

**THE 5Ws: THE EPIDEMIOLOGIST'S  
QUEST**

**AN INAUGURAL LECTURE,  
2016/2017**

**OLUFUNMILAYO IBITOLA FAWOLE**



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# **THE 5Ws: THE EPIDEMIOLOGIST'S QUEST**

*An inaugural lecture delivered  
at the University of Ibadan*

*on Thursday, 25 May, 2017*

By

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### **Preamble**

I consider it a great honour to deliver this year's inaugural lecture on behalf of the Faculty of Public Health. This lecture is the eighth from the Faculty and the third from the defunct Department of Epidemiology, Medical Statistics and Environmental Health (EMSEH). I consider it a privilege and thank The Almighty for it, because it is the first inaugural lecture from the new Department of Epidemiology and Medical Statistics (EMS). Coincidentally, I am the first woman to present an inaugural lecture from the Faculty of Public Health; at a time I served as the first female substantive Dean in the Faculty. It is also from the first Professor of Human Epidemiology (so designated) in the University of Ibadan (other epidemiologists were professors of Preventive and Social Medicine or Community Medicine).

The first lecture from the then Department of EMSEH was by Professor M.K.C. Sridhar, a Professor of Environmental Health and was titled, "Waste to Wealth", the second was by Professor E.A. Bamgboye a Professor of Medical Statistics, and was titled, "Medical Statistics: A Microscope for Health and Disease". Today's lecture is titled, "**The 5Ws: The Epidemiologist Quest**". It is the 411<sup>th</sup> lecture in the University and the 12<sup>th</sup> in the 2016/2017 series. Having opened the way for the women, I can safely predict with 95% confidence ( $P < 0.05$ ) that there will be more women from the Faculty, who will be giving inaugural lectures in the not too distant future!

When the opportunity arose to present this lecture, I accepted with a great sense of humility as I saw it as an



opportunity to enlighten the university community and the public on what Epidemiology is about, and also to thank all those who have helped me in my academic journey.

### **What is Epidemiology?**

This is a question I am frequently asked when I meet members of the public and they ask me what my profession is. First, I begin with the origin of the word. The word 'Epidemiology' comes from the Greek words *epi*, meaning 'on or upon', *demos*, meaning 'people', and *logos*, meaning 'the study of'. In other words, the word 'Epidemiology' is the study of what befalls a population. Many definitions have been proposed, but it is best defined as: "The study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems" (Last 1993). It is data-driven and relies on a systematic and unbiased approach to the collection, analysis and interpretation of data. However, Epidemiology also draws on methods from other scientific fields, including biostatistics and informatics, biologic, economic, social, and behavioural sciences.

A good news story or gist, whether it is about a tsunami, dramatic rescue, or presidential candidate's speech, must include the **5 Ws**. The **5 Ws** are the essential components of the story because if any of the five is missing, the story is incomplete. The same is true in characterizing epidemiologic events, whether it is an outbreak of Lassa fever in a state or the use of Pap smear test to detect early cervical cancer. Most Epidemiologists tend to use the synonyms – **5 Ws**, and merge the 'Why?' and 'How?', while a few use the synonyms – **5Ws and 1H**.

W- What? (Diagnosis or health event)

W- Who? (Person)

W- Where? (Place)

W- When? (Time)

W- Why/How? (Causes, risk factors and modes of transmission) (CDC 2012).

Quest is a search or pursuit made in order to obtain something. It is a difficult journey towards a goal. Our goal in 'Epidemiology' is to understand and explain the occurrence of health events. However, even after undertaking these quests I have tried to go a step further to take action to address these gaps.

Epidemiology is concerned with the *frequency* and *pattern* of health events in a population. *Frequency* refers not only to the number of health events (this is preferable to just limiting ourselves to the use of the term diseases) such as the number of cases of malaria, meningitis or diabetes mellitus in a population, but also to the relationship of that number to the size of the population. The resulting *rate* allows Epidemiologists to compare disease occurrence across different populations. *Pattern* refers to the occurrence of health-related events by time, place and person. Time patterns may be annual, seasonal, weekly, daily, hourly, weekday versus weekend, or any other breakdown of time that may influence disease occurrence. Place patterns include geographic variation, urban/rural differences, and location of work sites or schools. Personal characteristics include demographic factors such as age, sex, marital and socioeconomic status, as well as behaviours and environmental exposures. Characterizing health events by time, place, and person are activities of *Descriptive Epidemiology* (fig. 1). Such questions are useful for research, outbreak detection and disease surveillance (Cates 1982; Last 1993).

