the amendments and changes made in protocol and consent form needs DRERC approval
3. The PI should report DRERC within 10 days of the event.
4. End of the study, including manuscripts and thesis works should be reported to the DRERC

Departmental Research and Ethics Review Committee (DRERC) Approval period: from **February 28 to July, 28, 2021.**

Follow up report expected in

2 months_____√_____ 6 months_____ 9 months_____ one year

Chairperson, DRERC: Kassu Desta

Signature: _____

Date: 05/03/2021

Chair Person for DMLS: Rahel Alemu

Signature: _____

Date: 05/03/2021



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Addis Ababa University
College of Health Sciences
School of Nursing and Midwafery
Department of Medical Laboratory Sciences

ቀን፡-26/06/ 2013 ዓም
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በአዲስ አበባ ዩኒቨርሲቲ ጤና ሳይንስ ኮሌጅ በህክምና ላቦራቶሪ ሳይንስ ት/ክፍል የ2ኛ ዓመት የማስተርስ ተማሪ የሆኑት ታምራት መሰለ መለያ ቁጥር GSR/3928/11 ከዚህ በታች በተጠቀሰው ርዕስ seroprevalence and Risk factors of HIV,HBV and syphilis infections among pregnant Women Attending Gandhi Memorial Hospital Addis Ababa, Ethiopia.ጥናታዊ ፅሁፍ ለማዘጋጀት ይችሉ ዘንድ ተማሪ መሆናቸው ተጠቅሶ የትብብር ደብዳቤ እንዲፃፍላቸው በቀን 26/06/2013 ዓ.ም በማመልከቻ ጠይቀውናል ::

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Declaration

I, the undersigned agree to accept responsibility for the scientific Ethical, and Technical conduct of the research project and for the provision of required progress reports as per terms and conditions of the research publications office.

M.Sc. Candidate: Tamirat Messele (B.Sc.MSc Candidate)

Signature: _____

Date of Submission: _____

This Thesis Has Been Submitted With Our Approval As Advisors.

Advisor: Mr.: Kassu Desta (MSc, P.h.D Fellow)

Signature: _____

Date: _____