



MAPPING AND MONITORING OF HIV SUSCEPTIBLE VICTIMS IN ANAMBRA STATE, NIGERIA USING GIS

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ABSTRACT

The spread of HIV had been on the increase over the past years. The approach adopted in reducing the spread of the virus has not been effective in curbing the disease. The approach has been more of “post contamination” measures of mapping the reported cases of the virus in the hospital. There is need for a “pre contamination” measure of preventing the contamination of the disease. GIS technology was applied in mapping the geographic location of persons likely to contaminate the virus by their activities. The location of the following Spot (Brothel, street, Home-based, Bar/Night club/Casino based, Hotel/lodge, Massage parlour, Hostel/campus-based, trailer (truck) stop, Escort (call girl/mobile) and others) were identified vis-à-vis the target persons (Female Sexual Workers (FSW), Male Sexual Workers (MSW) and Injected Drug Users (IDU)) that visit the Spot. Sample questionnaire was designed for each of the target person and used to create a database. The result of the query performed shows that Onitsha zone 1 and Awka zone 1 has the highest number of FSWs. This may be attributed to the activities around the Spot. No information was obtained for MSW and few Spot were identified where IDU visit in Onitsha and Awka.

KEYWORDS: SPOT, VENUE, GPS, Database *etc.*

INTRODUCTION

Acquired Immunodeficiency Syndrome (AIDS) emerges as a world health problem approximately thirty years ago. Since 1981 when the first cases of AIDS were reported, infection with HIV has grown to pandemic proportions, resulting in an estimated 65 million infections and over 25 million deaths globally (Ngigi, 2007). In 2002, the HIV/AIDS epidemic claimed the lives of three million people and that same year, another five million acquired the HIV virus worldwide (Onojehuo et al, 2007). In the year 2006, an estimated 2.9 million persons had died from AIDS, 4.3 million were newly infected with HIV and 39.5 million were living with HIV (UNAIDS, 2006). Eastern Europe and the Russian federation is experiencing the fastest increase in HIV/AIDS, with Western Europe, North America and Australia having more than 1.5 million cases; in the Caribbean and Latin America an estimated 1.9 million adults and children are affected. Sub-Saharan Africa, with just over 10% of the world's population, has been the worst affected, accounting for almost two-thirds of the global number of people living with HIV/AIDS. The number of people living with HIV/AIDS (PLWHA) has also risen every year despite the global efforts in fighting the epidemic. In Nigeria since the invention of HIV/AIDS in 1986, the country is experiencing a “generalized” epidemic with state's HIV prevalence persistently above 1% in pregnant women attending antenatal clinic since 1999 (Federal Ministry of Health, 2007). Furthermore, the prevalence of HIV infection among antenatal clinic clients was 1.8% in 1991, 4.5% in 1996, 5.8% in 2001, and 5.0% in 2003, 4.4% in 2005. The obvious implication is that in 2003, it was estimated that about 3.8 million persons were living with HIV/AIDS and in 2005 about 4.5 million are PLWHA (Federal Ministry

of Health Serosentinel survey, 2005). In addition, Life expectancy that increased from 45 years in 1963 to 51 years in 1991 as a result of improved standard of living and quality health care services, has fallen to 43.4 years by 2003 (UNDP/HDR, 2003). Major epidemic of HIV/AIDS infection is presently occurring in Nigeria in general and Anambra State in particular (FMH, 2003, 2005). The epidemiological feature of HIV infection in Anambra State is strikingly distinct from those in other States in Nigeria as unprotected sexual intercourse and heterosexual activities are the major mode of transmission. Similarly, the 2003 HIV sero-prevalence in Anambra State indicated that of the State population of 3,964,073 people, 107,853 people were living with HIV/AIDS, 15,130 were youth aged 15 to 24 that were infected with HIV/AIDS as at 2003 and this number would increase to 20,136 by 2008.

