TREND ANALYSIS OF HIV PREVALENCE IN THE HOHOE MUNICIPALITY OF GHANA, FROM 2013 TO 2017

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Abstract: Human Immunodeficiency Virus (HIV) is known as one of the leading causes of death in the world. About 36.7 million people lived with HIV (including 1.8 million children), and about 1.0 million people died of HIV-related illnesses in 2016. About 25.5 million morbidities of HIV/AIDS were recorded in Sub-Saharan Africa. While more than 50% of new infections among children have been reduced, there is a significant rise of HIV new infection among young adults and adolescents. HIV new infections in Ghana was 20,148 in 2016, as compared to 12,000 in 2015. Volta region is one of the leading regions of HIV in Ghana, with 2.7% of new infections. This study aimed at determining the trends of HIV/AIDS prevalence among males and females, age groups and the urban and rural areas in the Hohoe Municipality from 2013 to 2017. A retrospective survey on HIV prevalence for 5 years (2013-2017) was carried out. Data were extracted from the HIV/AIDS unit database in the Hohoe Municipal Hospital from 2013 to 2017. The Stata version 14 by Stata Corp (LP, Texas, USA) was used to analyse the data for the study. The data were compared with District Health Information Management System (DHIMS 2) data to check accuracy and consistency. Excel 2013 was used to plot the actual observed cases by year to assess their trend and seasonality. Most of the people who routinely go to the facility to test for HIV from 2013 to 2017 represent 59.8% regardless of location. People within the age group 25-34 have the highest number of people tested for HIV, 1883 (29%). The overall number of female HIV positives (685) over the five years is more than twice that of the male figures (321). The findings indicate that HIV was higher (4.6% and 4.5%) among age groups 45+ and 35-44, respectively. Age groups 15-24 recorded the lowest prevalence, 1.1%. This study found that people in the rural areas who were tested are less likely to be HIV infected (OR = 0.1) than urban residents. This study shows that HIV prevalence among the sexually active age group was 7.6%.

Keywords: HIV, Deadliest Diseases, Hohoe Municipality, HIV infections

1. INTRODUCTION

Human Immuno-Deficiency Virus is one of the "difficult to fight" public health problems the world has ever encountered. HIV is found in all the tissues of an infected body, but it is transmitted through the body's fluids of the infected person (Nordqvist, 2018). In just recent years, from 2015, only Tuberculosis has surpassed HIV as the world's leading cause of death from infectious disease. The trend of HIV studies helps predict the future movement of HIV incidence and implement the appropriate treatment, care and support services and systems. Therefore, as frequently as we examine the trend of HIV infections for proper implementation of HIV prevention programs and services, we arrive at good access to treatment for HIV (Mikkelsen, et al., 2017). Ghana's HIV prevalence and incidence trends are determined by assessing the national and regional HIV prevalence rate, gender rate, pregnancy rate, rural-urban rate, and age rate (Ghana AIDS Commission, 2016).

