



SERO PREVALENCE AND FACTORS ASSOCIATED WITH HEPITITES B
SURFACE ANTIGEN AMONG ANTENATAL CARE ATTENDANTS IN
SHAKISO WOREDA, GUJI ZONE, SOUTHERN OROMIA, ETHIOPIA.

BY: MEDHANIT MARIO

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JIMMA, ETHIOPIA

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ABSTRACT

Background: Potential mother to child transmission of Hepatitis B virus is a major concern, because of the associated long-term morbidity and mortality of the infection. Most chronic Hepatitis B Virus infections occur during childhood. The presence of Hepatitis B surface Antigen among Hepatitis B positive mothers is an indicator of active infection and the potential for mother to child transmission of Hepatitis B virus infection. An attempt has been made to provide recent data on prevalence and factors associated with Hepatitis B surface Antigen.

Objective: To determine the sero prevalence and factors associated with Hepatitis B surface Antigen among antenatal care attendants in Shakiso woreda.

Method and Materials: Facility based crosssectional study design was conducted among 422 consecutively enrolled antenatal care attendants at the four health centers in Shakiso woreda. Data on potential risk factors were collected using interview and Bioline HBsAg One step qualitative test was used for screening blood samples. Data was entered, checked and cleaned by Epidata Version 3.1 and exported to statistical package for social science version 16 for analysis. Descriptive, bivariate and multivariate analysis was performed.

Result: Four hundred seventeen pregnant women attended the four health facilities antenatal care clinics from April 21/2014 to May 9/2014 were consecutively enrolled in this study. The overall prevalence of Hepatitis B surface Antigen among antenatal care attendants in Shakiso woreda was 6.9%. Unsafe abortion, unsafe dental procedure and history of multiple sexual partners were the identified risk factors of hepatitis B virus infection. Those pregnant women having exposure to unsafe dental procedure and unsafe abortion were about five fold at higher risk of having hepatitis B virus infection (AOR=4.703 and 5.386) respectively and those pregnant women experienced history of multiple sexual partner were about eight times at higher risk of contracting hepatitis B virus infection (AOR=7.953).

Conclusion and recommendation: There is an intermediate Hepatitis B surface Antigen Seroprevalence rate among antenatal care attendants in Shakiso woreda. Hence, incorporating screening Hepatitis B surface Antigen among antenatal care attendants in Shakiso woreda as routine package and having public health measures to control its associated risk factors is mandatory.

Key words: HBsAg, ANC attendant, associated factors

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ACRONYMS AND ABBREVIATIONS

ANC- Antenatal Care

DNA-Deoxyribonucleic Acid

EIA-Enzyme Immunoassay

ERC-Ethical review committee

HBIG-Hepatitis B Immunoglobulin

HBsAg-Hepatitis B surface Antigen

HBV-Hepatitis B Virus

HCC-Hepatocellular carcinoma

JU-Jimma University

MCH -Maternal and child health

PMTCT-prevention of mother to child transmission

RIA-Radio immunoassay

RPM-revolution per minute

SPSS-statistical package for social science

VCT-Voluntary counseling and testing

WHO-World health organization

1. INTRODUCTION

1.1 BACK GROUND

Viral hepatitis is an inflammation of the liver due to viral infections of hepatitis families and there are seven geno- types (A to G) of hepatitis viruses that affect the liver. Among those hepatitis B is the common and serious disease causing, partially double-stranded DNA virus of the Hepadna viridae family which secretes hepatitis B surface antigen(HBsAg) that circulates in the blood within an average of four weeks after an initial exposure to the virus (1, 2). The presence of HBsAg in the blood indicates that an individual is currently infected with the virus. Individuals who recover from acute hepatitis B infections clear the blood of HBsAg within approximately four months after the onset of symptoms. These individuals develop antibodies to HBsAg (anti-HBs) that provides complete immunity to subsequent hepatitis B viral infection. Similarly, individuals who are successfully vaccinated against HB produce anti-HBs in the blood(3).

Viral hepatitis is a major health problem worldwide and cause acute and/or chronic hepatitis which can lead to the development of extensive liver scarring (cirrhosis), liver failure, liver cancer and death (4, 5). About 2 billion people worldwide(or 30% of world population) have serological evidence of current or past HBV infection, and an estimated 350 million people harbor chronic infection resulting in 500,000 to 1.2 million deaths per year due to liver diseases (chronic hepatitis, cirrhosis, and hepato cellular carcinoma). In addition to that those estimated 350 million chronically infected people remain an ongoing source of infection(6).

HBV infection prevalence varies markedly in different geographic areas of the world, as well as in different population sub groups. It ranges over 10% in some Asian, Western Pacific and sub Sahara African countries to under 0.5% in the United States and northern European countries(7). Regions like South East Asia and Sub Saharan Africa are high endemic areas for HBV(8).Ethiopia, being part of this region, is ranked as an area with medium to high

endemicity for HBV (8, 9). In general, the prevalence of chronic HBV infection worldwide could be categorized as high if it is higher than 8%, intermediate if it is between 2% and 7% and low endemicity if it is below 2%(10). Overall, approximately 45% of the global populations live in areas of high chronic HBV prevalence(11).

HBV is carried in blood and other body fluids, including saliva, tears, semen and vaginal secretions(12). Prenatal, horizontal, and sexual transmissions are the three major routes of spread for HBV. In developing countries, the main routes of transmission are; vertically from HBV carrier mother to the infant usually during birth or soon after birth following close contact, transfer of HBV via cuts, sexual transmission, transfusion of infected blood or blood products, needle stick injury, contamination of eye, re-use of HBV contaminated needles, syringes, lancets and instruments, possibly blood sucking insects and bed bugs(11).

In high endemic areas, HBV infection occurs during infancy and early childhood by either horizontal or vertical transmission from pregnant women carrying HBV who act as a reservoir for HBV infection. Vertically transmitted HBV infection is becoming an important risk factor for acquisition of HBV worldwide (13).

Infants born to mothers known to carry HBV can be treated with post exposure prophylaxis (passive active immunoglobulin) which has an efficacy of 90% when given the vaccine within 12 to 24 hours of birth. So that the prevention of mother-to-child transmission requires screening for HBsAg in pregnant women to identify which new born should be immunized(14). WHO recommends the first dose of hepatitis B vaccine be given as soon as possible after birth (24 h) in countries where a high proportion of infections with HBV are acquired prenatally, to prevent prenatal HBV transmission(7).

1.2 STATEMENT OF THE PROBLEM

The global prevalence of chronic HBV infection varies widely, from high (greater than 8%, e.g., Africa, Asia, and the western Pacific) to intermediate (2-7%, e.g. Southern and Eastern Europe) and low (less than 2%, e.g. Western Europe, North America and Australia) (15). Most countries in Africa have high HBV endemicity(5). Studies from around the world have found the prevalence of HBsAg among pregnant women varies from 0.1% to 25.3%(16).

Ethiopian national hepatitis study showed that 10.8% of young males from all regions of the country were positive for HBsAg(17). A community based sero epidemiological survey of Addis Ababa, Ethiopia has shown a 7% sero prevalence for HBsAg(18). Another study done in Ethiopia has showed an overall HBsAg prevalence of 6.2% and infection occurring early in life and continuing to increase gradually without leveling off(15). All these studies are showing Ethiopia as intermediate to high prevalence area for HBV based on WHO criteria(7).

Infection with hepatitis B virus (HBV) is a serious public health problem worldwide and leads to a wide spectrum of clinical presentations, ranging from asymptomatic carrier state to acute self-limiting infection or fulminant hepatic Failure, chronic hepatitis with progression to cirrhosis, and Hepatocellular carcinoma (HCC). In addition to this HBV related liver disease are the ninth leading cause of death worldwide resulting in one million deaths every year (19). Among pregnant women HBV infection yields a higher incidence of low birth weight and prematurity during acute infection whereas gestational diabetes mellitus, ante partum hemorrhage and preterm delivery are more frequent in chronic maternal HBV infection(14).

Vertical transmission from mother to baby is an important route of transmission for hepatitis B virus infection. Neonates who contract hepatitis B will have an almost 90 % risk of developing chronic HBV carriage and chronic liver disease. Moreover, those with chronic hepatitis have 15% to 20 % risk of dying prematurely from HBV related cirrhosis and HCC (13, 15). So investigating sero prevalence of HBsAg in pregnancy in different settings is needed to prevent vertical transmission.

Many studies has been done in Ethiopia on sero prevalence of HBsAg with regional variation (5% to 16%) indicating the endemicity of the infection. Despite its endemicity and 90% chance of transmission from mother to the offspring, data is scarce among pregnant women. Published studies on pregnant women about the sero prevalence and associated factors of HBsAg are only from Addis Ababa (5%), Jimma (3.7%), and Debre Tabor (5.7%)(16, 17, 20) and even these studies are not recent. No study has been done about the prevalence and associated factors of HBsAg among pregnant women in Shakiso woreda even in the entire Guji zone.