In addition, the number of deaths due to HIV/AIDS was 11,049 in 2003 and would increase to 11,101 by 2008; whereas, cumulative number of death due to AIDS was 81,905 in 2003 and would increase to 139,306 by 2008. Also, the overall number of orphans in Anambra State was 243,279 in 2003 and would increase to 285,617 by 2008. In contrast, the actual number of orphans in 2003 was 58,548 and would increase to 88,569 by 2008 respectively. However, the 2003 Anambra state cities centre sentinel HIV/AIDS sero-prevalence index (SPI) indicate that Awka city had the highest HIV prevalence ranking of 4.3%, Onitsha city had 4.0% and Ekwulobia city had 2.9% in that order. Furthermore, the overall HIV/AIDS prevalence in Anambra State is 0.4% in 1991, 2.4% in 1993, 5.3% in 1995, 6.0% in 1999, 6.5% in 2001 and 3.8% in 2003. Similarly, HIV sero-prevalence trend in Awka provincial city stood at 1.0% in 1993, 2.1% 1995, 8.4% in 1999, 10.7% in 2001 and 4.3% in 2003 (FMH,

2003). Thus, the HIV/AIDS sero-prevalence surveillance indicated a geometrical progression in the HIV/AIDS disease incidence in the State over the years but a decrease in 2003(Ezeokana et al, 2012).

The geographical pattern and spatial distribution characteristics of the HIV/AIDS epidemic has been of interest in the investigation of the factors influencing the heterogeneity of the pandemic. Recording the geographical distribution of any major disease forms an important basis for locating appropriate interventions for its control and a means for monitoring their effectiveness. Geographic Information System (GIS), a system for capturing, storing, querying, analyzing and displaying geographically referenced data, offers itself as an effective tool for modeling, mapping and monitoring of prevalence of HIV/AIDS disease. A lot of study has been done in mapping, monitoring of HIV prevalence using GIS (Onojeghuo et al, 2007; Livia et al, 2007; Ngigi, 2007). Most of the studies focused on mapping the prevalence of

HIV/AIDS but on mapping the probable location where HIV can be contacted and monitoring the activities of HIV susceptible victims so as to know where, when, what and who needed HIV assistance program. This is what this paper seeks to address.

STUDY AREA

Some parts of Anambra State, Nigeria were selected for this study. Anambra State is located between latitude 5°40¹¹N and 6°48¹¹N and Longitude 6°35¹¹E and 7°30¹¹E. The area covered included: Awka, Amansea, Amawbia, Onitsha North, Onitsha South, Ogidi, Nkpor, Abagana, Ekwulobia, Oko, Amaokpala, Ajali, Umunze, Nnewi, Ozubulu, Ihiala, Uli and Atani. Some of the major towns like Onitsha, Nnewi, Awka and Ihiala were divided into sub-zones. This area covers both the urban cities and rural areas in Anambra State, Nigeria.

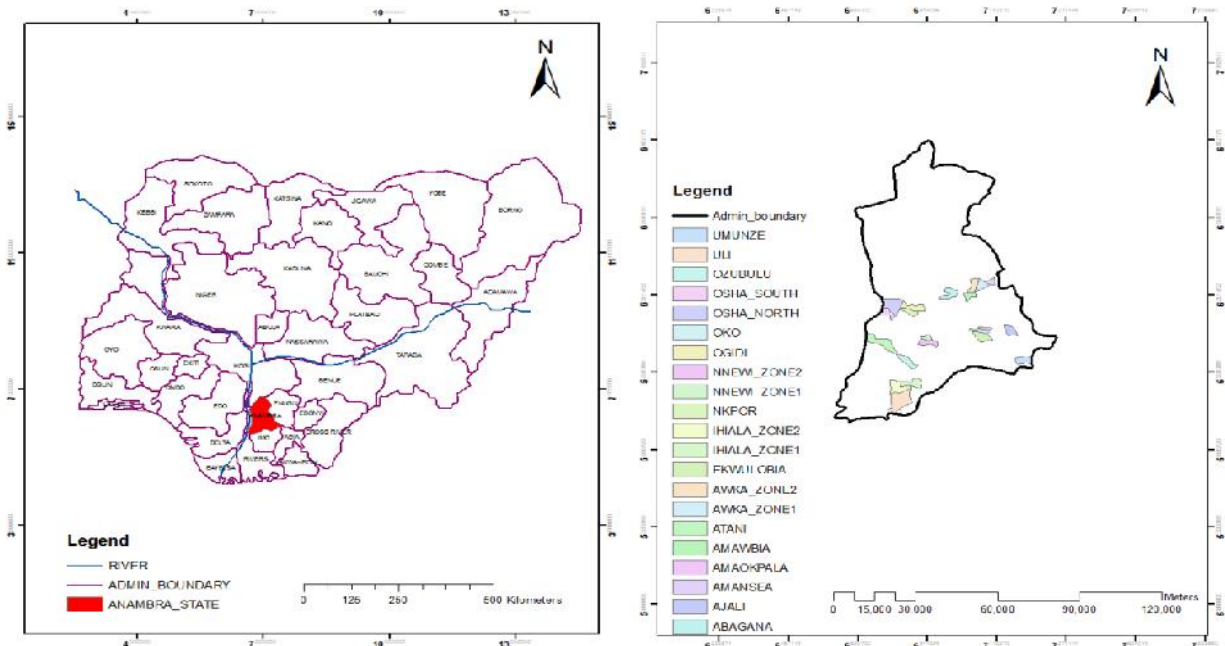


FIGURE 1a: Map of Nigeria Showing Anambra State **FIGURE 1b:** Map of Anambra State showing the Study Areas

