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PREVALENCE OF HERPES SIMPLEX VIRUS TYPE-2 AMONG HIV-POSITIVE PATIENTS IN SOME AREAS OF KATSINA STATE, NIGERIA

[*]Hayatudeen MR[1], [2]Aminu M[2], Inabo HI[2]

[1]Department of Microbiology, Umar Musa Yar'Adua University, Katsina, Nigeria.
[2]Department of Microbiology, Ahmadu Bello University Zaria-Nigeria.

***Author for Correspondence:** hayatudeen.muhammad@umyu.edu.ng*

ABSTRACT

Herpes simplex viruses (HSV) are large double-stranded DNA virus that are proficient in promoting cell death upon infection and in establishing latency in sensory ganglia and replicating in epithelial cells during primary and recurrent infection. Herpes Simplex Virus type 2 (HSV-2) is a significant public health problem being one of the most prevalent sexually transmitted infections (STIs) worldwide and the leading cause of genital ulcerative disease (GUD) that is common both in industrialized and developing countries. The objective of this study was to survey Immunoglobulin G and M of Herpes Simplex Virus type 2 among HIV positives patients in Katsina State, by determining the sociodemorgraphic and risk factors associated with HSV-2 infection. A cross-sectional serological survey enrolling 125 HIV positive participants attending public health care settings in six local government of Katsina State was conducted. Serum samples were obtained from randomly selected subjects. Samples were tested using an IgG and IgM HSV-2 specific commercial enzyme-linked immunosorbent assay kit. The overall prevalence of HSV-2 IgG is 74.4% and 40.0% for IgM ranging from 81.8% in Katsina, 81.3% in Daura, 69.2% in Malumfashi, 64.3% in Baure, 63.2% in Funtua to 82.4% in Dutsinma for IgG respectively while IgM recorded prevalence rate of 23.5% in Dutsinma, 36.4% in Katsina, 42.9% in Baure, 62.5% in Daura, 36.8% in Funtua and 42.3% in Malumfashi. HSV-2 prevalence increased with age and HIV positivity. These results demonstrate a high prevalence of Herpes type 2 positivity among the participants. We recommend improved health education regarding Herpes type 2 among the populace and increasing routine testing for Herpes type 2 antibodies to prevent HSV-2 related morbidity and mortality, particularly in immunocompromised patients.

Keywords: Herpes, GUD, prevalence, HIV, ELISA.

INTRODUCTION

Herpes simplex viruses (HSV) are large double-stranded DNA virus belonging to *Alphaherpes virus* subfamily of *Herpes viruses* surrounded by an envelope of lipid glycoprotein (Kahsay *et al.* 2015). Once the virus has contact with the mucous membranes or skin wounds, it begins to replicate (Maliyar *et al.* 2019).The virus is then transported within nerve cells to their roots where it remains inactive (latent*)* and persists for the whole life of the infected person (WHO, 2020). During inactive periods or latent state, the virus cannot be transmitted to another person (Rajagopal *et al.* 2014).

Herpes Simplex Virus Type 2 (HVS-2) is a common human pathogen that can cause primary and recurrent infections of mucous membranes (Pinninti and Kimberlin, 2018). Primary HSV-2 infections are usually symptomatic but may be asymptomatic when there are no pre-existing antibodies against it (Tronstein *et al.* 2011). Recurrent infection takes place when HSV-2 reactivates in sacral ganglia, and is transported in the peripheral nerves back to the mucosal or skin surface (Barnabas *et al.* 2011). Recurrence may be triggered by physical or emotional stress, fever, ultraviolet light and tissue damage (WHO, 2020).

Herpes Simplex Virus Type-2 is sexually transmitted, that is, horizontally transmitted (WHO, 2020) and it can also be transmitted through oral and anal sex (James *et al.* 2020). Herpes simplex virus type-2 is periodically shed in the human genital tract, most often asymptomatic (Maliyar et al. 2019). It may also be transmitted vertically during childbirth from mother to its child (Shannon *et al.* 2015).