These studies assessed the prevalence and associated factors contributing for the accusation of the infection. However, they have not addressed the issue of direct sexual transmission due to cultural and social desirability bias even though HBV infection is said to be transmitted directly through sexual contacts but this study tried to address this issue. Therefore the result form this study strengthen the previous studies and provide unreserved benefit to the communities of Shakiso woreda, especially pregnant women and their offspring. As well as the finding of this study will give better attention for policy makers, Shakiso woreda health office officials, health professionals in the four health centers, and those interested on the maternal and child health activities in having evidence based intervention plan.

2. LITRATURE REVIEW

Hepatitis B virus (HBV) has been described as major public health problem, occurring endemically, in all areas of the world(21). Globally, about one third of the population has been infected with HBV; six percent are chronic carriers and over 600,000 people die each year from acute disease or chronic squeals secondary to HBV infection.

On the basis of the HBV prevalence rate, the world can be divided in to high, medium and low endemicity regions(7). Based on this, approximately 45% of the world population live in areas where chronic HBV infection is highly endemic which means greater than 8% of the population are Hepatitis B surface Antigen-positive; 43% live in areas of intermediate endemicity, HBsAg-positivity rate between 2-7%; and 12% live in areas of low endemicity, less than 2% HBsAg-positive(10).

2.1 Sero prevalence of HBsAg

A wide range of variation in HBV prevalence among pregnant women has been Seen in different countries of the world, and in different regions of the same country .Studies from around the world have found the prevalence of HBsAg among pregnant women varies from 0.1% to 25.3%(15). Countries with lower prevalence include United States with 0.14% – 0.97% variation in different races, except among Asian American where prevalence was 5.6%(22), Brazil 1.05%(23) and Mexico 1.65%(24), Northern Europe, Australia and parts of South America, the HBsAg prevalence is less than 2% (25). The Middle East, some Eastern European countries and the Mediterranean basin are considered areas of intermediate endemicity with a carrier rate between 2% and 8% HBsAg(25). Higher prevalence also reported in studies from Zambia reported the prevalence rate of HBV was 6.5% each (26). Other similar study in Hong Kong showed a 10%(27) prevalence. Other high prevalent areas are also reported in Papua New Guinea and Nigeria showing the prevalence rate of 11% and 17.2% respectively (28, 29). Extremely high prevalence has also been registered in Cameroon which was 25.3%(30).

Different studies conducted in the assessment of the prevalence and associated factors of HBV in Ghana, Kenya, Somali, Benin and Egypt reported that the prevalence of HBV was 16%, 14.1%, 37% 12.5% and 1.75% respectively(31-36). There are little evidences on the

prevalence of HBV infection among pregnant women's are found in Ethiopia. Those published evidences were from, Jimma Specialized hospital and its teaching health centers, Debre Tabor Hospital and Addis Ababa each has registered:3.7%,5.3% and 5%(16, 17, 20) respectively which places Ethiopia as intermediate endemicity area for HBV infection according to WHO criteria(10).

2.2 Factors associated with transmission of HBV Among pregnant women

A variety of risk factors have been found to be associated with high prevalence rates of HBV; however, the emphasis on these risk factors varies greatly from one country to another due to cultural and procedural factors.

Socio demographic and economic factors

Socio demographic factors in HBV transmission have shown variation among different studies. Similar cross-sectional studies conducted on the prevalence and associated factors of HBV among pregnant women in India(35) Nigeria(37), Egypt(32) and Ethiopia, Jimma reported that the prevalence of HBV were high among those women's in the middle age groups 20 to 35 with the significance value $p < 0.05$ however studies in Ethiopia, Debre Tabor(16) contradict these studies as there were no significance difference among different age groups. Also Study conducted in Jimma specialized Hospital and its teaching health centers(38) showed: place of residence, level of education, and income has significant association with HBV infection at $P < 0.05$ the same was true for study from China, those pregnant women living in urban area were at higher risk of contracting HBV infection. Also other study from Nigeria revealed that HBsAg was higher among those who do not have formal education and the prevalence increase with level of education(37). In addition to this, Other study from Nigeria showed as occupation has significant association with HBV infection, higher prevalence in those who were house wives(39).

Cultural related risk factors

In Africa, most HBV infections were thought to occur traditionally through close contact with household members, ritual scarification and other mechanisms, with exposure to Hepatitis B Virus (HBV) occurring before the age of sexual debut(40). Different studies have also revealed this evidence. One study in Nigeria from Benin Hospital revealed dental manipulations, tattooing and circumcision were statistical predictor of HBV infection(34). Study conducted among 384 Kenyan pregnant women also showed the odds of HBV among those women having circumcision was 3.125 times higher than that of women who did not have circumcision (31) similar finding have been gained from Yemen(41) but these study contradicted by findings from some other African countries like Sudan and Nigeria(25, 39). Study from Jimma Specialized Hospital and its teaching health centers(20) revealed the significant association of HBV and having tattoo with $P < 0.05$ the same was true for the study from China(42). Study conducted in Ethiopia, Debre Tabor Hospital(16) also shared the result from this study. Other cultural practice ear piercing also identified as significant predictor of HBV among 12,983 rural Chinese(42). Other study conducted in Kano hospital in Nigeria stated that those women with polygamous type of marriage were at higher risk of having HBV infection than those with monogamous type of marriage(43).

Behavioral related risk factors

HBV is an opportunistic infection occurred due to the presence of different immune suppressing diseases(44). Similar studies conducted on the Seroprevalence and associated factors of HBsAg in Debre Tabor Hospital(16) and Shashemene general Hospital(45) revealed that there were no significant difference among those who have exposure to multiple sexual partner and those did not exposed. Study from Shashemene general hospital among visitors of VCT clinic reported that having history of STI was a significant determinant of HBV infection(45). The same finding was gained from Jimma and Afghanistan(20, 46). Even though HBV is said to be transmitted through multiple sexual contact(47), many of the studies did not take into account to see the effect of this factor. However, study from Shashemene general hospital and its teaching health

center revealed the association(45). The same was obtained from study conducted in Nigeria among pregnant women in traditional birth home at Benin city(48).

Medical related risk factors

Medical related risk factors like history of transfusion of blood and blood products, hospital admission, surgery and dental procedure has been discussed in different literatures showed as there were great contributions to the transmission of HBV infection.

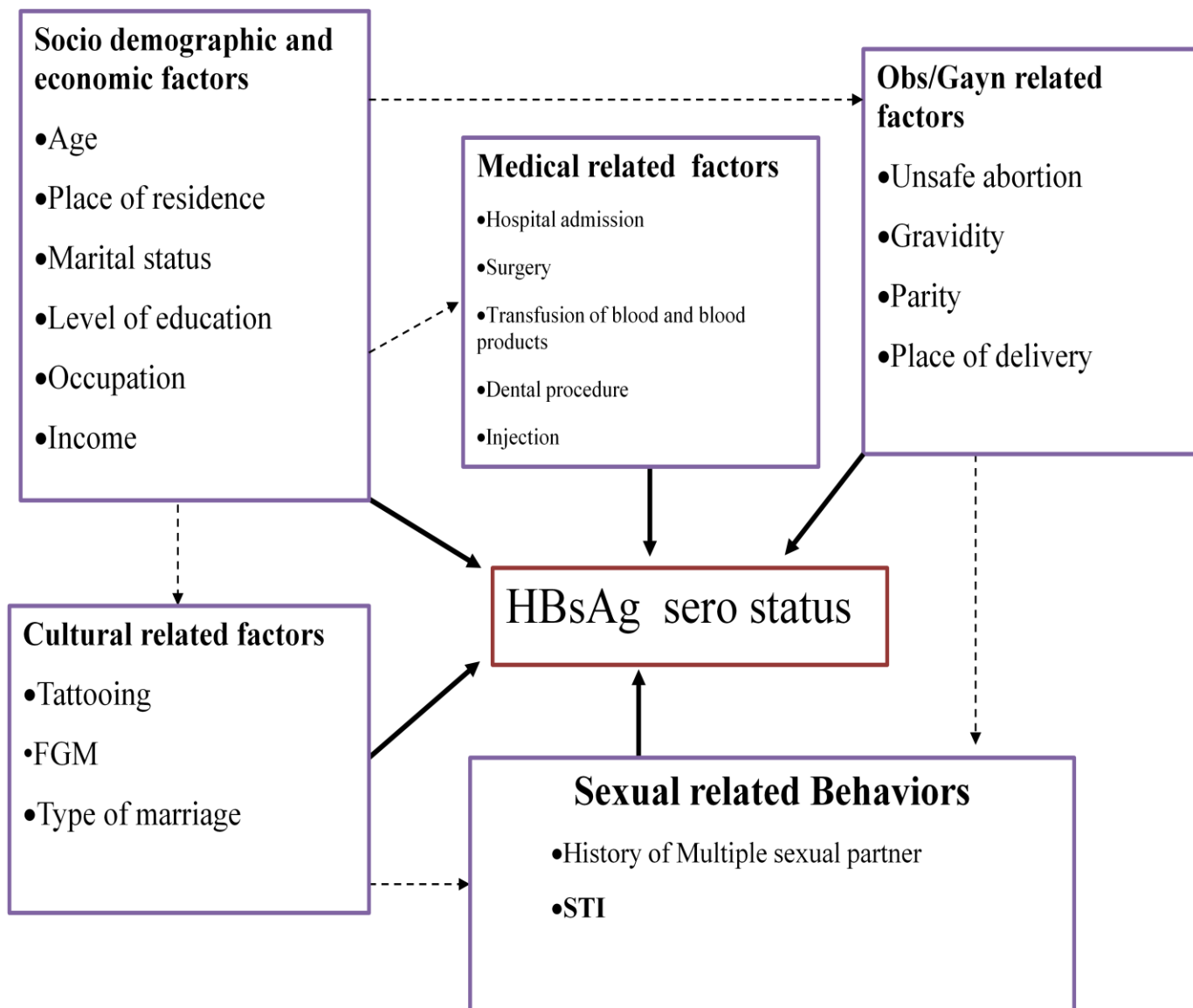
Study conducted in Shashemene general Hospital among visitors of VCT clinic to assess the association of HIV and HBV showed that around half of the prevalence's of the infection was predicted by History of having surgeries and hospital admission (45) the same was true for studies from Nigeria(39) and Jimma Specialized hospital and its teaching health centers(20). Whereas history of having transfusion of blood and blood product were not associated with the infection(40), however studies from Yemen(41), Ghana(30), Kenya(31),Nigeria(34) and Ethiopia, Jimma(20) contradict this finding by showing strong association between blood transfusion and HBV infection. Other medical related factors, unsafe dental procedure was also stated as significantly associated with HBV infection for example study from Ethiopia, Jimma (20) showed, infection with HBV was twice higher among those who had experienced unsafe dental procedure. Also study from Ethiopia, Debre Tabor(16) and Nigeria(43) agree with this finding that unsafe dental procedure had significant association with HBV infection(16) the same was true from Kenya, having unsafe dental procedure was 1.986 times higher among those who have experienced unsafe dental procedure(31).