METHODOLOGY

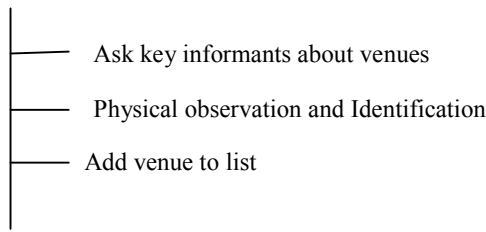
Street guide map of the selected zones were digitized from existing analogue map and updated using Google earth image. This maps aid in the identification of the Spot and landmark during the field visit. Sample questionnaire was designed based on some selected persons likely to be infected with HIV such as Injected Drug Users (IDUs), Men having sex with men (MSM), Male sexual workers (MSW) and Female sexual workers (FSW). A sample questionnaire was designed for each of the category of possible HIV victim being studied (i.e IDU, MSM/MSW, FSW). The possible location where HIV can be contacted was categorized into Brothel, Street, Home-based, Bar/Night club/Casino-based, Hotel/lodge, massage parlour, Hostel/campus based, trailer (truck) stop, Escort (call girls/mobile) and others. These categories are the Spot category. Also, venue listing and profiling was

conducted. The objective was to identify and characterize the key venues and locales where people meet new sexual partners as well as describe the sexual behaviours and networking patterns at key venues and locales. The following were categorized under venue: Bars, Night clubs, Hotel, lodge, commercial parks, campus, under bridge/open space, cinema, shopping malls, mechanic village, beauty salons, internet café point and kill/fish joint, brothel, street and others. The list of hot spot identified in that zone + the venue list for that zone = the master list of venues to be profiled. The venues listed on the master list were visited. On the second visit, the venues were validated to ensure that they are still active. At the stage, the geographic positions of the venues were obtained using handheld GPS. Also, other attribute values that may have contributed to the Spot being used as well as a spatial attribute of the Spot were obtained. The

questionnaire sample was used to create the database. The geographic locations of the validated Spots were plotted into the digitized map of the zone and analysis performed using the database created.

Stages

1. Identification and listing of venues



2. Profiling of venues

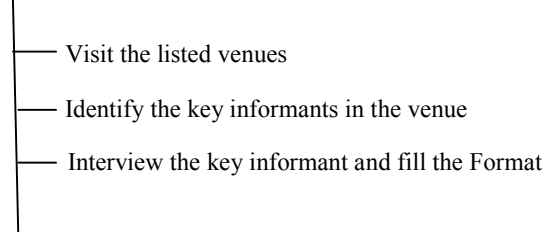


FIGURE 2.0: Methodology adopted in obtaining and filling the questionnaire data.

RESULTS & DISCUSSIONS

The attribute table of the Spot theme has the following fields: SPOT_ID, TYPE OF SPOT, SPOT_NAME, ZONE_NAME, TARGET PERSONS, Min_TP, Peak_day, Peak_time, Sex_active. The SPOT_ID is a unique identifier assigned to each SPOT through which each Spot can be uniquely identified in the database. The field Type and Name represent the type of Spot and the

name of the Spot. TP, Min_TP and Max_TP represent the target persons, the minimum number of target persons that visit the Spot and the maximum number of target persons that visit the Spot respectively. Peak day is the day of the week that the target person visits the Spot more than usual; Peak time is the time of day more target person visit the Spot. Some sample queries were performed to demonstrate the effectiveness of the database created.