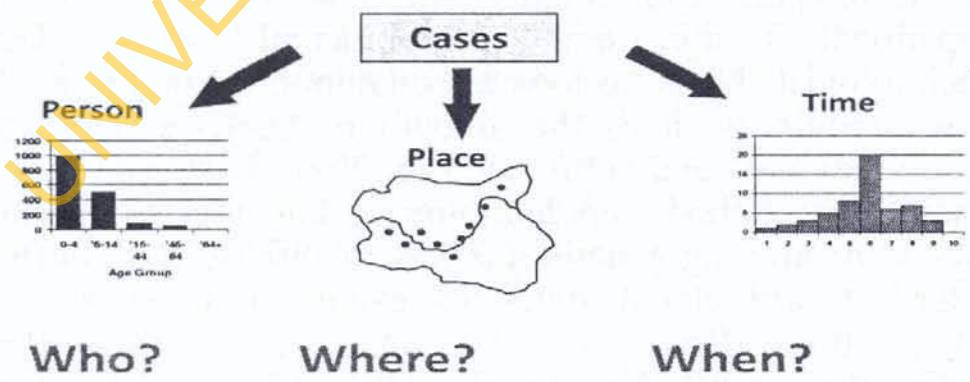


Fig. 1: Descriptive epidemiology (Who, Where, When?).



Epidemiology is also used to search for *determinants*, which are the causes and other factors that influence the occurrence of diseases. Epidemiologists assume that illness does not occur randomly in a population, but happens only when the right accumulation of risk factors or determinants exist in an individual. To search for these determinants, we use *Analytic Epidemiology* to provide the “*Why*” or “*How*” of such events (fig. 2). They assess whether groups with different rates of disease differ in their demographic characteristics, genetic or immunologic make-up, behaviours, environmental exposures, or other potential risk factors. Hence case control, cohort and experimental studies including systematic reviews are conducted. Ideally, the findings should provide sufficient evidence to direct prompt and effective public health control measures (CDC 2012).



Fig 2: Analytical study designs.

Epidemiology was originally focused exclusively on epidemics of communicable diseases, but was subsequently expanded to address non-communicable diseases. By the middle of the 20th century, additional epidemiologic methods were developed and applied to maternal-child health, occupational health, and environmental health. Then Epidemiologists began to look at behaviours related to health and well-being, such as the amount of exercise, nutrition, sexual behaviours and substance use. Now, with the upsurge in molecular methods, epidemiologists can make important strides in examining genetic markers of disease risk. Indeed, the term health-related states or events may be seen as anything that affects the well-being of a population. Nonetheless, many Epidemiologists still use the term



“disease” as shorthand for the wide range of health-related events that are studied (Greenwood 1935; Last 1993).

Major areas of epidemiological study include disease etiology, disease transmission, outbreak investigation, disease surveillance, study designs and screening and comparisons of treatment effects such as in clinical trials. Currently in the Department, three sub specialties of Epidemiology have emerged namely: Basic, Field and Clinical. Social Epidemiology is work in progress.

Mr. Vice-Chancellor, Sir, distinguished ladies and gentlemen, I will be presenting to you today some of my contributions in the field of Epidemiology in the University of Ibadan and in Nigeria. My contributions has been in three main areas namely - research, training and providing community service.

### **Research Engagements**

My research engagement lies in three main areas, namely Malaria, STIs/HIV/AIDS and Gender-based violence.

### ***Malaria***

My interest in Malaria research was triggered by the fact that I rarely have the condition, despite the endemicity of the disease. Since adulthood, my episodes of the infection are so widely spaced, occurring once in every six to eight years. This prompted me early in my career to take an interest in the disease, therefore I conducted my Part II dissertation for the Fellowship for the West African College of Physicians on Malaria. On completion of the examinations and subsequent appointment as a Lecturer, I went to the ‘Postgraduate Institute of Medical Research and Training’ ‘PIMRAT’ (as it was then called), to inquire about this unique phenomenon. Although I never got to investigate why, being a public health physician however, this led me to have a close contact with the then Director, Professor A.M.G. Oduola and gave me more enthusiasm for Malaria research.

Malaria is a mosquito-borne infection, classically characterized by periodic chills, rigors, and high fevers followed by profuse sweating (fig. 3) (CDC 2014; JHMRI 2014). It is a leading cause of death and disease in many



countries in sub-Saharan Africa, where young children and pregnant women are the groups majorly affected (fig. 4) (CDC 2014). Nigeria has the greatest malaria burden among countries in the world; it contains nearly one-third of the cases in Africa (Hmwe et al. 2013). In Nigeria, malaria is responsible for 33% of the under-five mortality and 11% of maternal mortality. About half of the population will have at least one malaria attack per year (Obayendo 2014).



Fig. 3: The female anopheles mosquito.