Obstetric and Gynecologic related Factors

Hospital based crosssectional study conducted in Nigeria stated that multipartite and multigravidie were at higher risk of HBV infection than premiparies and premigravidies respectively(49). Other Obstetric and gynecologic factor, history of unsafe abortion was stated as significantly associated with HBV infection for example study from Jimma Specialized Hospital and its teaching health centers(38) to determine the sero prevalence and associated factors of HBsAg among pregnant women showed, infection with HBV was twice higher among those who have experienced unsafe abortion.

2.3 Conceptual frame work

Literatures provided findings about prevalence of HBV infection and associated factors like socio demographic and economic factors, History of hospital admission, surgery, transfusion of blood or blood products, unsafe dental procedure and injection that were said to be medical related risk factors associated with HBV infection. Parity, gravidity, unskilled delivery and history of unsafe abortion are Obstetric and gynecologic related factors and cultural factors like circumcision, tattooing, ear/nose piercing and polygamous type of marriage were suggested to transmit HBV infection and sexual related behaviors like having history of STI either syndromic or confirmed and having history of multiple sexual partner will have an influence on HBV infection. The conceptual framework below summarizes the association between these factors and HBsAg sero status. This study tried to assess the association between these factors and HBsAg.



Key——> association between the dependant and independent factors studied by this study

---->Relationship between independent factors was not assessed by this study

Figure 1 Conceptual framework of the study on prevalence and factors associated with HBsAg among ANC attendants in Shakiso Woreda

2.4. SIGNIFICANCE OF THE STUDY

This study tried to determine the prevalence of HBV infection and identify the potential risk factors contributing for the acquisition of the virus among ANC attendants who have around 90% chance of transmitting the infection to their offspring in Shakiso woreda. Woreda officials and other stakeholders who are interested in maternal and child health activities will use this epidemiological data in having evidence based intervention measures on preventing mother to child transmission of the virus. In addition, identifying potential risk factors provide evidence based intervention measures in preventing the horizontal transmission. The communities of Shakiso woreda particularly pregnant women and their offspring are the direct beneficiaries of the finding from this study. In addition, this study may contribute in the achievement of millennium development goal through reducing child mortality.

3. OBJECTIVE

3.1 GENERAL OBJECTIVE

To determine the sero-prevalence and factors associated with HBsAg among ANC attendants in Shakiso woreda.

3.2 SPECIFIC OBJECTIVE

- To determine the sero prevalence of HBsAg among ANC attendants in Shakiso woreda.
- To identify factors associated with HBV infection among ANC attendants in Shakiso woreda.

4. METHODS AND MATERIALS

4.1 STUDY AREA AND PERIOD

The study was conducted in four health centers found in Shakiso woreda, which is one of the eighteen woredas in Guji Zone, Southern Oromia. The woreda is located in 500km to the South East of the capital city Addis Ababa and 140km from the zonal town Negele Borena. Shakiso woreda is rich in natural mineral resources like gold and Titanium and the communities of Shakiso Woreda have diverse socio demographic characteristics and their life is mainly depends on mining gold. Based on 2007 censuses the projected 2013/14 total population of Shakiso woreda is 149,138 from this 34,302 of them are in child bearing age and 4,862 of them are expected to be pregnant.

The woreda comprises of four functional health centers namely; Shakiso, Megado, Aletuta and Hangedi health center among which one (Shakiso health center) is found in urban kebele. All the four health centers give curative as well as preventive services including antenatal care (ANC). Screening for syphilis, blood groups, Rhesus factor, and hemoglobin level determination are the routine services provided for pregnant women coming to the clinic. In addition, counseling and testing for HIV as well as providing prophylaxis for the prevention of maternal to child transmission (PMTCT) for those positive mothers is among the routine activities done in each ANC clinics but no screening service for HBV infection. The community of Shakiso woreda uses these health centers. In addition, there is also one hospital located in 20 km far from Shakiso town and it mainly serves as a referral for different health centers including those found in Shakiso woreda.

The study was conducted from April 21/2014 to May 9/2014.

4.2 STUDY DESIGN

Facility based cross-sectional study design was used.

4.3 SOURCE POPULATION

The source population was all pregnant women under the catchment of Shakiso woreda and who uses ANC service from the four-health centers in the woreda

4.4 STUDY POPULATION

The study population was all pregnant women who come for ANC service to the four health centers during the data collection period and who fulfils the inclusion criteria

4.6 INCLUSION AND EXCLUSION CRITERIA

4.6.1 Inclusion Criteria- All pregnant women under the catchment of the four health centers coming to ANC service during the data collection period

4.6.2 Exclusion Criteria- Pregnant women who previously included in the study and revisited the facility or those severely ill and unable to sustain in the interview were excluded

4.7 SAMPLE SIZE DETERMINATION AND SAMPLING PROCEDURE

4.7.1 SAMPLE SIZE DETERMINATION

The sample size for this study was determined based on single population proportion formulae. After determining sample size for both the descriptive and analytic objectives the largest sample size have been obtained from the analytic objective by taking proportion of HBsAg among those who had history of abortion which was 16.8%(19), 95%confidence level and 3.5% precision.

$$n = \frac{(Z_{\alpha/2})^2 (pq)}{d^2}$$

$$\frac{(1.96)^2 \times 0.168 \times (1-0.168)}{(0.035)^2} = 438$$

P=proportion of HBV among pregnant women who have history of abortion=16.8%

D=Desired precision =3.5% (0.035)

Z/2= Standard normal score at 0.05 level of significance=1.96

n= Minimum optimum sample size

q=1-p

Since the study population is less than 10,000, population correction formulae was used

$$n = \frac{n_i}{1+n_i/N} = \frac{438}{1+438/4862} = 402$$

Adding 5% contingency for non-respondents, the final sample size required for this study was $n=402+20.1= 422$

4.7.2 SAMPLING TECHNIQUE

All functional health centers found in the Shakiso woreda were included in the study. Proportionate allocation based on patient flow (the quarter report) was made for each health centers. All pregnant women come to the health facilities for ANC service during the data collection period and fulfill the inclusion criteria were enrolled consecutively until the desired sample size was reached