Globally, HIV-related illnesses were the leading cause of death among women and girls of reproductive age (15-49 years) in 2016. For the past decade, the sub-Saharan African region had the lowest reduction of 30% in HIV-related deaths compared to the rest of WHO regions (UNAIDS, 2017). In 2016, 64% were in sub-Saharan Africa, and 37% were among young people (15-24). This makes HIV one of the deadliest diseases in the world, especially Sub-Saharan Africa (UNAIDS, 2017). HIV is extending and loitering to become a public health problem among young people (21-25) in developing Countries, precisely Ghana (Asante, 2013). In Western and Central Africa, Ghana is just next to Nigeria and Cameroon in newly infected HIV, about 20000 new HIV infections, which is a major concern (UNAIDS, 2017). For the past years, the Volta Region of Ghana has been leading the prevalence of HIV infection amongst the ten regions, especially the youth. For almost a decade, the burden of HIV and AIDS has remained to develop serious socio-economic and public health problems (Ghana AIDS Commission, 2016). The 2016 National HIV and AIDS Estimates show Ghana has 293,804 people living with HIV (PLHIV) (61% females and 39% males). Of this, 261,770 (89%) are adults and 32,034 (11%) children. The Adult HIV incidence is estimated at 0.07%, with 20,148 new infections and 9,248 HIV-related deaths recorded in 2014. Annual HIV death amongst children between 0-14 years is estimated at 1,295 (14% of a total number of deaths), of which 409 occurred among infants between 1-4 years of age. The adult national HIV prevalence is 1.47%. The median HIV prevalence among pregnant women is 1.6%; the 15-24-year group, which is used as a proxy for new infections, recorded 1.8% in 2016 against 1.1% in 2015 (Ghana AIDS Commission, 2016). The increase in new infections is a concern because Ghana recorded significant gains in the key target areas of ending HIV/ AIDS for five years. The figures were contained in a report by the National AIDS Control Program. The report also indicates that the Volta Region and Brong Ahafo Region topped the HIV/AIDS prevalence chart. The findings were revealed at the Commission's two-day annual strategic planning meeting. Therefore, the Ghana AIDS Commission is asking Ghanaians to be extra careful to not contract the deadly disease. A combination of evidence, informed and targeted interventions in HIV programs are key factors for effective HIV prevention (Ghana AIDS Commission, 2016)

A report from the Hohoe Municipal Health Directorate indicates that, in 2017, about 1853 people tested for HIV, where 226 were positive as compared to 209 people in 2016, representing a rise of almost 4%, which is a danger to the health of people in the Hohoe municipality. Volta Region and Brong Ahafo Region topped the chart of HIV/AIDS prevalence in the 2016 report of Ghana AIDS Commissions. They had a 2.7% prevalence rate of HIV each (Ghana AIDS Commission, 2016). A report taken from the Hohoe Municipal Health Directorate indicates that, in 2017, about 1853 people tested for HIV (HTC), where 226 were positive as compared to 209 people in 2016, representing a rise of almost 4%, which is a danger to the health of people in the Hohoe municipality. Therefore, this study would determine how HIV prevalence increase in all ages among the seven sub-districts of Hohoe municipality. The findings of this study would be given to the Hohoe municipal hospital and Hohoe municipal health directorate to know the rate at which the people of Hohoe municipal are contracting HIV among the seven sub-districts. Therefore, it would help minimise health problems caused by HIV. Also, other agencies and institutions who want to use this work can get access to it to help manage HIV conditions in other communities.

2. MATERIALS AND METHODS

Study area

The study was conducted in the Hohoe Municipality in Ghana, specifically the HIV/AIDS Unit of the municipal hospital. The municipality was situated in the middle of the Volta Region, and it is one of the twenty-five (25) Municipalities. Districts in the Volta Region of Ghana as the study was conducted. It has its administrative capital as Hohoe, an urban area. Hohoe municipal geographical map has seven sub-districts, namely, Agumatsa, Akpafu, Alavanyo, Gbi Urban, Hohoe, Lipke, and Lolobi. The Municipality was established by Legislative Instrument (L.I) 2072 and shares borders on the east with the Republic of Togo; on the north with Jasikan district. On the southeast with Afadzato district and southwest with Kpando Municipality. The Hohoe Municipality has a total land area of 1,172 km. This is 5.6 percent of the land area of the Volta Region. It is located between longitude 15°E and 00 45°E and latitude 6o 45"N and 7o 15"N.

Figure 1: Hohoe Municipal Map

SOURCE: Hohoe Municipal Health Directorate.

Study design

A retrospective cross-sectional study on HIV prevalence for five years (2013- 2017) obtained the necessary data within the seven sub-districts in Hohoe municipality. These data were then taken from the Hohoe Municipal hospital and analysed for the study. Data included the sub-district location of clients.