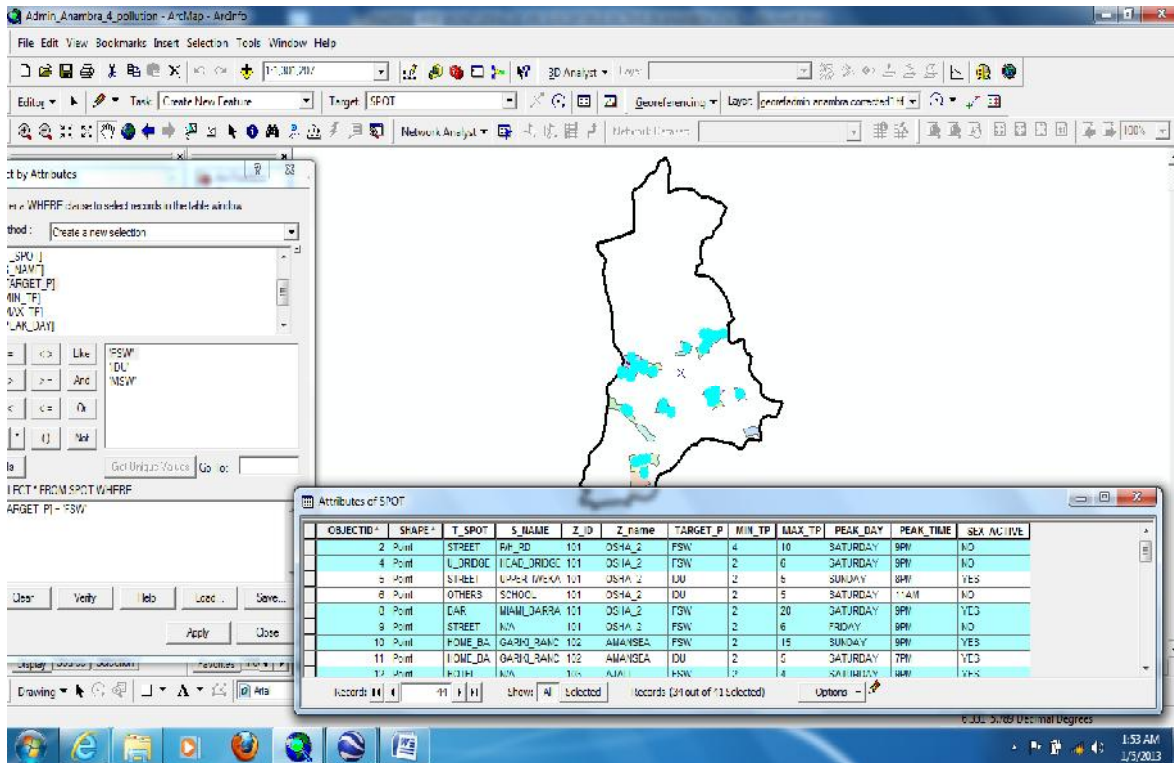


FIGURE 3: Query showing the target persons that are FSW

This query was performed in order to determine the target persons that are FSW. The query shows the geographic location of the target person “FSW” as well as its attribute. This present at a glance the minimum and maximum number of FSW that visit a Spot, their peak day and peak

time. This query will assist the various government and non-government agencies to know the peak day and peak time to visit this Spot for any HIV assisted program or counseling.