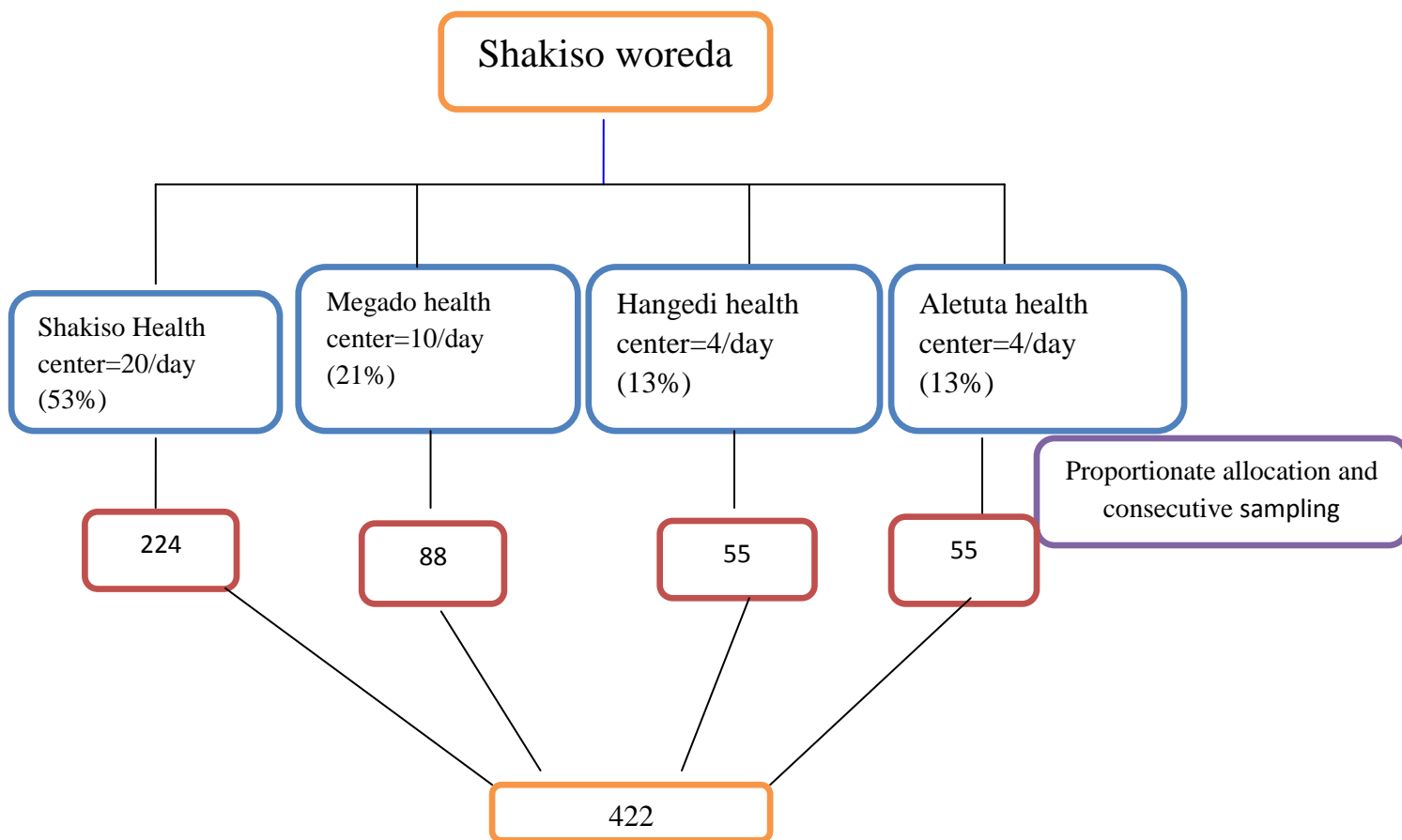


Figure 2 Schematic presentation of the sampling technique for the study on prevalence and factors associated with HBsAg among ANC attendants in Shakiso woreda

4.8 VARIABLES:

4.8.1 DEPENDENT VARIABLE:

HBsAg sero status

4.8.2 INDEPENDENT VARIABLES

- I. **Socio demographic and economic factors;** age, place of residence, marital status, level of education, occupation and income are the socio demographic and economic factors
- II. **Cultural factors;** tattooing, circumcision, ear/nose piercing and type of marriage are the cultural factors

- III. **Behavioral related factors;** having history(current) STIs and multiple sexual partner are behavioral related factors
- IV. **Medical Related factor;** history of hospital admission, history of surgery, history of transfusion of blood or blood products, history of injection and history of unsafe dental procedure are medical related factors
- V. **Obstetric and Gynecologic related factors;** parity, gravidity, unsafe abortion and history of delivery by non skilled attendants are obs/gyn related factors

4.9 DATA COLLECTION INSTRUMENT AND PROCEDURES

The potential risk factors related with HBV infection, socio demographic and economic factors, cultural related factors, behavior related factors, medical related factors and obstetric and gynecologic related factors were assessed through face to face interview using adapted (50, 51) and modified questionnaires based on the study context. In addition, record review for HIV and syphilis sero status from participant's medical record was made.

Female diploma midwife who were assigned at ANC clinic and can speak the local language Afan Oromo through face-to-face interview collected the data. The interview was undertaken in ANC clinic after the client gate all services she came for at the exit time and after she have fully understood the aim of the study, the anonymity and confidentiality of information and signed the consent.

After filling all the questionnaires the participant was referred to the health centers laboratory to give blood sample. All the laboratory procedures including collecting the blood sample was undertaken by laboratory technician. Five millilitre of venous blood was collected from peripheral vein using aseptic technique from each study participants. The sera was separated from clotted blood by centrifugation at 4,000 Revolution per minute(RPM) for five minutes(52). The next step was using Bioline HBsAg One step qualitative test to identify those blood samples having HBsAg which is the sero marker indicating the presence of active HBV infection.

4.10 DATA QUALITY MANAGEMENT

Questionnaire was prepared in English language, translated to Affan Oromo and re translated back to English by other person who is fluent speaker of the two languages.

One diploma midwife who was assigned at ANC clinic and one experienced laboratory technician were oriented for both the interview and screening test respectively from each the four health centers. The orientation was focused on familiarizing the interviewers with questionnaires, increase understanding by clarifying any ambiguities and practice in how to ask sensitive questions and familiarize the laboratory technicians with the test procedure, and let them to practice with both positive and negative samples.

Questionnaire was pre-tested on 5% of samples a week before actual data collection period in neighboring health center found in Adola woreda, which is 20km from Shakiso town, by those trained midwives. After pre-testing, necessary modification on its content was made. Biotec HBsAg which can detect any level of HBsAg in serum higher than 5ng /ml within 10 min and have 98% sensitivity and 97% specificity was used for the screening test(52). In addition, performance of a kit was assured using both positive and negative control samples obtained from Adama Regional laboratory.

The interviewers was selected from the service site, the tools on sensitive issue was phrased in positive way in order to minimize the bias and gate reliable answer. Before entering to the interview, the interviewers adequately introduced the purpose of the study and confidentiality of the information to the participants.

At time of data collection, filled questionnaires were checked for completeness and consistency of information by supervisor on a daily basis and typographic errors was manually edited. Any ambiguity and other problems were addressed by communicating with the data collectors.

4.11 DATA PROCESSING AND ANALYSIS PROCEDURE

After categorization and coding was made, Epidata version 3.1 was used to enter, clean and edit the data and finally it was exported to SPSS version 16 for analysis. Frequency distribution with its percentile was used to organize the data, to see the distribution and present the responses

obtained. Measures of central tendency was calculated and utilized for appropriate variables to describe the data. Bivariate analysis was employed and those variables having a p value ≤ 0.25 was considered as a candidate for multivariate analysis. Enter method was employed to select the variables in to the model. Hosmer Lemeshow and Omnibus test was used to test the model fitness. Variables having a p value less than 0.05 was considered as predictor for the outcome variable. Adjusted odds ratio with its confidence interval was used to see the strength of association. Finally, the result was displayed using graphs and tables.

4.12 ETHICAL CONSIDERATION

Ethical rules approval and clearance was obtained from Ethical Review Committee (ERC) of Jimma University College of Public Health and Medical Sciences. Official cooperation letter was obtained from Shakiso woreda health office to Adama Regional Laboratory to obtain positive and negative samples, for PFSA and to the four health centers for their cooperation. In addition, cooperation letter was gained from the health center before entering to data collection. Finally, each participant was signed on the consent form before entering to the interview and after getting all information about the purpose of the study, confidentiality and anonymity of the information and the need of her cooperation for interview and give small volume of blood sample was clearly discussed. The respondents' right to refuse or withdraw from participating in the interview was fully maintained and the information as well as the test result of each participant was kept strictly confidential. For those participants sero positive for HBsAg, letter was written to the clinic so that the assigned health professional at the clinic council her as she have to give birth in where she find the vaccine for her new born.

4.13 OPERATIONAL DEFINITION

- **ANC attendant-** pregnant women who came for ANC services
- **Delivery by non skilled person** - A women who gave birth outside health facility (clinic or health center or hospital) in one of her deliveries
- **Having Syphilis-**being reactive for RPR based on manufacturers instruction
- **HBV infection--** sero positive for HBsAg using Bioline One step qualitative test stripe

- **History of multiple sexual partner**-- individual who had any occasion to have sexual intercourse with any other person other than her husband (weather she need it or not) in her lifetime
- **History of STI**-- women who have symptoms of genital discharge or ulcer or sero positive for HIV or sero positive for syphilis(RPR)
- **HIV positive** --sero positive for HIV based on Ethiopian HIV test algorithm
- **Unsafe abortion**- Termination of pregnancy undertaken outside health facilities (clinic, health center or hospital)
- **Unsafe dental procedure**-dental procedures like tooth extraction undertaken outside health facility(clinic, health center or hospital)
- **Urban** - urban is characterized by higher population density and vast human features in comparison to the areas surrounding it

4.15 DISSEMINATION PLAN

The findings of this study will be presented to JU, distributed to Guji Zone Health Department, Shakiso woreda health office, to the four health centers; Shakiso, Megado, Hangedi and Ale Tuta health center and other organizations who are interested in maternal and child health related activities in Guji Zone. The findings may also be presented in different seminars, meetings and workshops and finally efforts will be made to publish it in a scientific journal.

5. RESULT

The study was conducted at four health facilities in Shakiso woreda, Southern Oromia, Ethiopia from April 21/2014 to May 9/2014. A total of 422 pregnant women were involved in the study and out of these pregnant women 224(53.1%) of them were from Shakiso health center, 88(20.9%) from Megado health center and the remaining 110(26%) were from Hangadi and Ale Tuta health centers.