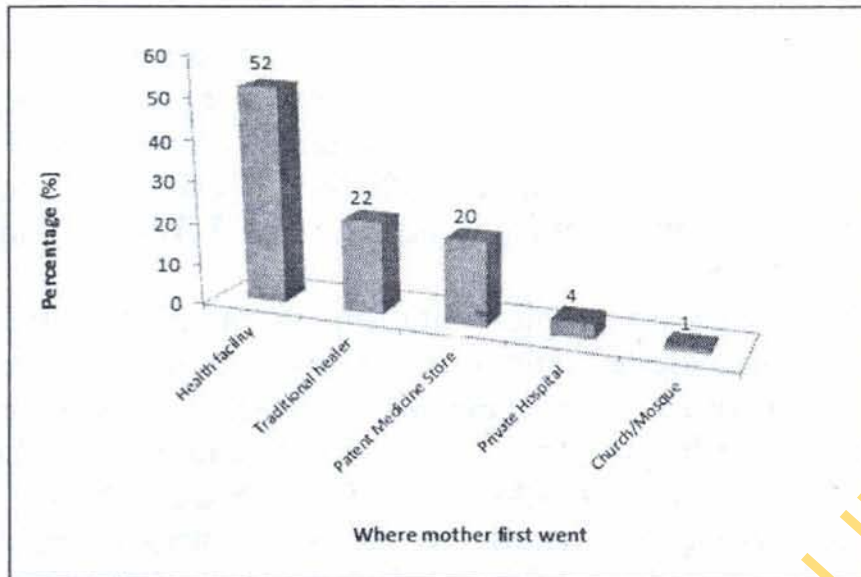
(a)



(b)

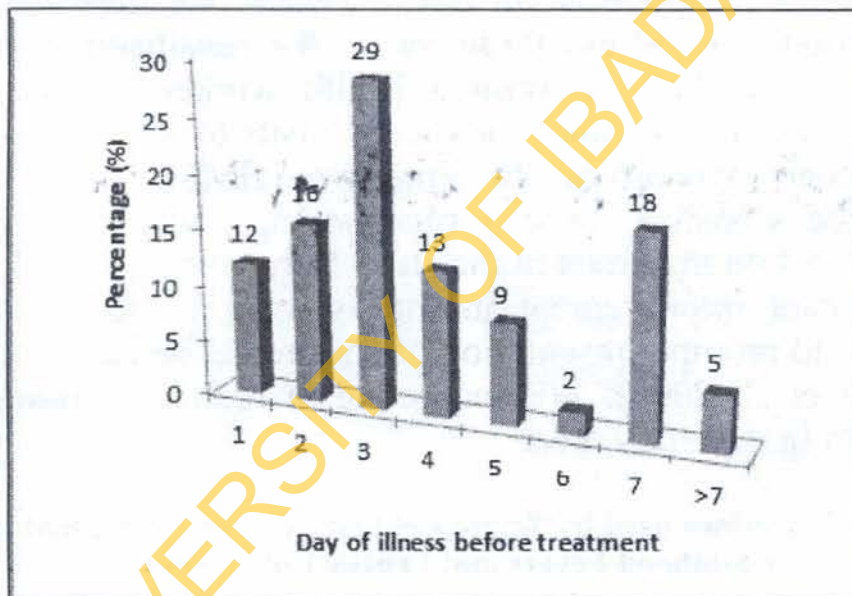
Fig. 4: (a) Child with malaria fever; (b) Common antimalarials.

Mr. Vice-Chancellor, Sir, my first few studies on malaria sought to describe the case management of this highly endemic disease. Our study on the case management practices of caregivers of children under five years of age found self-medication with orthodox drugs to be the common practice. Paracetamol (81%) was the common drug used by caregivers, while a few used antimalarial (29%). Of these, only about a fourth (27%) prescribed antimalarial correctly, while one half gave the correct dose of anti pyretic. The health facility was where mothers went first to seek outside care for fever (fig. 5), however, most went on the third day after fever started (fig. 6) (Fawole and Onadeko 2001; Fawole, Oyejide and Onadeko 2003).



**Fig. 5:** Where mother went first to seek care of child with fever.

Source: Fawole and Onadeko 2001



**Fig. 6:** Number of day(s) child was ill with fever before mother commenced treatment.

Source: Fawole, Oyejide and Onadeko 2003

I was Co-investigator and Epidemiologist in the Malaria Research Group that implemented two WHO/TDR/MIM Africa Research Strengthening Grants. Professor J.D. Adeniyi, (former Dean of the Faculty of Public Health) of blessed memory led the research team of the project that



improved “Home Management of Malaria in children”, which we fondly called ‘HMM’, while Professor Edith Ajaiyeoba led the second team on Phytomedicine compendium for Nigeria which we nick named ‘Phyto’. These two projects gave me another opportunity to address **the 5 Ws** on Malaria infection in Nigeria.

“HMM” was an implementation research. Firstly, we studied the knowledge and case management practices of mothers and other caregivers of children in two urban (Ogbomoso and Iseyin) and 2 rural (Orire and Kajola) Local Government Areas (LGAs) of Oyo State. Next, we interviewed heads of health facilities, traditional healers, patent medicine sellers (table 1) (Falade et al. 2005; Fawole et al. 2009). We found that for many knowledge was inadequate and treatment practices were often incorrect (usually one teaspoon to all ages). Hence, we implemented interventions to address these gaps. We sensitised mothers and traditional healers, trained health workers and patent medicine sellers. We made advocacy visits to state and local government executives to improve HMM. Also, we distributed posters and information, education and communication materials in the state. Subsequently, we found a significant improvement in management practices, early referral and prompt presentation of children at health facilities (Adeniyi et al. 2006). We succeeded in reducing childhood morbidity in the study area.