Study population

The primary study population was HIV prevalence records of all persons who tested HIV positive in the Hohoe Municipality from 2013 to 2017. The study included adults (>24yrs), young people (15-24yrs) and children (0-14). The study interest was much centred on how the prevalence rate of HIV/AIDS increases among the seven sub-districts, between rural and urban areas and among age groups. Currently, Hohoe is the most populated sub-district with (68,565) population with many social and economic activities. Likpe (41,383), Agumatsa (24,822), Akpafu (20,574), Alavanyo (18,607), Gbi Urban (15,106), and Lolobi has the lowest population of (7,631), making a total of 196,688 population in the municipality (Ghana Statistical Service, 2014). The population of youth in the municipality is 45238, representing almost 30%.

Data collection tool

A data extraction form was used to collect data from the Hospital. Age group, Sex, sub-District, and client's location (Urban & Rural) was then recorded on HIV prevalence. The checklist was designed to collect the required data from the HIV/AIDS units of the Hohoe Municipal Hospital. The data were collected by: Gathering documents on HIV prevalence from 2013 to 2017, Reviewing all HIV prevalence from 2013 to 2017, Variables on Age, Sex, and the number of HIV cases, location, and date of records were recorded using the checklist, and The data on these variables were entered into EpiData version 3.1 format.

Sampling method

A purposive sampling procedure was used in this study. People who came to the Hohoe municipal hospital for HCT service were included. Criterion sampling was done by picking all cases that met some criteria. The logic of criterion sampling was to review and study all the prevalence that met some predetermined criterion of importance. The criterion sampling method drew all HIV prevalence from 2013 to 2017 in the Hohoe

Municipality. This facility was purposively selected based on availability, volume and quality of data necessary for analyzing trends of HIV prevalence.

Inclusion and Exclusion Criteria

All clients who lived in the Hohoe municipality who were diagnosed with HIV and tested positive from 2013 to 2017 and had their information recorded in the HIV unit's database systems of the Hohoe municipal hospital were included in this study. All clients who were diagnosed with HIV and tested negative from the period of 2013 to 2017 were excluded. All clients who were diagnosed with HIV and tested positive before 2013 and live in the Hohoe municipality were not included in the study.

Data analysis

Data extracted from the HIV/AIDS unit of Hohoe Municipal Hospital using the extraction form was entered into EpiData version 3.1 format and exported to Excel 2013 and Stata 14.1 (Stata Corp, College Station, Texas, USA) for cleaning by reducing and deleting possible duplicates and missing data checks, and performing further analysis. Before analysis, the data were validated to ensure that the collected data was of good quality and obtained reliable results. Descriptive and trend analyses were done to describe the data. Autocorrelation in Excel 2013 was used to plot the actual observed cases by year to assess its seasonality in time series and predict future values and found trends or patterns over the stipulated period.

Ethical issues

Ethical clearance for the study was sought from the University of Health and Allied Sciences' Ethical Review Committee through the School of Public Health of the University of Health and Allied Sciences. Also, an introductory letter from the school was submitted to the Hohoe Municipal Hospital to seek permission for the study. Informed consent from study participants was not required as this was routinely collected operational data, and the above ethical committee waived the need for consent. However, written consent was sought from the University of Health and Allied Sciences' Research Ethics Committee (UHAS-REC A.4 [122]18-19) through the School of Public Health.

3. RESULTS

4.1.1 Coverage and distribution of HIV by sex

Table 1 below shows a total number of 6,476 clients who were tested for HIV from the year 2013-2017. Out of this number, 2,604 (40.2%) were males, while the more significant number of them, 3872(59.8%), were females. The year 2017 recorded the highest number, 1,853 cases tested with 36.6% of males and 63.4% of females, followed by 2016 41.9% for males and 58.1% for females. 2014 was next which recorded 40.3% for males and 59.7% for females, and 2015 also had 42.3% for males and 57.7 for females. In 2013, only 385 cases were tested, with 43.9% of males and 56.1% of females.