5.1. Socio-demographic characteristics of the study subjects

The mean (\pm SD) age of the respondents were 24.82(\pm 5.463) with median age 25 years. Majority of the respondents were married 410(97.1%), 292(68.8%) of them were from rural area and most of them had a low level of average families monthly income, <500/month 206(47.2%). Concerning their educational status 160(37.9%) of them had no education and 204(48.4%) of them had primary school level of education (Table 1).

5.2. Prevalence of HBV infection

The detection of HBV was made through investigation of HBsAg in the serum. Out of 422 pregnant women 29(6.9%) of them were identified as sero positive for HBsAg.

It was seen that at least one sero positive case of HBsAg was observed in all age groups. The highest prevalence was observed in the age group of 30 to 35 (19.0%) followed by 25 to 30 (12.1%) and those in the age group 15 to 20 were the least. The highest occupation specific prevalence of HBsAg was observed among the merchants and daily laborer, 11.7% and 7.8% respectively. However, HBsAg was not observed in those who were students or government employers.

Respondents level of education ranged from no education to higher diploma level and education specific prevalence was higher among those who had primary school level of education, grade 1-8(7.8%), followed by those who had secondary school level of education, 9-12(6.0%) and no observation was seen in those who had a higher level of educational status. Pregnant women who had average monthly income >1000 Birr (8.5%) had a higher proportion of HBsAg than their counterparts did. Proportion of HBsAg in urban and rural residents were 6.8% and 6.9%

respectively. However, none of the socio demographic and economic factors was candidate for multivariate analysis (Table 1).

Table 1 Prevalence of HBsAg in relation with socio demographic and economic characteristics of ANC attendants in Shakiso woreda, May 2014

Variable	No screened	HBsAg positive (%)
Age of the women		
-20	128	2(1.6%)
20-25	129	5(3.9%)
25-30	107	13(12.1%)
30+	58	9(15.5%)
Place of residence		
Urban	130	20(6.8%)
Rural	292	9(6.9%)
Educational status		
Not education	160	10(6.2%)
primary education(1-8)	204	16(7.8%)
secondary education(9-12)	50	3(6.0%)
higher education(12+)	8	0(0.0%)
Income		
-500	206	13(6.4%)
500-1000	129	11(8.5%)
1000+	87	5(5.7%)
Marital status		
Single/never married	8	1(1.9%)
Married	410	28(6.9%)
Divorced	2	0(0%)
Widowed	2	0(0%)
Occupation		
Daily laborer	77	6(7.8%)
Pastoralist	52	3(5.8%)
Government employer	8	0(0.0%)
House wife	193	11(5.4%)
Merchant	77	9(11.7%)
Student	4	0(0.0%)

5.3 Exposure to Risk Factors and Distribution of HBV infection

5.3.1 Prevalence of HBV by cultural related factors

Regarding cultural related practices in the study area, 315(76.5%) of the respondents were in monogamous type of marriage, had pierced their ear/nose 361(85.5%) , 170(40.3%) participants were circumcised and tattooed 115(27.3%). Proportion of HBsAg among those who had exposed to monogamous type of marriage, ear piercing, tattooing and circumcision ware 6.98%, 7.2%, 8.24%, and 7.82% respectively. However, none of these factors was a candidate for multivariate analysis (Table 2).

Table 2 Experience of cultural related practices and distribution of HBsAg among ANC attendants in Shakiso woreda, May 2014

Variable	HBsAg sero status		COR/95%CI	p-value
	Positive No (%)	Negative No (%)		
Ear piercing				
Yes	26(7.2%)	335(92.8%)	1.500(0.440-5.119)	0.517
No	3(4.9%)	58(95.1%)	1	
Tattooing				
Yes	9(7.82%)	106(94.17%)	1.218(0.538-2.760)	0.636
No	20(6.51%)	287(93.49%)	1	
Circumcision				
Yes	14(8.24%)	156(91.76%)	1.418(0.666-3.019)	0.365
No	15(5.95%)	237(94.05%)	1	
Type of marriage				
Monogamous	22(6.98%)	293(93.02%)	1	
Polygamous	6(6.19%)	91(93.87%)	0.878(0.345-2.232)	0.785

5.3.2. Prevalence HBV by medical related factors

The study observed the distribution of medical related exposures in the study area, 271(64.5%) the respondents had history of injection and 92(21.8%) of them had exposed to unsafe dental procedures and the sero positivity among these exposures were 18(6.64%) and 19(20.65%) respectively. Some of the participants were exposed to history of suturing 41(9.7%) and hospital admission 56(13.4%). The sero positivity of HBsAg among these exposures was 5(12.19%) and 4(7.15%) for those who had history of suturing and history of admission respectively. As per history of surgery, (7.8%) and transfusion of blood or other blood products (3.6%) and none of these individuals was sero positive for HBsAg. Based on the bivariate analysis only history of suturing and unsafe dental procedure has been selected as a candidate for multivariate analysis (Table 3).

Table 3 Distribution of medical related factors and frequency of HBsAg among ANC attendants in Shakiso Woreda, May 2014

Variable	HBsAg sero status		COR/95%CI	p-value
	Positive No (%)	Negative No (%)		
History of Injection				
Yes	18(6.64%)	253(93.36%)	0.893(0.410-1.944)	0.775
No	11(7.38%)	138(92.62%)	1	
History of suture				
Yes	5(12.19%)	36(87.80%)	2.066(0.743-5.745)	0.164
No	24(6.3%)	357(93.7%)	1	
History of admission				
Yes	4(7.15%)	52(92.85%)	1.043(0.349-3.118)	0.940
No	25(6.87%)	339(93.13%)	1	
Unsafe dental procedure				
Yes	19(20.65%)	73(79.35%)	0.120(0.054-0.269)	0.000
No	10(3.03%)	320(96.97%)	1	

5.3.3. Prevalence of HBV by Obs/Gyn related factors

It was observed that 35% of the respondents were primiparous among which only one was sero positive for HBsAg. In the case of gravidity, about 32% of the respondents were primigravidae and none of these was sero positive for HBsAg. About 65(15.4%) respondents had at least one delivery by non-skilled attendants and among those who experienced this exposure 7(10.77%) of them were sero positive. As per history of unsafe abortion 47 (11.1%) of them were experienced unsafe abortion from these 15(31.91%) were sero positive. Based on the bivariate finding, unsafe abortion and non-skilled delivery was a candidate for multivariate analysis (Table 4).

Table 4 Distribution of Obs/Gyn related risk factors and prevalence of HBsAg among ANC attendant in Shakiso Woreda, May 2014

Variable	HBsAg sero status		COR (95%CI)	p-value
	Positive No (%)	Negative No (%)		
Parity				
Premiparous	1(0.68%)	147(99.32%)	1	
Multiparous	28(10.2%)	246(89.78%)	16.732(2.253-124.26)	0.276
Non skilled delivery				
Yes	7(10.77%)	58(89.23%)	1.838(0.751-4.498)	0.183
No	22(6.12%)	335(93.84%)	1	
Unsafe abortion				
Yes	15(31.91%)	32(68.09%)	12.087(5.360-27.256)	0.000
No	14(3.733%)	361(96.27%)	1	

5.3.4. Prevalence HBV by behavioral related factors

Based on the response obtained from the participants, 73 (17.3%) and 123(30.1%) of them had current/past history of exposure to multiple sexual partner and STI respectively. Among those who had such exposures, 18(24.66%) and 20(15.75%) of them were sero positive for HBsAg and both these factors were a candidate for multivariate analysis (Table 5).

Table 5 Distribution of behavioral related factors and prevalence of HBsAg among ANC attendants in Shakiso woreda, May 2014

Variable	HBsAg sero status		COR(95% CI)	p-value
	Positive No (%)	Negative No (%)		
History of having multiple sexual partner				
Yes	18(24.66%)	55(75.34%)	10.056(4.508-22.434)	0.001
No	11(3.15%)	338(96.85%)	1	
History of STI				
Yes	20(15.75%)	107(84.25%)	5.940(2.623-13.452)	0.001
No	9(3.05%)	286(96.95%)	1	

5.4. Factors associated with HBsAg

In the bivariate analysis, candidate variables were identified based on their p value ($p \leq 0.25$) for the next multivariate analysis. Exposure to delivery by non-skilled attendants, unsafe abortion, and dental procedure, history of suturing, STI and multiple sexual partners were the variables identified for multivariate analysis. In the multivariate analysis, enter method was employed to select the variables into the model. Fitness of the model and multicollinearity between the independent variables was assessed.

Based on the model from multivariate analysis, history of unsafe dental procedure, unsafe abortion and multiple sexual partners were significantly associated with HBsAg sero status.

However, other variables, which were candidate in bivariate analysis at p value ≤ 0.25 like history of suturing, history of delivery by non-skilled attendants and history of STI, were not significant.

Those who experienced unsafe dental procedure and unsafe abortion each had an almost five times more chance of being sero positive for HBsAg than those who had not experienced unsafe dental procedure[AOR=4.703(1.704-12.983)], and unsafe abortion[AOR=5.386(1.640-17.690)]. Those who had history of multiple sexual partner were 8 times more likely to be sero positive for HBsAg than who did not have such exposure [AOR=7.953(2.772-22.818)].