**Table 1: Options used by Traditional Healers for Treatment of Childhood Fevers and Febrile Convulsion**

<b>Treatment Given</b>	<b>Fever No (%)</b>	<b>Febrile Convulsion No (%)</b>
Boiled herbs “Agbó”	91 (71.6)	92 (72.4)
Powder “Agunmu”	18 (14.2)	7 (5.5)
Soaps	5 (3.9)	1 (0.8)
Combination of dry herbs	5 (3.9)	3 (2.4)
Local cream	4 (3.2)	2 (1.6)
Incision/Scarification	4 (3.2)	8 (6.3)
Incantations	-	5 (4.0)
Do not treat	-	9 (7.0)
<b>Total</b>	<b>127 (100)</b>	<b>127 (100)</b>

Source: Fawole et al. 2009



“Phyto” was a national study which aimed to know ‘**what?**’ herbal remedies were used to treat malaria in urban and rural communities in South West (Oyo and Otu); North Central (Gboko and Katsina Ala) and South South zones of Nigeria (Eleme and Kaani-Bouo) with a view of identifying new potential antimalarials. On completion of the study, we identified 112 herbal remedies and 25 recipes (Ajaiyeoba et al., 2002). Further studies confirmed the efficacy of two out of eight most recommended herbal remedies and thereby validated the role of ethno-medicine as a possible source for the discovery of new therapeutic agents in the treatment of malaria (fig. 7) (Ajaiyeoba et al. 2004).

Another positive outcome from these two studies, was that they built the capacities of researchers of two southern universities, the Obafemi Awolowo University, Ile-Ife and the University of Port Harcourt, Port Harcourt and established linkages with a northern partner (CDC, Atlanta and Kings College, London) in Malaria research.

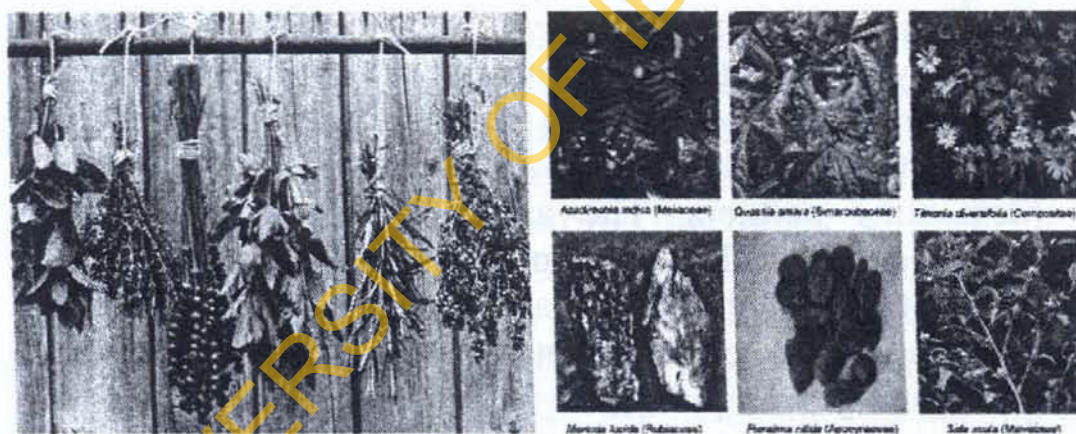


Fig. 7: Phytomedicinal plants with antimalarial properties.

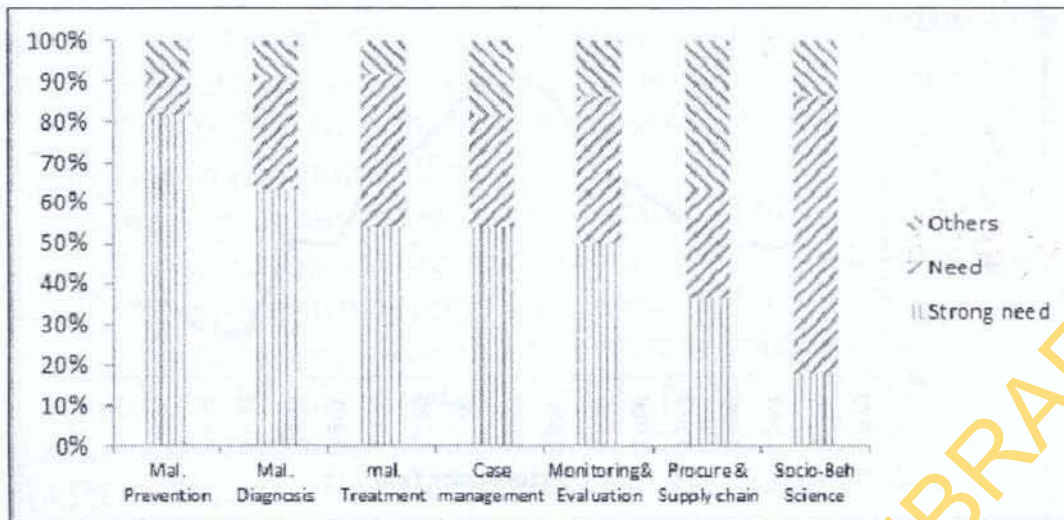
These studies were followed by other studies (table 2) however notable was the research prioritization workshop for postgraduate students.