Herpes Simplex Virus type-2 is a significant public health problem being one of

the most prevalent sexually transmitted infections (STIs) worldwide and the leading cause of genital ulcerative disease (GUD) that is common both in industrialized and developing countries (Looker *et al.* 2017). Majority of the infections are asymptomatic and this enhances HSV-2 transmission because asymptomatic individuals shed the virus and transmit the disease (Shannon *et al.* 2015).

The virus annually affects an estimate of 400 million persons in the reproductive age range worldwide (Looker *et al.* 2017). Herpes Simplex Virus Type-2 infection is particularly devastating when it occurs in immunocompromised patients and, unfortunately, coinfection is common (Brent *et al*. 2021). Of major public health importance is the interaction of HSV-2 with human immunode?ciency virus (De Baetselier *et al.* 2015). HSV-2 infection increases the risk of acquiring HIV infection by two-to-three folds, HIV transmission on a per-sexual act basis by up to five folds, and may account for 40–60% of new HIV infections in high HSV-2 prevalence populations (Edith *et al.* 2014). Patients with HIV may have more frequent, severe and prolonged episodes of recurrences of genital herpes especially in those with a low CD4 count <200/μL (Dellar *et al.* 2015). There is a higher rate of subclinical shedding of HSV-2 (i.e. in the absence of obvious genital lesions) in those infected with HIV (Schiffer *et al.* 2014).

Human Immunodeficiency Virus (HIV) also increases the risk of acquisition and transmission of HSV-2. Herpes Simplex Virus Type-2 infection actually defines AIDS in the case of chronic ulcers of more than one month duration, bronchitis, pneumonitis or oesophagitis (Maliyar et al. 2019). In Nigeria, genital herpes has been reported to be associated with considerable morbidity and mortality (Duru *et al.* 2014) such that infection in neonate with the virus is rare, but has a high risk of mortality and morbidity in Nigeria and many literatures in Nigeria had shown high prevalence rate of Herpes Simplex Virus-2 (Agabi *et al.* 2010). Since there is high prevalence of HSV-2 infection in Nigeria and other developing countries, there is need to educate people on the prevalence of HSV-2 infection in the population, the importance of routine HSV-2 screening, and how to help partners to make responsible choices regarding their sexual practices.

MATERIAL AND METHODS

Study Area

The study was carried out in Katsina State located at the extreme northern margin of Nigeria the state covers a total area of about 23,938sqkm (9,341 sq mi) with a total population of 5,801,584 people, going by 2006 census (FGN 2007). The state is bounded by Niger Republic to the north, by Jigawa and Kano States to the east, by Kaduna State to the South and by Zamfara State to the West. Katsina State has predominantly Hausa-Fulani indigenes. About 75% of the people are farmers and others are traders and livestock owners. The state has thirty four (34) local governments' areas (LGAs). The LGAs are divided into three (3) senatorial zones according to their geographical locations, namely; Funtua zone (South), Katsina zone (Central), and Daura zone (North) (Dauda *et al.* 2011).

Study Design:

The study was a descriptive cross-sectional and experimental study in which structured questionnaire was administered to the participants and blood samples were collected from those who consented and analyzed.

Study Population:

The study population comprising of male and female coming for HIV screening from six hospitals were conveniently selected for the study. The hospitals selected for the study were; General Hospital Funtua, Children's and Maternity Hospital Malumfashi, General Hospital Dutsinma, General Hospital Katsina, General Hospital Daura and General Hospital Baure.

Inclusion and Exclusion criteria:

This includes any male or female that was above 15years old attending the selected hospital and tested positive for HIV and gave their consent, while those that did not consented, below 15year or not tested positive for HIV where excluded from the study. Ethical approval was obtained from the Ethical Committee of

General Hospital Services Management Board, Katsina State.