Table 6 Parameter estimates from multivariate logistic regression model predicting the probability of HBsAg sero status among ANC attendants in Shakiso woreda, May2014

Variable	HBsAg sero status		COR(95% CI)	AOR(95% CI)
	Yes	No		
History of suture				
Yes	5(5.26%)	36(94.74%)	2.066(0.743-5.745)	0.837(0.209-3.054)
No	24(8.54%)	357(91.46%)	1	1
History of unsafe dental procedure				
Yes	19(20.9%)	72(79.12%)	8.329(3.717-18.663)	4.703(1.704-12.98)*
No	10(3.07%)	316(96.93%)	1	1
History of unsafe abortion				
Yes	15(31.91%)	32(68.09%)	12.087(5.360-27.256)	5.386(1.640-17.690)*
No	14(3.733%)	361(96.27%)	1	1
History of delivery by non skilled attendants				
Yes	7(10.77%)	58(89.23%)	1.838(0.751-4.498)	1.750(0.547-5.722)
No	22(6.16%)	335(93.84%)	1	1
History of having multiple sexual partner				
Yes	18(24.66%)	55(75.34%)	10.056(4.508-22.434)	7.953(2.772-22.818)*
No	11(3.15%)	338(96.85%)	1	1
Sexually transmitted disease				
Yes	20(15.75%)	107(84.25%)	5.940(2.623-13.452)	1.980(0.708-5.532)
No	9(3.05%)	286(96.95%)	1	1

*- $pvalue < 0.05$, Hosmer and Lemeshow test $X^2 = 6.116$ and p value 0.295

History of suture, History of unsafe dental procedure, History of unsafe abortion, History of delivery by non skilled attendants, History of having multiple sexual partner and Sexually transmitted disease were the variables entered in the model

6. DISCUSSION

In this study, an attempt has been made to determine the sero prevalence and associated factors of HBsAg among 422 ANC attendants in Shakiso woreda.

The overall prevalence of HBsAg was found to be 6.9% ranging from 5.9% to 9.1% lower in Shakiso and higher in Megado health center. WHO classifies the endemicity of HBV based on the sero positivity rate of HBsAg; low endemicity area (less than 2% sero positive), intermediate endemicity area (2% to 7% sero positive) and those having higher than 7% as high endemic areas(10). Based on this context our study area is intermediate endemic area to HBV infection.

The result from this study was in agreement with the investigation done among pregnant women from community based sero-epidemiological survey conducted in Addis, which was 7% (18). It was also almost concordant with the finding from Zambia, 6.7%(25). Lower and higher prevalence rates were also detected in similar study populations in different parts of the world. Countries with lower prevalence include United States with 0.14% – 0.97% variation(22), Brazil 1.05%(23), Mexico 1.65%(24), Northern Europe, Australia and parts of South America, also reported the prevalence of less than 2%(25). The better attention given to HBV prevention by the countries government in the developed world as compared to ours might be the reason to such lower rate.

Countries with higher prevalence were reported almost from African region which include Papua New Guinea 11%(27) and Nigeria 17.2%(28), Ghana, Kenya, and Somali also reported a higher rate of HBV which was 16%, 14.1%, and 12.5% respectively (30, 31, 36). The lower attention of the countries government towards HBV might be the reason for the higher rate of HBV infection in African region including ours.

Our study finding was higher as compared to similar studies conducted in the country. Study from Jimma specialized hospital and its teaching health center revealed the prevalence of HBsAg among pregnant women was 3.4(20). Other similar study also conducted among pregnant women at ANC clinic in Debre Tabor hospital stated the prevalence of HBsAg sero

status was 5.3%(16). The difference in socio demographic characteristics, the difference in life style and the temporary nature of their dwelling might explain this discrepancy.

In this study, cultural related practices like circumcision and tattooing were not significant predictors of HBsAg as they were stated in different studies from Nigeria(34), Kenya, Yemen(41), Jimma(20) and Debretabor(16). The fact that female genital mutilation and tattooing is relatively rare in our study area, could possibly explain the differences.

This study revealed that the sero positivity of HBsAg is almost five times higher among those who have exposed to unsafe abortion as compared to those who did not exposed to such risk factor. In line with this, study conducted among ANC attendants in Jimma specialized hospital and its teaching health center revealed that the odds of HBsAg sero positivity among those who have experienced unsafe abortion was twice as compared to the none exposed(38). The same finding was obtained from Nigeria among pregnant women attending antenatal clinic at Aminu Kano Teaching Hospital(43). The strong association between unsafe abortion and HBV infection might be due to unsafe abortion is related with unprotected sexual intercourse, which results in unplanned pregnancies and increases the risk of HBV infection if such partners are infected. On the other hand, instrumentation during abortion may serve as sources of exposure since such terminations might be done by unskilled persons using contaminated instruments and surfaces.

The sero positivity of HBsAg was almost five times higher among those who have exposed to unsafe dental procedure as compared to those who did not exposed to such exposure. Different studies have showed the strong association of unsafe dental procedure and HBV infection. Study conducted by Mohammed Abade among pregnant women in Garisa district agreed our finding saying the sero positivity of HBsAg was twice higher among those with unsafe dental procedure(31). The same finding was obtained from study conducted among Nigerian pregnant women(43). Study conducted among 209 pregnant women attending ANC service in Debre Tabor hospital(16) also in line with ours.

The association of HBV infection and unsafe dental procedure could be explained by the fact that instrumentation during dental procedure may serve as sources of exposure since such unsafe procedures might be done by unskilled persons using unsterilized instruments.

Even though different studies conducted in the country on prevalence and factors associated with HBsAg among pregnant women ignored to assess the risk of having multiple sexual partner on HBV infection, our study was revealed the eight fold risk of contracting HBV infection among those who had history of multiple sexual partners as compared to those who do not had history to such exposure. In line with ours, one study conducted among visitors of VCT clinic in Shashemene General Hospital revealed that the sero positivity of HBsAg was seven times higher among those visitors having history of multiple sexual partners as compared to those who do not have (45). The same finding was obtained among Nigerian pregnant women from study conducted in Benin City(48).

The association between exposure to multiple sexual partner and HBsAg sero positivity is obvious that HBV is transmitted directly through sexual intercourse. This implies those individuals having multiple sexual partners and have unprotected sexual intercourse will have a risk of HBV infection.

HBV is an opportunistic infection that will occur due to the presence of different immune suppressing diseases(44). Because of the shared modes of transmission, HBV infection occurs in parallel among people who have sexually transmitted disease (53). Unlike study conducted in Jimma specialized hospital and its teaching health centers (38). Our study did not found any association between STI and HBV infection. In accordance with the finding from Jimma, study conducted in Afghanistan among 520 Afghan pregnant women, the prevalence of HBV was twofold higher among those who had history of STI (46). The discrepancy between these factors might be answered by other investigation.

In this study, prevalence of HBsAg has no difference among those who have history of delivery in at least in one of their deliveries. In contrast to this study conducted in Nigeria revealed the two fold difference of HBsAg sero positivity and this factor(48). The same was obtained by

study from India(35). The good practice of health extension workers in our set up might be the reason for this discrepancy.

LIMITATION OF THE STUDY

This study was limited by the fact that it is a facility-based study a selected population, those who have health seeking behaviors and attend ANC services had the chance to participate in this study. Hence, the results cannot be generalized for the whole pregnant women of Shakiso woreda. Due to the fact that this study has some personal and sensitive issues like experience of multiple sexual partner, sexually transmitted disease and STI obtaining an honest response was difficult because of the social desirability bias. However, this bias has been minimized through assigning the interviewers (data collectors) from the service site by considering the clients will tell all their issues to their health care provider and undertaking the interview in the exit time after the clients has served all the services she came for. In general, the findings of this study have adequately shed light into the problem of hepatitis B virus infection among pregnant mothers in Shakiso woreda.

7. CONCLUSION

A total of 6.9% of the pregnant women studied were sero-positive for hepatitis B surface antigen which places the study area as intermediate endemic area to HBV infection based on WHO HBV endemicity criteria(10). History of unsafe dental procedure, unsafe abortion and history of multiple sexual partners were the identified risk factors for hepatitis B virus infection in our study area.

8. RECOMMENDATION

The reported prevalence in this study is a cause for alarm because it is high enough to warrant the initiation of routine antenatal screening for HBV infection. This is because HBV positive pregnant women represent a major reservoir of the virus in the community and this can be passed on to the children either vertically or even horizontally.

Therefore based on the finding from our study the following recommendations were forwarded:

To Shakiso woreda health office and health center

- Shakiso woreda health office has to facilitate an environment to initiate HBsAg screening service as a routine ANC by so doing HBV carriers could be identified early and measure will be taken to avert the prenatal transmission of HBV
- Shakiso woreda health office has to provide all the necessary supplies of HBsAg screening
- Shakiso woreda health office has to facilitate a community based education program in unsafe procedures like unsafe dental procedure and abortion and the risk of exposure to multiple sexual practices
- Shakiso woreda has to strengthen health development army (one to five) to combat traditional practitioners working in the local community
- The four health centers should strengthen their health education program in giving awareness on the transmission of HBV infection especially on the risk of unsafe dental procedure, unsafe abortion and unsafe multiple sexual practices
- Shakiso woreda health office and the four health center should work together in monitoring the traditional practitioners

To other partners who are interested in maternal and child health activities

- Partners who are interested in maternal and child health activities will be recommended to work together with the woreda health office and the four health centers in instituting routine screening of all pregnant mothers for HBV. Likewise, the administration of prophylaxis for babies of HBsAg positive mothers so as to reduce the vertical transmission.