**Table 2: Other Studies on Malaria Infection**

Theme	Studies
Malaria in children	Mineral levels (Ayoola et al. 2005)
Laboratory investigations for malaria	Blood groups (Akinboye et al. 2009), Diagnosis (Bamiselu et al. 2016)
Severe malaria	Disease burden (Orimadegun et al. 2007)
Malaria diagnosis and treatment	Home care (Adedire et al. 2016b), Guidelines (Bamiselu et al. 2016)

I coordinated a research prioritization workshop aimed to assist postgraduate students develop relevant Malaria-related research proposals in line with National research priorities during my sabbatical leave with the African Field Epidemiology Network (AFENET) at the Nigeria Field Epidemiology Programme (N-FELTP) in Abuja. This was my second time working with an international organization, the first being with the World Health Organization (WHO), Nigeria. This workshop was based on the premise that although several research groups have done extensive malaria research, however, the link between the research community and policy formulation has not been optimal. Technical papers were presented by the experts from the academia, National Malaria Elimination Programme (NMEP) and its implementing partners. The area of “strongest need” for research identified by the students in the training needs assessment was on ‘malaria prevention’ (fig. 8). On completion, a compendium that addresses the research needs of the country was published to guide students in training institutions in Nigeria on their choice of research projects (Fawole et al. 2014).



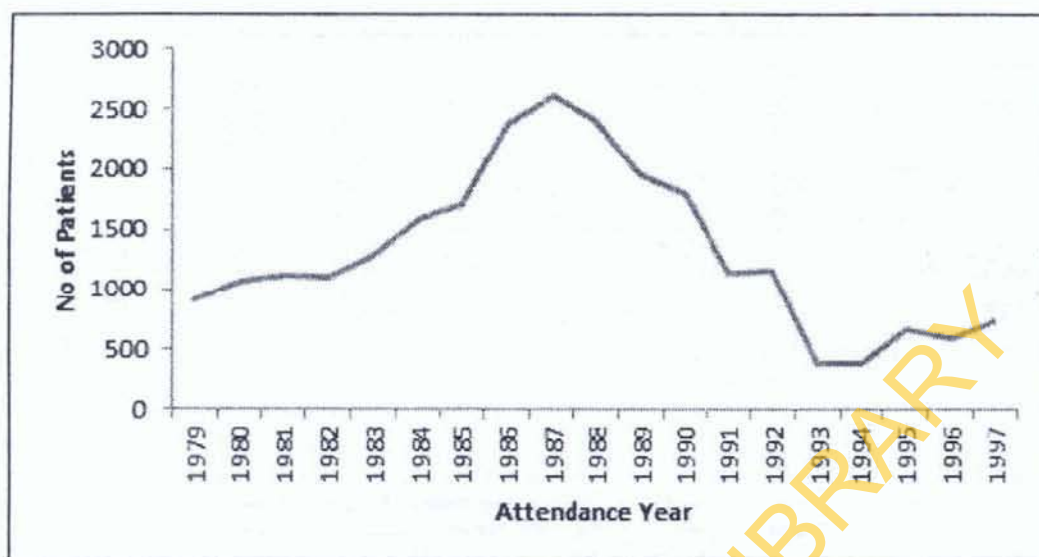


**Fig. 8:** Results of training need assessment on themes on malaria research.

Source: Fawole et al. 2014

### From STI to HIV

In my quest to measure the '5Ws' of another common but hidden public health problem, after I was employed, I took interest in research on Sexually Transmitted Infections (STIs) based on my previous work experience at the Special Treatment Clinic (STC). I used epidemiological tools and methods to identify the "Why?" for the decline in patients' clinic attendance after measuring the trends in attendance over a 20-year period (fig. 9). Introduction of fees, social strife and perceived reduction in quality of service (due to the depressed economy) were reasons/factors identified to be responsible for the decline. The public health implication of the decline is an increased risk of HIV transmission due to inadequate treatment provided by alternative providers who are often unskilled (Fawole and Asuzu 1997).