HIV susceptible victims in Anambra State, Nigeria using GIS

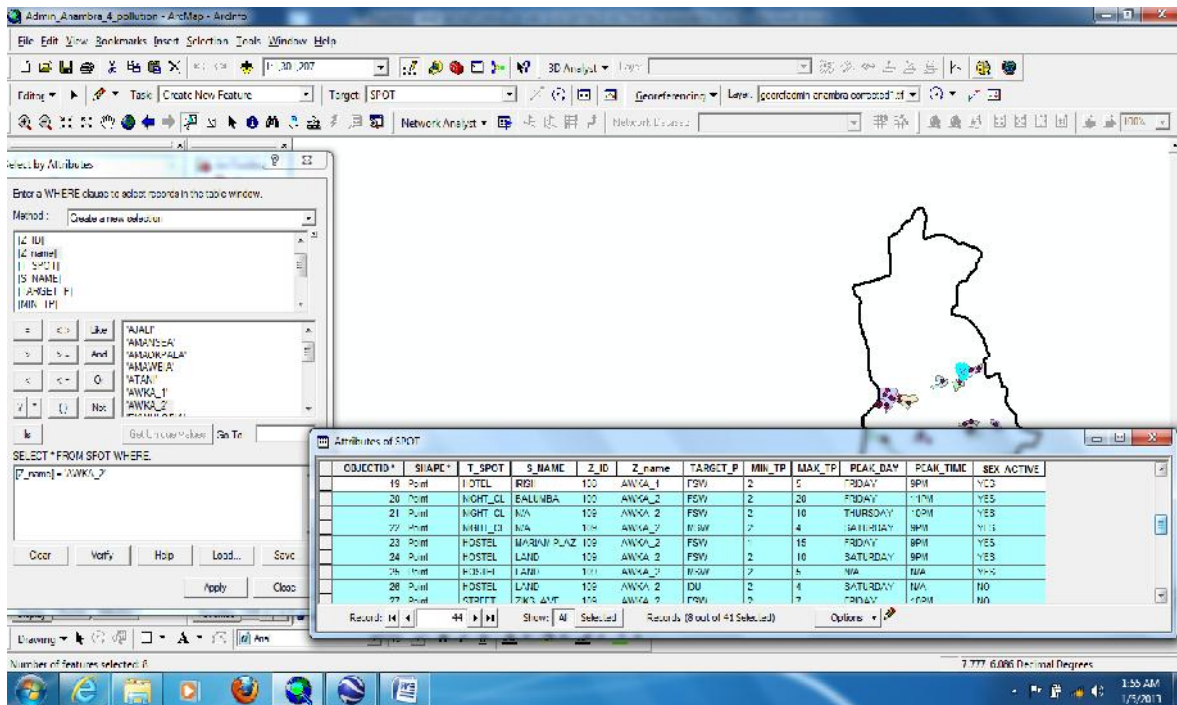


FIGURE 4: Query showing the attribute of Awka zone 2

This query shows the various types of target persons that can be found in Awka zone and their attributes.

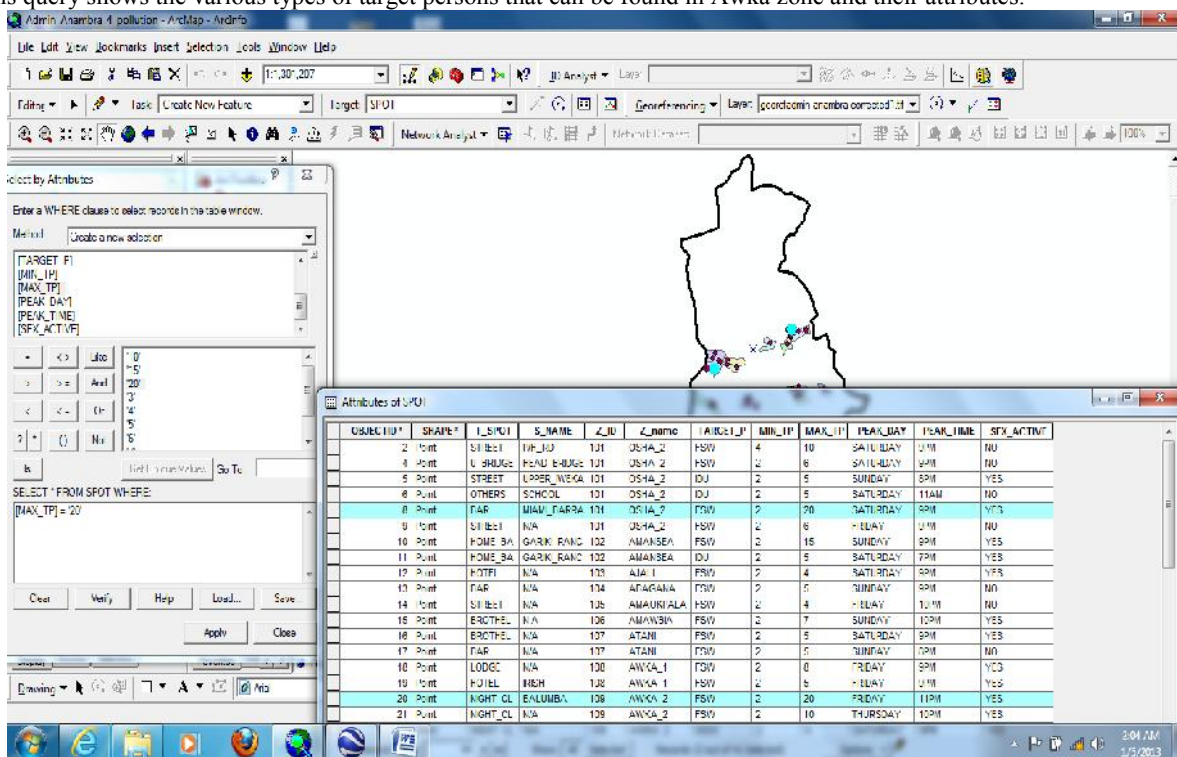


FIGURE 5: Query showing the highest number of target person

This query was performed to know the maximum number of target person that do visit a particular Spot. The query shows that the maximum number of target person that visit a particular Spot is twenty (20). This number is found in zone Awka_2 and osha_2 and they are FSWs. In Onitsha zone 2, the maximum FSWs is found in Miami-barrack