For Researchers

- Further research which incorporate larger sample size and study population is better if done to strengthen this study finding which leads to a better decision.

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10. ANNEXS

10.1. Procedure for Laboratory test

Solid phase, two-site sandwich immunoassay for the detection of HBsAg in serum or plasma. The membrane is pre-coated with anti-HBsAg antibodies on the test band region and anti-mouse antibodies on the control band region. During testing, the serum sample reacts with the dye conjugate (mouse anti-HBsAg antibody colloidal gold conjugate) that has been coated in the test strip. The mixture then by capillary action reacts with anti-HBsAg antibodies on the membrane and generates a red band. Presence of this red band indicates a positive result while its absence indicates a negative result. Regardless of the presence of HBsAg, as the mixture continues to migrate across the membrane to the immobilized goat anti-mouse region a red band at the control band region will always appear. The presence of this red band serves as verification for sufficient sample volume and proper flow and as a Control for the reagents.

Briefly, the procedure is as follows:

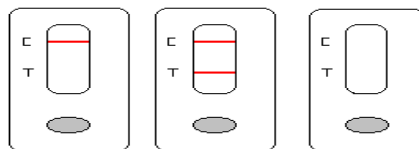
- 1) The Bioline HBsAg test strip was removed from the foil pouch.
- 2) The test strip in the serum samples was immersed with printed sample pointing toward the serum or plasma.
- 3) Then waited for the red bands to appear. The test was read after 5 minutes

Interpretation of the test:

Negative - A single red band appears in the control region. No apparent red or pink band appears in the test region.

Positive - Two distinct red bands appear, one in test region and another in the control region.

Invalid - Control band fails to appear which means improper testing procedure or deterioration of reagents probably (52)



**JIMMA UNIVERSITY COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCE
DEPARTMENT OF EPIDEMIOLOGY AND BIostatISTICS**

Participants Socio demographic and economic factors, risky sexual behavior, obstetric/gynecologic, cultural and medical related factors against hepatitis B virus infection among pregnant women attending ANC clinics in _____health center.

10.2. Consent Form

My name is _____. I am working as data collector in study conducted by Jimma University College of Public Health and Medical science, department of Epidemiology and Biostatics. I am interviewing pregnant women at ANC clinic in _____health center on prevalence and factors associated with hepatitis B virus surface antigen in order to collect information necessary for developing appropriate strategies to prevent the transmission of the infection to the offspring. To attain this purpose your honest and genuine participation by responding to my questions and willing to give blood sample for laboratory diagnosis is very important and highly appreciable.

I expect the interview and the sample collection procedure will take will take about 20 minutes. You do not need to provide your name; the information collected through this interview will not be included in your clinical record. If you prefer not to respond to all questions or responding to some of the questions are your right and you can stop the interview at any time. Your decision will not affect in any way the services you are receiving our institution.

Please be assured that all the information gathered will be anonymously and kept strictly confidential.

Are you willing to participate in our study?

Yes_____ Signature of the respondent _____

NO _____Thank you anyway. Have a nice day.

Date of interview: ----/-----/----- . Time interview began: Hours: Minutes _____

Time interview finished: Hours: Minutes _____ Interviewer initials _____

Contact address of principal investigator:

Name: Medhanit Mario mob. 0911952681

10.3. Questionnaire English version

Questionnaire for the study on the prevalence and associated factors of HBsAg among pregnant women attending health facilities found in Shakiso woreda.

Participants code _____ Date of interview _____

Name of health facility _____

Interviewer Name _____

Please ask the respondents the following questions and record the response as follows, for closed ended questions please circle the respondent's response and put the response of the respondents for open ended and for semi- closed questions on the space provided.

<i>Sr no</i>	Question	choice
I. socio - demographic and economic related questions		
101	How old are you? (in year)	_____
102	Where do you live?(write the participants kebele)	_____
103	What is your level of education?	<ol style="list-style-type: none"> 1. not able to read and write 2. able to read and write but didn't attend formal schooling 3. If attended formal schooling, the highest grade completed_____
104	What is your occupation, what kind of work do you mainly do?	<ol style="list-style-type: none"> 1. Government employed (specify)_____ 2. Merchant 3. Farmer 4. House wife 5. Daily laborer 6. Other (specify)_____
105	How much is your families average monthly income?(in ETB)	_____
II. Cultural related questions		
201	Have you ever been tattooed in any part of your body?	<ol style="list-style-type: none"> 1. yes 2. no
202	Have you been pierced your ear/nose?	<ol style="list-style-type: none"> 1. yes 2. no
203	If yes for Q 202 where?	<ol style="list-style-type: none"> 1. In jewelry shop 2. other specify_____
204	Are you circumcised?	<ol style="list-style-type: none"> 1. yes 2. no

III. Medical related questions

301	Have you had an injection for any reason?	1. yes 2. no
302	If yes for Q 301 Where did you get an injection	1. clinic 2. health center 3. hospital 4. traditional practitioners/injectors? home 5. other(specify)_____
303	Have you had exposed to suturing	1. yes 2. No
304	If yes for Q 303 where did you sutured	_____
305	Have you ever been admitted in hospital?	1. yes 2. no
306	If yes for Q 303 where?(name of health facility)	_____
307	Have you had surgery of any type?	1. yes 2. no
308	Yes for Q 305 where?(name of health facility)	_____
309	Have you ever been received blood?	1. yes 2. no
310	If yes for Q 307 where (name of the health facility)?	_____
311	Have you ever had any dental procedure(tooth extraction or tooth	1. yes 2. no

replacement)?

- 312 If yes for Q 309 where?
1. clinic
 2. health center
 3. hospital
 4. traditional practitioners home
 5. other(specify)_____

IV. Obstetric/Gynecologic related factors

- 401 Gravidity prior to this pregnancy (revise participants card) or ask for smooth relation with your participants
1. null Para
 2. one
 3. greater than two(write the number)

- 402 Parity(revise participants card) or ask for smooth relation with your participants)?
1. zero
 2. one
 3. greater than two(write the specific number)

- 403 If not 1 for Q402. where did you give birth?
1. in the home
 2. in clinic
 3. in hospital
 4. in health center
 5. other(mention)_____

- 404 If not 1 for Q402. was you delivered by caesarian, that is, did they cut your belly open to take the baby out
1. yes
 2. no

- 405 If not Null Para for Q 401 Have you experienced Abortion/miscarriage?
1. yes
 2. no

- 406 If yes for Q 405 where
1. clinic
 2. health center
 3. hospital
 4. traditional practitioner

5. other(specify)

V. Behavioral related questions

501 What is your marital status?

1. Single/never married
2. Married
3. Divorced
4. Widowed
5. Other, specify_____

502 If not 1 for Q104 are/were you the only wife for your husband?

1. yes
2. no

Now I would like to ask you some personal questions. Let me assure you that your answers are completely confidential and will not be told to anyone. If we should come to any question that you don't want to answer, just let me know and we will go to the next question

503 If 1. for Q 502 have you had any occasion to have sexual intercourse with any other person other than your husband(weather you need it or not) in the past 12 month?

1. yes
2. no

504 If 1. for Q 401 have you had any occasion to have sexual intercourse with any other person other than your husband(weather you need it or not) in your life time?

1. yes
2. no

505 If 1. for Q 404/405 do you used condom during these occasions?

1. yes
2. no

506	Sometimes women experience a bad smelling abnormal genital discharge. Have you had a bad smelling abnormal genital discharge in your life time?	1. yes 2. no
507	Sometimes women have a genital sore or ulcer. Have you had a genital sore or ulcer in your life time?	1. yes 2. no
508	HIV sero status(revise the record)	1. positive 2. negative
509	Syphilis/RPR sero status(revise the record)	1. reactive 2. non reactive
	HBsAg sero status	1.Positive 2.Negative

Thank You!

10.4. Afaan Oromo version of information sheet, consent form and Questionnaire

Yuuniversitii Jimmaa

Kolleejii Fayyaa Hawaasaa fi saayiinsii fayyaa

Muummee Epiidimologi fi Biostatiksi

Gaaffiilee qorrannoo dhibee tiruu fi sababoota dhukuba tiruu fiduu danda'an dubartoota ulfaa anaa Shakkiisoo jiran irrattii qorachuu ta'a.