**Fig. 9:** Patient attendance at the Special Treatment Clinic, 1979 – 1997.

*Source:* Fawole and Asuzu 1997

To understand the “**Who?**” a 5 year review of medical records of patients seen at the STC was undertaken. We found that adolescents constituted 38.0% of the attendees. As regards the ‘**What**’, one in five youth had a diagnosis of Gonorrhoea. As for the “**Who?**”, most of the adolescents were students and females (table 3). The study recommended school-based education programmes to help adolescent avoid these infections and to present it promptly for treatment (Fawole et al. 1999a).

In another study on prevalence of Human Papilloma Virus (HPV) in the Clinic, we found that females and youths were the main groups with the infection (Okesola and Fawole 2000). Considering women are often asymptomatic for most STIs and often do not have the resources to obtain healthcare we found this unacceptable. This stimulated my interest in studies on women’s health and empowerment (Fawole and Adeoye 2015).

In a bid to prevent HIV infection, one of its risk factors was studied among the clinic attendees—Genital Ulcer Disease. Genital ulcer disease constituted 10% of all STI’s managed, which is a tip of the iceberg. **Who?** Its prevalence was highest in the 20-29 age group. Most of the patients were unmarried and were students. **Why?** - Risk factors we



identified were—having multiple sexual partners and unprotected casual sex. These findings along with the results of other studies in the clinic (Fawole and Asuzu 1997; Fawole et al. 2000) led to subsequent studies on HIV prevention among the youth population.

Screening remains the most effective epidemiological tool for early detection of pre-invasive stages of cervical cancer. In Idikan, a poor urban inner core area of Ibadan, we screened 932 sexually active women for cervical infection with HPV and intraepithelial neoplasm. This population survey was funded by International Agency for Research on Cancer (IARC), France. Both Papanicolaou (pap) smear and visual inspection with acetic acid (VIA) were done. The overall prevalence of HPV was 26%, 9% of the women had multiple HPV infections. As regards '**Who had HPV?**', single and illiterate women were twice more likely to have HPV positivity (Thomas et al. 2004; Thomas et al. 2005).

My contribution (2001-17) to the body of knowledge on HIV/AIDS prevention included both surveys and intervention studies with young people (fig. 10) (Fawole et al. 1999b; Fawole et al. 1999c). With funding support from the University of Ibadan Senate Research Grant, UNIFEM, New York and DFID-British Council, we implemented interventions for in-school adolescents (Fawole et al. 1999b; Fawole et al. 1999c).



**Fig 10:** Nigerian youths.

Generally, we found that knowledge of sexual transmission of HIV/AIDS was good, but the proportion aware of other modes of transmission was much lower. We found that about a third of secondary school students were sexually active of which about a quarter had multiple partners and consistent use of the condom was poor (Fawole et al. 1999b). The sexual practice of out of school youths was more alarming. When we compared 3 groups of young people namely: apprentices, traders, students, we found the sexual behaviour among the apprentices to be most risky (Amoran and Fawole 2008). Therefore, we decided to work specifically with out of school youths. We compared two groups of apprentices, those in organised apprenticeship (hairdressers, carpenters, masons, and mechanics) programmes with a highly mobile unaffiliated group of apprentices (packed water sellers, newspaper vendors, shoe shiners and cassette/CD sellers). We found that the unaffiliated group engaged in riskier HIV/AIDS related sexual behaviour (multiple partnership 38% vs. 33%) because they were more economically disadvantaged than their apprenticed counterparts (table 3) (Abdulraheem and Fawole 2009).

**Table 3: Summary of HIV High Risk Behaviour among the Youth Groups Studied**

Authors	Population	Sexually active (%)	Multiple partners (%)	Casual sex - 3 month (%)	Consistent condom use (%)
Aburahemeen & Fawole, 2009	Unaffiliated apprentices	60 M-71 F-48	38	52	37
Aburahemeen & Fawole, 2009	Affiliated apprentices	61 M-67 F-44	33	32	27
Amoran & Fawole, 2008	Apprentices, traders & students	41	App-30 Trad-28 Stud-25	7	75
Fawole et al. 1999	Secondary school students	35	28	12	20
Salawu et al. 2015	Tertiary students	73	48	18	75



With these dismal results, we implemented interventions to improve young people's knowledge and practices (Fawole et al. 2004; Ajuwon et al. 2008). Also, there was the urgent need to identify stakeholders who could influence the knowledge and sexual practices of young people. Hence, studies targeted at other groups important in the lives of young people were implemented. These groups included peers (Ajuwon et al. 2011), teachers (Asekun-Olarinmoye et al. 2007), parents (Amoran and Fawole 2008; Omoniyi et al. 2013) and religious leaders (Asekun-Olarinmoye et al. 2013) (table 4).