while in Awka zone 2 it is found in a particular night club known as Balumba. This confirmed the report of (FMH, 2005). This zone is mostly inhabited by student of a higher institution and high concentration of hotels, Bars, night club e.t.c. All this activities may have contributed to the high number of FSW.

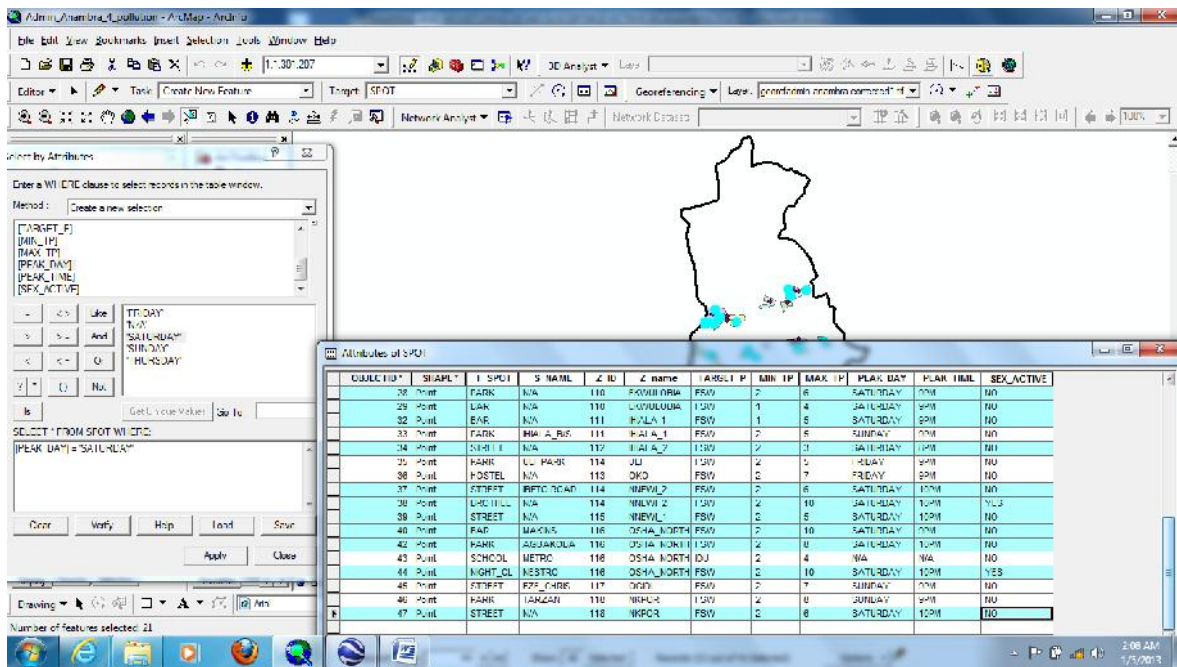


FIGURE 6: Query showing “peak day = Saturday”

This query will assist the various agencies to know the particular day of the week that a particular target person visits a particular Spot. This will help to know when to visit the Spot. The number of IDU is not high because some of the places visited on the first visit become inactive on the second visit of validation. The IDU frequently changed their locations whenever they noticed that their environment is being threatened by law enforcement agencies except at Upper Iweka in Onitsha zone 1 known by its notoriety. Information about male sexual workers/ male having sex with male (MSM) was not easily obtained in most places visited and persons interviewed. This may be attributed to the socio-cultural and religious antagonism towards this target group in this part of the country.

CONCLUSION

It has been demonstrated that GIS is an effective tool for mapping and monitoring the geographic location of where HIV can be contacted. By monitoring the activities of persons likely to be susceptible to HIV infection, the relevant agencies that control the spread of the virus will know who needed HIV assisted program, where and when they can be found. With the information available in the database, the agencies will be able to know where HIV infection can be prevalent as a result of the activities of the target persons in the area. This measure will help to control the spread of HIV virus by preventing the contamination of the virus through early preventive measures rather than the “post-contamination” measures of preventing the spread of the virus.

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