Table 1: Coverage of HCT Screening by Sex

Year	Male Tested	%	Female Tested	%	Total
2013	169	43.9	216	56.1	385
2014	605	40.3	897	59.7	1502
2015	544	42.3	742	57.7	1286
2016	608	41.9	842	58.1	1450
2017	678	36.6	1175	63.4	1853
Total	2604	40.2	3872	59.8	6476

Distribution of HIV by Age-Group 2013-2017

The table below shows a distribution of HIV cases among age groups. Among the age groups, 25-34 represented the highest tested age group (1883), followed by 15-24, which recorded (1496), 45+ also recorded (1433) and 35-44 had (1119). 0-14 recorded the most minor tested age group, which was (545). However, the age group that tested for high positive was 45+ 300 (4.6%), followed by 35-44 292 (4.5%). 25-34 was the third highest 246 (3.8%), 0-14 was next with 97 (1.5%), and 15-24 recorded the least as 71 (1.1%). Age group 25-34 had 200 (81%) females testing for positive out of the 246. No age group had males tested more than females. 0-14 age group had a closed interval between males and females, representing 49.5% and 50.5% for females. The mean age of individuals tested for HIV from 2013 to 2017 is 31.33 years.

Table 2: Distribution of HIV by Age-Group 2013-2017

Age Group	Total Tested	Level	Total	Male	Female	% of Positive cases
0-14	545	Positive	97	48	49	1.5
		Negative	448			
15-24	1496	Positive	71	7	64	1.1
		Negative	1425			
25-34	1883	Positive	246	46	200	3.8
		Negative	1637			
35-44	1119	Positive	292	110	182	4.5
		Negative	827			
45+	1433	Positive	300	110	190	4.6
		Negative	1133			

Associations of HIV by Location, Sex and Outcome

Odds for marginal Location and Outcome was 1.4, Location and Sex were 2.0, and Outcome and Sex were also 2.0 are 1.4, 2.0 respectively. The marginal odds ratio for Location and Sex and Outcome and Sex are the same. For Partial 1, the odds ratio for Location and Outcome was 0.6, Location and Sex were 4.8, and Outcome and Sex were also 1.3, respectively. For partial 2, the odds for Location and Outcome were 1.0, Location and Sex were 7.3, and Outcome and Sex were also 2.0, respectively.

Table 3 Associations of HIV by Location, Sex and Outcome

	Location & Outcome (ZY)	Location & Sex (ZX)	Outcome & Sex (YX)
Marginal Odds Ratio	1.4	2.0	2.0
Partial 1 Odds Ratio	0.6	4.8	1.4
Partial 2 Odds Ratio	0.9	7.3	2.0

Gender variation of HIV/AIDS Positivity rate across sub-districts in the Hohoe municipality

From the figure below, we could see that females were highly positive than their male counterparts. In Akpafu and Gbi-Urban sub-Districts, differences of HIV positive among males and females were very high, with the males having zero prevalence. Alavanyo and Hohoe sub-Districts had almost the same and high variances, with 33.3% for males in Alavanyo and 66.7% for females. Hohoe had 32.15% for males and 67.0% for females.

Figure 2: Gender variation of HIV/AIDS Positivity rate across sub-districts in the Hohoe municipality

HIV Prevalence among age groups from 2013 to 2017

The figure below shows that HIV prevalence was highest at 26.1% among 35-44, followed by 20.1% among 45+. Age groups 0-14 followed with 17.8%, and 35-4 had 13—1%. Age groups 15-24 recorded the lowest prevalence, 4.7%.

Figure 3: HIV Prevalence among age groups from 2013 to 2017

Trends in HIV Prevalence from 2013 to 2017

From the figure below, the trends show a significant decrease over the years from 2013 to 2017. 2013 recorded the highest prevalence as 20%, then 18.6% for 2014. In 2015, 17.1% was recorded, 14.4% recorded in 2016 and 11.9% in 2017. The prevalence decreases over the years from 2013 to 2017.