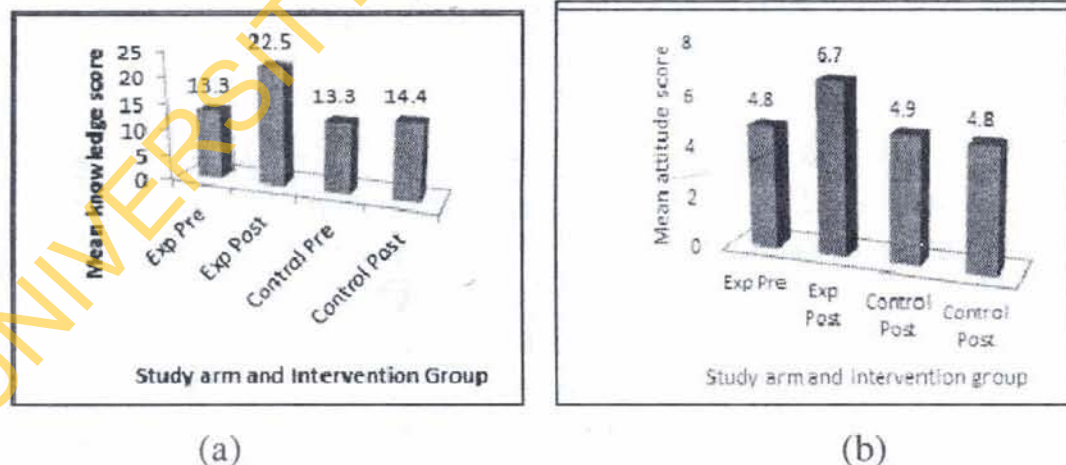
**Table 4: Stakeholders Perception and Activities on HIV Prevention**

Stakeholders	Percent
<b>Teachers (n=302)</b>	
Perceives role in sexuality education	11.1
Feels sole responsibility for sexuality education is parents	52.8
Positive attitude to sexuality education in schools	86.9
<b>Parents (n=274)</b>	
Father ever gave child comprehensive family life education	16.8
Mother ever gave child comprehensive family life education	40.9
Father strict in monitoring on reproductive health matters	22.3
Mother strict in monitoring on reproductive health matters	36.9
<b>Religious leaders (n=336)</b>	
Perceives role in prevention of HIV/AIDS	64.0
Ever preached about HIV/AIDS prevention to congregation	56.5
Has HIV/AIDS prevention programme (seminar/youth/voluntary services)	58.3

Also, my research directed attention on the young people too, and assessed the effects one of the “factors” implicated in decisions to engage in high risk behaviour—the electronic media! Although the electronic media may provide basic information about sexuality, it may also encourage unhealthy sexual behaviour in some young people (Strouse and Buerkel-Rothfuss 1987). We explored the effect of television and internet on sexual behaviour of young people to identify ways of promoting safe sexual practices in this population. **How?** - We found that 14% of the students go online to watch sexual

explicit movies and one in four experienced sexual solicitation online. Many (63%) admitted they were influenced after watching these programmes (Salawu et al. 2015). **Who?** - Boys were approximately five times more likely than girls to watch such movies and experience solicitations. First year students were less likely to experience solicitations than other levels. These effects of the electronic media on young people prompted me into another research much later on, on the use of the social media. In these cases, young girls were the group being lured and abused following relationships made on the internet. Unfortunately most abusers went off scot free (Makinde et al. 2016).

Based on all these results, we implemented interventions to address these risky behaviours. We also, referred those with reproductive health problems to sources for care. The interventions succeeded in changing young people's behaviour by encouraging them to abstain, adopt safer sexual practices and empowered them by providing factual information (fig. 11) (Fawole et al. 1999c; Fawole et al. 2003; Fawole et al. 2005b; Fawole and Asekun Olarinmoye 2005; Ajuwon et al. 2008). A practical and feasible HIV training programme, which can be replicated in other schools was developed (Fawole et al. 1999c).



**Fig. 11:** (a) Mean HIV knowledge scores pre and post intervention (b) Mean attitudes scores pre and post intervention.

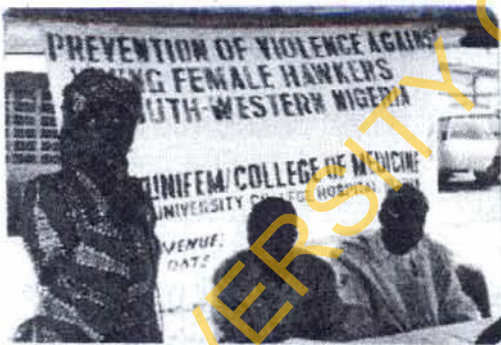
Source: Fawole et al. 1999



## From HIV/AIDS to GBV

My experience working on HIV among the youth led to my great passion for research on Gender Based Violence (GBV). Gender based violence is acts that inflict physical, mental and sexual harm or suffering, threats of such acts, coercion and other deprivation of liberty (UN 1993). GBV occurs in every culture and social group (UNFPA 2016) and contributes significantly to preventable morbidity and mortality for women and children. It is also known by the terms— Domestic Violence (DV), spousal abuse and Intimate Partner Violence (IPV). However, the term GBV is preferred because it takes into consideration that men can also be victims.