Blood Sample Collection:

A total of 125 blood samples were collected aseptically using 5ml syringe from patients who gave consent by the laboratory technologist in the selected Hospitals of Katsina State. The blood was allowed to clot for 30 minutes and centrifuged at 1000rmp for 10 minutes. The serum was carefully removed with a transfer pipette and transferred aseptically to a sterile labeled serum storage screw-capped container and stored at -20°C in a freezer until analyzed.

Serological Assay for HSV-2 IgG and IgM Antibodies:

The serum sample were analyzed using HSV-2 IgG and IgM specific ELISA kits manufactured by Diagnostic Automation / Cortez Diagnostics Inc, USA. The manufacturer's instruction were strictly followed.

RESULTS

Of the 125 sera analyzed, 74.4% (93/125) were positive for IgG and 40.0% (50/125) were positive for IgM no statistical significant difference observed between current HSV-2 infection and previous HSV-2 infection ($^{IgG}\chi^2$= 7.843, df= 3, p= 0.432; $^{IgM}\chi^2$= 62.45, df= 3, p= 0.107) as shown in Table 1.

Analysis of the result by age group is shown in Table 2. Higher IgG prevalence was recorded among participants in aged group 41-50 years (88.6%: 31/35), while participants in aged group 51years above had the lowest IgG prevalence of (52.1%: 12/23). The association observed between age of the participants and previous HSV-2 infection was not statistically significant ($^{IgG}\chi^2$= 10.386, df= 8, p= 0.239). The findings showed a statistical significant different between age groups in relation to current infection ($^{IgM}\chi^2$=12.510, df= 4, p=0.023). Generally, prevalence of HSV-2 infection is higher in participants of higher age groups than those in lower age groups.

Analysis of HSV-2 infection by hospital showed that General Hospital Dutsinma recorded highest IgG prevalence of (82.4%: 14/17), while lowest IgG prevalence was obtained in General Hospital Funtua (63.2%: 12/19). The association between previous HSV-2 infection and hospitals observed was statistically significant ($^{IgG}\chi^2$= 25.415, df= 5, p= 0.003). General Hospital Daura had highest IgM prevalence rate (62.5%: 10/16), while the least prevalence of IgM was detected in General Hospital Dutsinma (23.5%: 4/88). No statistical significant different between the prevalence rate of HSV-2 infections in relation to the Hospitals ($^{IgM}\chi^2$= 8.646, df= 5, p= 0.124) (Table 3).

Analysis of results by clinical symptoms is shown in Table 4. None of the symptoms observed was significantly associated with HSV-2 infection, but IgG prevalence rate is higher in heparticipants without blister (85.3%: 81/95) compared to those participants with blister.

Furthermore participants without blister had higher IgM prevalence rate (41.1%: 39/95) compared to participants with blister; odd ratio shows that those without blister are more likely to be infected with the virus (OR=5.367, 95% C.I=2.204-3.730).

The analysis of result according to muscle ache shows that (78.6%: 66/84) of the participants without muscle ache had higher IgG prevalence rate compared to participants with muscle ache, while participants with muscle ache had higher IgM prevalence rate (42.9%: 36/84) compared to participants without muscle ache but odd ratio indicate that participants with muscle ache are more likely to be infected with the virus (OR=4.009, 95% C.I= 6.970-8.472).

However, participants with burning sensation had lower IgG prevalence rate (78.4%: 80/102) compared to participants without burning sensation, while participants without burning sensation had lower IgM prevalence rate (13.0%: 3/23) compared to the participants with burning sensation but odd ratio indicate that participants without burning sensation are more likely to be infected with the virus (OR=2.734, 95% C.I= 0.397-4.030).

However, participants without vaginal discharge had higher IgG prevalence rate (94.8%: 74/78) compared to participants with vaginal discharge, while participants without vaginal discharge had higher IgM prevalence rate (41.0%: 32/78) compared to participants with vaginal discharge; odd ratio indicate that

participants with vaginal discharge are more likely to be infected by the virus (OR= 2.117, 95% C.I=1.736-2.730).