Unka Eeyyama Gaafachuu:

Irra deebi'u dhaan harka fuune. Ani maqaan koojedhama. Universitti Jimma Fayyaa hawaasa fi saayinsii fayyaa mumme ipidimology fi biostatiksii qorannoo godhamuu irratti ragaa sasaabduu dha.

kaayoon Qoranichaa:-nutti kan qoranuu baayina dhibe tiruu fi sababoota dhukuba kana fiduu danda'an dubartoota ulfa anaa Shaakisoo irraa dha.Dhibeen kun duubartoota ulfaa iratii yoo jiraatee gara daa'ima haaraa dhalatu irratti nii darba kanatti ansuunis du'as ni geesa. Kanaafu bu'a qorrannoo kanaan qorannoo kana dubarti ulfa qabduu maraa akka laatamu fi talaalii barbaachisaa godhame dhibeen kun haadhaa gara muchaatii akka hin darbinee nigargaara.

Hirmaanaa:-Issin miseensa qorannoo kanaa fedhi keesaniin akka hirmaatan issin gaafana.Wantii issin irraa egamuu gaafiif deebbi daqiiqaa shanii kan hin chaalee fi dhiga milli litraaa 5 keenu dha.Dhibeen kan fudhatamu haala qulquluu ta'ee fi hinfaalamneenii dha. Qorannoo kana irratti hirmaatanii dhignii kessan qoratamee dhibeen kun yoo argame goorsa barbaachisaa fi yaala barbaachisu issinif laatamaa.

Sababa qorrannoo kana keessatti hirmaataniif rakkini qaamaa, kaffaltii fi xiinsammuu, akkasuumas tajaajila fayyaa fudhatan irratti rakkoo tokkoollee hin ummuu. Qorannoo kana irratti odeefano issin irra argamee maraa ichittin isaa kan egamee dha maqaan keesan essattu hin kaa'amu. Kanaafu waa'ee keesani kan ibsu homtuu hin jirru. Hicciitiin yaada issin kenniitanii fi

deebin qorannoo kesanii dhuufaadhan ifati bahee nama biraatiif ykn dhaabata kamiif iyyuu kan hin laatamne tahuu isaa waada isiniif galla. Qorannoo kana keessaatti hirmaachuu fi hirmaachuu dhiisuu, akkasumas addaan kutuuf mirga guutuu qabdu. Qorannoo kana keessaatti hirmaachuuf fedha qabdu?

oboolee/haadhaa gafii ni qabdaa? Qorannoodhaafiis hirmaana gochuuf fedhi nii qabdaa?

Lakkii..... Achuma dhaabiiti gaafatamaa galatoomfadhu.

Eyyeemalatto kee asira nuu kaa'i

Malattoo hirmaataa _____

Maqaa Hirmaachisaa _____

Malattoo Hirmaachisaa _____

Guyyaa _____

Maqaa qorannoo gaggeesaa _____

Bilbilaa 0911952681

Gaafilee Qorannoo sababoota dhukkuba hepatitisiiitiin wal qabatan

Gaafilee armaan gadiitiif filannoo kan qabuuf deebii isaa irrattii sararii filannoo kan hin qabneef ammoo deebii issaanii bakka duwwaattii guutii

<i>Sr.no</i>	Gaafii	filannoo
I. Haala ummataa fi haawaas-dinagdee		
101	Umriin kee haagam(wagaa bareesii)	_____
102	Essa jiraataa(kabalee bareesii)	_____
103	Barumsa hanga meeqaa barateertaa?	<ol style="list-style-type: none"> 1. dubisuu hin danda'u 2. dubisuu danda'a garuu barumsa idile hin baranee 3. yoo baratee haanga meeqaaa?_____

105	Hujiin kee maali?	<ol style="list-style-type: none"> 1. Hujjii mootumaa (ibsii) 2. Daldaltuu 3. horsisee bultuu 4. haadha manaa 5. hujii guyyaa 6. Kan biraa(ibsii)
106	Galiin maatti kee ji'aan?(Qarshii)	_____
Sababoottaa adaan waliin walqabattan		
201	Tumatee jirtaa?	<ol style="list-style-type: none"> 1. eyee 2. lakkii
202	Gura/funyaa kee urateertaa?	<ol style="list-style-type: none"> 1. eyee 2. lakki
203	Eyee yoo jetto gaaffii 202 dhaaf essaa?	<ol style="list-style-type: none"> 1. mana warqii 2. bakka biraa(ibsii)_____
204	Bakka biraa yoo jettee gaaffii 203 dhaaf maalin urattee	_____
205	Kitaanateertaa?	<ol style="list-style-type: none"> 1. eyyee 2. lakkii
II. Sababoota yaalaan walqabate		
301	Dhukubsatee mana yaalaa deemtee beektaa?	<ol style="list-style-type: none"> 1. eyyee 2. lakkii
302	Eyye yoo jettee gaafii 301 dhaaf limmo si ajjajamee waraanatertaa	<ol style="list-style-type: none"> 1. eyyee 2. lakkii
303	Eyyee yoo jettee gaafii 302 dhaaf essaa?(Maqaa mana yaalicha)	_____
304	Mana yaalaattii nafa kee iratti hoodhamtte beektaa?	<ol style="list-style-type: none"> 1.eyyee 2.Lakkii

305	Gaaffi 304 ttif eyye yoo jette essatti(maqaa mana yaalicha)	_____
306	Mana yaalaatii dhukubsatee ciftee bektaa?	1. eyyee 2. lakkii
307	Eyyee yoo jette gaafii 304 dhaaf essaaa	_____
308	Naftii kee mana yaalaatii baqaqfamee hodhamee beekaa?	1. eyyee 2. lakkii
309	Eyyee yoo jette gaafii 304 dhaaf essaaa?(maqaa mana yaalichaa)	_____
310	Dhukubsatee dhiga nama irraa siif keenamee beekaa?	1. eyyee 2. lakkii
311	Eyyee yoo jette gaafii 307 dhaaf essaaa?(maqaa mana yaalichaa)	_____
312	Ilkaan kee si dhukube buqifatee yokiin guchisiftee bektaa?	1. eyyee 2. lakkii
313	Eyyee yoo jette gaafii 309 dhaaf essaaa?(maqaa mana yaalichaa)	_____
III. Sababoota ulfaaf da'umsaan wal qabatee		
401	Ulfa meeqaffaa keetii?(kaardii ilaalii)	1. tokkofaa 2. lamaffa 3. >seddii(lakoofsa baresii)
402	Lamaaf isaa olii hoo jettee to gaafii 401 dhaaf Mucaa lubuun dhalatee meqa qabdaa?	1. hommaa 2. tokko 3. lammaa 4. lamaa olii(lakofsa baresii)

403	Tokkof isaa olii yoo jetea gaffii 402 dhaaf assati dessee?	<ol style="list-style-type: none"> 1. manatti 2. klinikaatii 3. bufata fayyaatti 4. hospitaalaatii 5. bakka biraa(ibsii)_____
404	Tokkof isaa olii yoo jetea gaffii 402 dhaaf enyu tuu sii deesisee?	<ol style="list-style-type: none"> 1. haadha kiyyaa 2. deesiistu gandaaa 3. hojjettaa fayyaa 4. kan birraa(ibsii)_____
405	lamaaf isaa olii yoo jetea gaffii 401 dhaaf ulfa siraa ba'e beekaa?	<ol style="list-style-type: none"> 1. eyee 2. lakkii
406	Eyyee yoo jette gaaffii 405 dhaaf essatti?	<ol style="list-style-type: none"> 1. kilinikaa 2. bufata fayyaa 3. hospitaalaa 4. manaatti 5. kan birraa(ibsii)_____
IV. Sababoota amala saalaan walqabatee		
501	Haalii heeruma keetii akkam?	<ol style="list-style-type: none"> 1. adda kiyyaa/herumme hin beeku 2. heerumeerraa 3. hikkeeraa 4. Abbaa manaa du'aan kan dhabdee 5.kan birraa, ibsii_____
502	Gaaffii 501 tiif adda kiyyaa yoo hin jennee abaan manaa kee nitti biraa qabaa/qabee beekaa?	<ol style="list-style-type: none"> 1. eyyee 2. lakkii
503	waggaa darbee keesatti kka tassaa walqunamtii nama biraa wajiin(abbaa manaa keettiin allaa) feedhiidhaanis ta'e dirqamaan gottee bektaa	<ol style="list-style-type: none"> 1. eyyee 2. lakkii

504	Umrii keettiin akka tassaa walqunamtii nama biraa wajiin(abbaa manaa keettiin allaa) feedhii dhaanis ta'e dirqamaan gotee beektaa?	1. eyyee 2. lakkii
505	Eyyee yoo jettee gaafii 503/504 dhaaf kondoomii yeeroo sanatti fayadamteertaa?	1. eyyee 2. lakkii
506	Yerroo tokkoo tokkoo dubartiin foolii badaa qaama saalaa ishee keesaa ba'u ni dhageesii. Haala akkasii si mudatee beekaa	1. eyyee 2. lakkii
507	Yerroo tokkoo tokkoo dubartiin madaa qaama saalaa ishee irrattii ba'u ni danda'aa. Haala akkasii si mudatee beekaa	1. eyyee 2. lakkii
508	Firri HIV sero status(medicaal rikardii gaafatamtuu irraa ilaalii)	1. positivii 2. negaatiivii
509	Dhibee fantoo/frrii RPR (medicaal rikardii gaafatamtuu irraa ilaalii)	3. reactive 4. non reactive
	Firi qoranoo HBsAg	1.Positive 2.Negative

Galatoomaa !