Figure 4: Trends in HIV Prevalence from 2013 to 2017

4. DISCUSSION

HIV Counselling and Testing (HCT) and prevention of mother to child transmission (PMTCT) are the core approaches used in most health facilities. Hohoe municipal hospital, however, has been using routine and diagnostic HCT approaches. Most of the people who routinely go to the facility to test for HIV from 2013 to 2017 represent 59.8% regardless of location. This finding was consistent except in 2015, and it agrees with the findings of a descriptive study conducted in Ghana, which had 59.4% females in the study (Yawson, et al., 2014). Some of these women may depend on migrants, professionals who work at banks, health institutions, education services, work as drivers and other workers for livelihood through commercial sexual activities, especially in the urban areas. These activities put them at high risk of HIV infection, as suggested by Miss Mariama Awumbila in 2015 (Awumbila, 2015). This study found that people within the age group 25-34 have the highest number of people tested for HIV, 1883 (29%), which is consistent with a study conducted in Ethiopia (Molla, Huruy, Mussie, & Wondowsen, 2015). This finding could result from females who were in this particular age group are significantly into marriage and are also in their prime time of fertility, which requires HIV testing during the pregnancy period at ANC visits. However, among those tested in that study, 24% of them were in the age group of 25-34, which slightly differs from this finding where age group 25-34 had 29% as the highest representative, and this difference could be as a result of different study design employed in this study. HIV testing is associated with sexual risk behaviours and educational levels (Asante, 2013).

The coverage of HIV testing and its prevalence varies among sex. Females were more tested and had high prevalence than males. This is confirmed by the 2014 Ghana AIDS Commission's report, which indicates that 13% of females tested for HIV compared to 6% of males (Ghana AIDS Commission, 2014). Studies have also reported high prevalence among females than males. A study conducted in Ghana also assessed the gender inequalities in perceived risk and testing experience of HIV in an urban fishing setting of Ghana. This study reported a significant proportion of females (42.2%) that were willing to test for HIV compared to males (28.6%) (Yawson, et al., 2014). In a similar study, HIV male patients receiving ART were significantly declining in percentages as the national percentage increased (Dako-Gyake, Snow, & Yawson, 2012). This current study assesses the coverage and distribution of HIV cases by sex. In both cases, the number of tested positive females was higher than males in each of the years (2013-2017). The overall number of female HIV positives (685) over the five years is more than twice that of the male figures (321). This finding agrees with studies by (Dako-Gyake, Snow, & Yawson, 2012) and (Girum, et al., 2018); in which they found more women than men to participate in HIV testing and had a higher prevalence.

Biological and social factors are identified as accounting for women's higher risks of HIV infection than men, especially within the context of generalized HIV/AIDS epidemics, where heterosexual sex is the primary mode of HIV transmission. The disparities are attributable to the differential distribution of risk factors among males and females, such as socioeconomic status, cultural and social norms, educational levels, unequal power in relationships and female subordinate positions (Avert, 2018). Women's educational levels in rural areas remain low (Ghana Statistical Service, 2014) with low socio-economic status. Among sexually active women, HIV is associated with income through regular or intermittent employment, marital status and number of sexual

partners (Avert, 2018). A study conducted in Ethiopia found that migrant workers had sexual intercourse, of which 74% was with commercial sex workers, which account for why population having many migrants like Hohoe town have a high prevalence of HIV than the rural areas of the district (Tiruneh, Wasie, & Gonzalez, 2015). In the urban settings, female labour migrant is generally engaged in low-skilled jobs in domestic and home care, hotel and catering services, and the sex industry. These works are also defined by poor working conditions like high risk of sexual harassment and abuse and considerable insecurity (Awumbila, 2015). This implies that the higher prevalence of HIV among women in this study results from transactional sex, especially with migrant workers.