Analysis further also reveals that participants without adenopathy had higher IgG prevalence rate (76.2%: 77/101) compared to participants with adenopathy, while participants no any clinical symptoms of adenopathy had higher IgM prevalence rate (43.6%: 44/101/114) compared to participants Participant with adenopathy but odd ratio indicate that participants with adenopathy are more likely to be infected with the virus (OR= 3.142, 95% C.I=1.201-4.110).

The finding according to risk factors is shown in table 5. Participants who had engage in sexual activity had higher IgG and IgM prevalence rate of 82.7% and 48.0% respectively compared with participants that had not engage in any form of sexual activity. No statistical significant association between sexual activity and presence of antibodies to HSV-2 ($^{IgG}\chi^2$= 0.033, df= 1, p= 0.856; $^{IgM}\chi^2$= 0.325, df= 1, p= 0.569). Further analysis of the result reveals that participants engage in sexual activity are more likely to be infected with HSV-2 (OR=3.567, 95% C.I=1.234-4.730).

Furthermore, participants who had single sexual partner recorded higher IgG prevalence rate 69.2% of HSV-2 infection compared to those with multiple sexual partners. For IgM analysis of result reveals that those participants with multiple sexual partners had higher prevalence rate of 59.6% compared to those participants with single sexual partners. No statistical significant association between number of sexual partners and presence of HSV-2 antibodies ($^{IgG}\chi^2$= 0.433, df= 1, p= 0.511; $^{IgM}\chi^2$= 1.231, df= 1, p= 0.267). Odd ratio analysis reveals that participants with multiple sexual partners are more likely to be infected with HSV-2 (OR=2.789, 95% C.I= 3.970-5.412).

Further analysis showed that participants that use protection had lower IgG prevalence rate (47.8%: 11/23) compared to those who did not agreed to use protection, while participants that use protection had lower IgM prevalence (39.1%: 9/23) compared to those participants did not agreed to use protection. There is no statistical significant association observed between HSV-2 infection and use of protection ($^{IgG}\chi^2$= 1.116, df= 1, p= 0.734; $^{IgM}\chi^2$= 0.154, df= 1, p= 0.695) but odd ratio confirm the association was not statistically significant (OR=2.654, 95% C.I=0.121-3.000).

The IgG prevalence among cancer patient's participants is higher 100% compared to participants that are non-cancer participants, while participants that are non-cancer patients had lower IgM prevalence rate. There is statistical significant association observed between cancer status of the participants and previous HSV-2 infection and no statistical significant association observed between cancer status of the participants and current HSV-2 infection ($^{IgG}\chi^2$= 3.321, df= 1, p= 0.022; $^{IgM}\chi^2$= 0.156, df= 1, p= 0.563). Odd Ratio indicate that cancer participants are more likely to be infected with the virus (OR=5.734, 95% C.I=0.397-8.730).

The result was analyzed according to socio-demographic factors as shown on Table 6. A higher prevalence of (79.7%: 63/79) and (40.5%: 32/79) for IgG and IgM was detected among those with low socioeconomic status, while those with high socioeconomic status had lower prevalence rate. There is no statistically significant association between socio-economic background and HSV-2 infection ($^{IgG}\chi^2$= 3.341, df= 1, p= 0.063; $^{IgM}\chi^2$= 2.219, df= 1, p= 0.136) and odd ratio confirm those with high socioeconomic status are two times more likely to be infected with the virus (OR=2.007, 95% C.I=0.321-5.210).

However, higher IgG prevalence rate (82.4%: 28/34) was recorded among those participants with primary level of education, while those with secondary school level had the lower IgG prevalence. Those participants with secondary level of education had higher IgM prevalence (52.2%: 24/46), while those with none level had the lower IgM prevalence rate. Similarly, no statistical significant association was observed between HSV-2 infection and educational level of the participants ($^{IgG}\chi^2$= 1.847, df= 3, p= 0.605; $^{IgM}\chi^2$= 1.654, df= 3, p= 0.647).

Analysis of result by occupation showed that self-employed had higher IgG prevalence rate (80.6%: 29/36), while lower IgG prevalence was detected among farmers, while higher IgM prevalence rate (60.0%: 6/12) was seen among self-employed and lower IgM prevalence rate was recorded among civil servant (20.0%: 7/35). There is no statistical significant association

observed between HSV-2 infection and the occupation ($_{IgG}\chi^2$= 6.791, df= 3, p= 0.079; $_{IgM}\chi^2$= 2.234, df= 3, p= 0.525).

Furthermore, analysis of result by marital status of the participant's showed that married had higher IgG prevalence rate (83.8%: 57/68), while lower IgG prevalence rate was detected among divorced. In other hands married participants had higher IgM prevalence rate (50.0%: 34/68), lower IgM prevalence rate of was seen among widows. There was statistical significant association observed between HSV-2 infection and marital status of the participants ($_{IgG}\chi^2$= 2.601, df= 3, p= 0.046; $_{IgM}\chi^2$= 5.406, df= 3, p= 0.013).

Table 1: Prevalence of Immunoglobulin G and M among the HIV positives participants

Test	Total	Positive (%)	Negative (%)	Chi-square (χ^2)	P-value
IgG	125	93 (74.4)	32 (25.6)	7.843	0.432
IgM	125	50 (40.0)	75 (60.0)	62.45	0.070

Table 2: Prevalence of Immunoglobulin G and M in relation to Age of the participants

Age groups	Total	IgG			IgM		
		Positive (%)	χ^2	P-value	Positive (%)	χ^2	P-value
10-20	14	10 (71.4)	10.39	0.239	01 (7.14)	12.51	0.023
21-30	21	13 (61.9)			03 (14.3)		
31-40	32	27 (84.3)			19 (59.4)		
41-50	35	31 (88.6)			14 (40.0)		
51 and above	23	12 (52.1)			13 (56.5)		
Total	**125**	**93 (74.4)**			**50 (40.0)**		

Table 3: Prevalence of Immunoglobulin G and M by Hospital in Katsina State, Nigeria

Hospital	Total	IgG			IgM		
		Positive (%)	χ^2	P-value	Positive (%)	χ^2	P-value
GH Dutsinma	17	14 (82.4)	25.415	0.003	04 (23.5)	8.646	0.124
GH Katsina	33	27 (81.8)			12 (36.4)		
GH Baure	14	09 (64.3)			06 (42.9)		
GH Daura	16	13 (81.3)			10 (62.5)		
GH Funtua	19	12 (63.2)			07 (36.8)		
MCH Malumfashi	26	18 (69.2)			11 (42.3)		
Total	**125**	**93 (74.4)**			**50 (40.0)**		

Keywords: GH= General Hospital, MCH= Maternity and Children Hospital

Table 4: Prevalence of Immunoglobulin G and M in relation to the symptoms

Factor	Total	IgG		IgM		
		Positive (%)	P-value	Positive (%)	P-value	Odd ratio
Blister			0.111		0.213	5.367
Yes	30	12 (40.0)		11 (36.7)		
No	95	81 (85.3)		39 (41.1)		
Muscle ache			0.239		0.154	4.009
Yes	41	27 (65.9)		14 (34.1)		
No	84	66 (78.6)		36 (42.9)		
Burning sensation			0.466		1.843	1.734
Yes	23	13 (56.5)		03 (13.0)		
No	102	80 (78.4)		47 (46.1)		
Vaginal discharge			0.856		0.169	2.117
Yes	47	19 (40.4)		18 (38.3)		
No	78	74 (94.8)		32 (41.0)		
Adenopathy			0.547		0.093	3.142
Yes	24	16 (66.7)		06 (25.0)		
No	101	77 (76.2)		44 (43.6)		