The trends in HIV prevalence generally shows a declining trend between 2013 and 2017 which is consistent with findings of UNICEF in 2015, which found in 2012 that there was a 24% global decline in HIV prevalence which were observed from 2000 to 2009 and 45% from 2009 to 2014 and a significant decline in HIV prevalence in rural India from 1.22% to 0.35%, as there was also a decline in Ghana in 2013 (Ghana AIDS Commission, 2014).

The findings show that HIV was higher (4.6% and 4.5%) among age groups 45+ and 35-44, respectively. Age groups 15-24 recorded the lowest prevalence, 1.1%. This agrees with the 2016 HIV Sentinel Survey Report in Ghana, which found that HIV prevalence among 45-49 was highest at 5.6%, followed by 35-39 at 3.5% and the young population 15-24 years was 1.1% as of 2015 (Ghana AIDS Commission, 2016). Studies have assigned possible reasons for the high and low prevalence of HIV among certain age groups. A study conducted in Techiman of the Bono Ahafo region attributed the low prevalence of HIV in the age group 15-24 to poor attitude towards HCT services by the young people (Djan, 2018). According to Mukasa Kabiri, lack of confidentiality, lack of privacy, mistrust of the health system, inconvenient facility opening hours, fear of positive results and poor attitude of service providers were cited as barriers for young people to the uptake of HIV testing and counselling in the Kintampo south (Kabiri, 2016). The high prevalence of HIV among the age groups 35-44 and 45+ may result from the young aged groups seeing the aged groups as the regular working class. Hence the young people, mostly the females, accept to indulge in a transactional sexual act with them (Hajiadeh, Sia, Heyman, & Nandi, 2018) & (Wamoyi, Stobeanau, Bobrova, Abramsky, & Watts, 2016).

This study found that people in the rural areas who were tested were less likely to be HIV infected (OR = 0.1) than urban residents. This finding agrees with a similar study conducted in Tanzania, which found rural residents, especially women, were 0.6 less likely to be HIV-infected than urban women (Singh & Patra, 2015). The slight difference in the odds ratio may result from different age group categories employed by this study and the other study. Also, it was found that the prevalence of HIV in the urban areas was 5.0%, whereas, in a rural area, the prevalence was 0.3%. These findings also were a little similar to the summary of the 2016 HIV Sentinel Survey Report, which found that prevalence in the urban area was 4.2% compared to 0.5% in the rural area (Ghana AIDS Commission, 2016). This slight difference may be attributed to how the area sentinel areas in the survey differ from the Hohoe municipality. This current study found that HIV prevalence among the sexually active age group was 7.6%; this finding confirms the study conducted in Kenya, which also found that sexually active adults had a 7.4% prevalence with only a 0.2% difference. This slight difference may be attributed to the different sample sizes used by the two studies (Oluoch, et al., 2011).

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6. CONCLUSION

This study reveals that the age group 15-24 in the Hohoe municipality is not condescending in HIV testing and counselling programs, resulting from poor or inconvenient service opening hours, lack of confidentiality, and mistrust. This becomes a significant problem that needs much attention to address. Participation in the HIV testing and counselling program rate in the rural areas was also a significant concern due to less information or knowledge about the HIV program. It may also be attributed to the unequal distribution of resources among the urban and rural areas. The gender difference was also too huge as the chances or likelihood for a female to contract HIV infection was very high compared to a male getting the HIV. Health workers should be sent to the

sub-districts where the HCT program has not been going on, and they should be encouraged to test people in the sub-districts to help reduce HIV in the Hohoe municipality. VCT units should be created at all the health facilities in the municipality to make testing compulsory. Ghana Aids Commission and health planners in the municipality should provide incentives on awarding people who voluntarily go for VCT services in the rural area. HIV service and program managers like Ghana Aids Commission should design HIV services to provide assurance, trust, confidentiality, and privacy to the youth to increase their patronization.

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