Table 5: Prevalence of Immunoglobulin G and M in relation to risk factors in Katsina State

Variables	Number	IgG		IgM		
		Positive (%)	P-value	Positive (%)	P-value	Odd ratio
Sexual activity			0.856		0.569	3.567
Yes	75	62 (82.7)		36 (48.0)		
No	50	31 (62.0)		14 (28.0)		
Partners			0.511		0.267	2.789
Single	78	54 (69.2)		22 (28.2)		
Multiple	47	39 (82.9)		28 (59.6)		
Use of			0.734		0.695	2.654
protection	23	11 (47.8)		09 (39.1)		
Yes	102	82 (80.4)		41 (40.2)		
No						
Cancer			0.042		0.231	3.117
Yes	11	11 (100)		09 (81.8)		
No	114	81 (71.1)		41 (35.9)		

Keywords: (%)=percentage

Table 6: Prevalence of Immunoglobulin G and M in relation to the sociodermographic factors

Factor	Number	IgG		IgM	
		Positive (%)	P-value	Positive (%)	P-value
Socioeconomic			0.063		0.136
High	46	25 (54.3)		18 (39.1)	
Low	79	63 (79.7)		32 (40.5)	
Education			0.605		0.647
None	19	13 (68.4)		05 (26.3)	
Primary	34	28 (82.4)		13 (38.2)	
Secondary	46	36 (78.3)		24 (52.2)	
Tertiary	26	16 (61.5)		08 (30.8)	
Occupation			0.079		0.525
Civil servant	35	26 (74.3)		07 (20.0)	
Self employed	36	29 (80.6)		19 (52.3)	
Unemployed	42	32 (76.2)		20 (47.6)	
Farmer	12	06 (50.0)		04 (33.3)	
Marital status			0.046		0.014
Single	17	11 (64.7)		08 (47.1)	
Married	68	57 (83.8)		34 (50.0)	
Widow	25	16 (64.0)		05 (20.0)	
Divorced	15	09 (60.0)		03 (20.0)	

DISCUSSION

In this study, the higher IgG prevalence of 74.4% found is lower than the 97.2% reported in Porthacourt, Nigeria (Okonko et al. 2015) and the 96.5% in Coitdevoire (Boni et al. 2015) but similar to 73.8% reported in Enugu, Nigeria (Ojinmah et al. 2012), 73.0% in South Africa (Abbai et al. 2015) and 75.6% in Dhaka, Bangladesh (Uddin et al. 2015). The prevalence is however higher than 56.3% in Kisumu, Kenya (Ondondo et al. 2014) and 58.0% in Uganda (Edith et al. 2014). The IgM prevalence of 40.0% obtained in this study is lower than the 54.7% reported in Zambia (Looker et al., 2015) and also similar to 41.57% reported in turkey by Duran et al. (2004) and 41.3% in Eastern India (Soumyabrata et al. 2015).The prevalence is higher than 35.16% in Senegal (Amudha et al. 2014). Infection with HSV-2 appears to be silent and unnoticed in the study area and knowledge of the mode of transmission of the virus also appears to be limited and hence facilitates the spread of the virus in the population. This shows that many of the lesions might be mild and insufficiently troublesome for those positive patients to seek for medical attention under conditions where medical facilities are scarce and home treatment of self-limiting conditions is common. In addition, HSV-2 is known to establish lifelong infection that recurs more often and detecting antibodies to the virus is often used to identify carriers of HSV-2 (Brent et al. 2021). Hence, these infected patients are carriers of HSV-2 and might continue to be source of the virus in the community.

Even though HSV-2 antibodies were detected across all the age groups with similar rate, the prevalence was highest within age group of 41-50 years old. Several literatures (Agabi et al. 2010; Ojinmah et al. 2014; James et al. 2020) have demonstrated signi?cant increase in

prevalence with an increasing age and the pattern of distribution of HSV-2 antibodies is compatible with the sexual habits of the different age groups. This can be explained by the fact that HSV-2 infections persist for life, the prevalence increases with age through the sexually-active years.

It is surprising that higher prevalence rate were obtained in Dutsinma than Baure local government areas considering the fact that Dutsinma is more urbanized than Baure and there is more awareness of the virus among the hospital attendees in Dutsinma compared to Baure. The variation of prevalence rates could explain the differences in sexual habit in the regions (Looker et al. 2017) being that HSV-2 is a sexual promiscuity marker. In addition, genital herpes varies from one region to the other, depending on social and sexual behaviours and activity.

Contrary to other studies, there was no significant association observed between clinical symptoms and HSV-2 prevalence, which agrees with previous report in Nigeria (Agabi et al. 2010). The higher prevalence of HSV-2 infection obtained is not in line with previous report in Nigeria (Duru et al. 2014) and reports of other countries (Abbai et al. 2015) while higher prevalence recorded among those with adenophathy than those without adenophathy contrasts the report of Agabi et al. (2010). This finding indicated that the clinical manifestation underestimated the prevalence of HSV-2 infection in the study and may be due to other infections other than HSV-2.

Participants who claimed not engage in any sexual activity had higher prevalence than those who said they were engaged. Previous studies have made similar observations (Dellar et al. 2015). The source of infection of these patients might possibly be sources other than sexual contact since genital herpes virus infection has been known to occur by means other than sexual transmission (Maliyar et al. 2019). Moreover, it has been shown that the virus could survive outside the human host for sufficient time to allow infection to be transmitted via fomites, shared bed-clothes, towels or underclothing (Shannon et al. 2015). Similarly participants who claimed to use protection had higher prevalence compared to those who claimed not to use protection. This agrees with previous reports of (Agabi et al. 2010; Phipps, 2015). This higher prevalence raises a concern regarding the poor quality of the protection used by the participants. In addition, the participants may have probably acquired HSV-2 through non-sexual routes.

It is interesting to note that there was consistently high prevalence of HSV-2 infection irrespective of educational status in this study which agrees with (Looker et al. 2017). However, in the present study the high prevalence was detected among participants that had primary level of education. This collaborates with the previous reports (Obeid, 2007; Edith et al. 2014). This higher prevalence can be better explained by lack of education or awareness on mode of transmission of the HSV-2 virus. The higher prevalence rate of HSV-2 recorded among self employed in the present study collaborates with previous report of (Soumyabrata et al. 2015). These have explained sexual behaviors and activity among self employed an possible sexual promiscuity. The prevalence in the present study was observed to be higher in married participants compared to single participants. This is not consistent with previous observation in Nigerian (Duru et al. 2014). However, the significant association observed between HSV-2 infection and marital status in this study is similar to observation made by previous studies (Agabi et al. 2010; Kalu et al. 2014). This may likely be due to active sexual life and multiple sex partners and probably extramarital affairs among the married participants.

CONCLUSION

Conclusively, Overall prevalence of 74.4% for IgG and 40.0% for IgM of HSV-2 infection appears to be relatively very high in the study area and it can lead to serious complication associated with HSV-2 infection. This indicates a higher prevalence of HSV-2 infection among HIV positive participants emphasizing the possible risk of transmission to seronegative individuals. This implies that the virus is highly endemic in the communities where these hospitals are situated. This could be due to the fact that HIV positivity may activate the latent HSV-2 infection and possibly lead to transmission to seronegative individuals. All the sociodemorgrahic factors analysed in this

research are not statistically associated with HSV-2 infection except marital status of the participants. The findings elucidate the synergetic association between Herpes simplex virus type 2 and HIV infection and it can facilitate the spread of HIV in the study area.

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