As regards prevalence of GBV in Nigeria, the 2013 Demographic and Health Survey reported that, 25% of married women had ever experienced physical, emotional or sexual violence by a partner and 19% in the last 12 months (NPC and ICF International 2014). My research in this new field has sought to describe the Epidemiology of GBV. Thus, data on the – 5W's of different study populations in Nigeria were provided (fig. 12) (table 5):



(a)



(b)

Fig. 12: Training programmes on GBV (a) Drivers; (b) Media practitioners.

**Table 5: Target Groups Studied on Gender Based Violence Prevention**

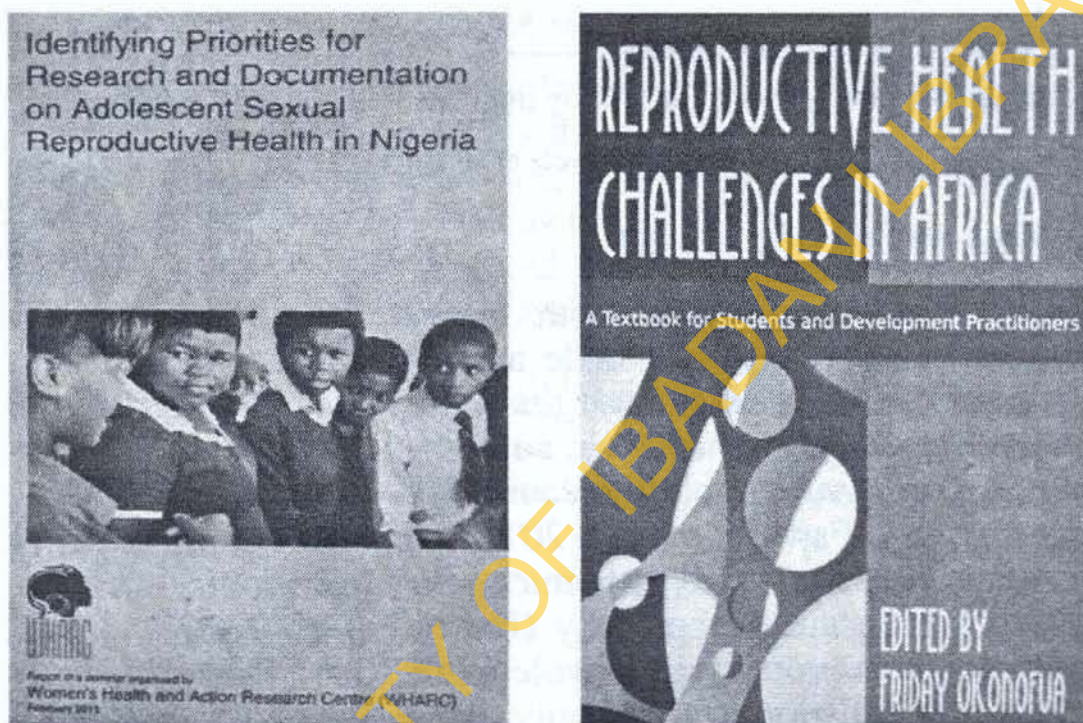
<b>Groups</b>	<b>Examples</b>
1 Young people	Secondary school (Fawole et al. 1999c) and University students (Umana, Fawole et al. 2014), Apprentices (Fawole et al. 2005b), Hawkers (Fawole et al. 2002)
2 Women	Pregnant women (Fawole et al. 2008; Fawole et al. 2010a), Parents of children (Ige and Fawole 2012), Rural and urban women (Balogun, Fawole et al. 2012; Balogun, Fawole et al. 2013), Beggars and homemakers (Fawole et al. 2013a), Brothel based female sex workers (Fawole and Dagunduro 2014), Married women (Fawole and Adeoye 2015; Sigbeku, Fawole et al. 2015), People living with HIV (Olowookere et al. 2015)
3 Men and boys	Instructors and trade union executives (Fawole et al. 2005a), Married men (Fawole et al. 2010b), Students (Umana, Fawole et al. 2014; Adeleke et al. 2016), Military men and civil servants (Adejimi, Fawole et al. 2014)
4 Parents and children	Children under 5 (Ige and Fawole 2011; Ige and Fawole 2012); (Osifo, Fawole et al. 2016)
5 Health sector	Primary healthcare workers (Fawole et al. 2010c), Faculty and medical students (Fawole et al. 2013b)
6 Law enforcers	Police and judicial officers (Fawole et al. 2003; Fawole et al. 2005b)
7 Media practitioners	Journalist (Fawole and Asekun-Olarinmoye 2005)

As regards the Who?, we studied in and out of school youths and women and have 15 publications on these groups. We also studied other groups such as men and boys, health care providers, law enforcement officers, media practitioners and even medical students, and we have over 50 publications on VAW. I have severally been acknowledged as one of the leading researchers on this topic in Nigeria.

One of the major highlights of my research on GBV is that it brought to the fore 'Economic Abuse' as another form of violence women experience (Fawole 2008). Hitherto only

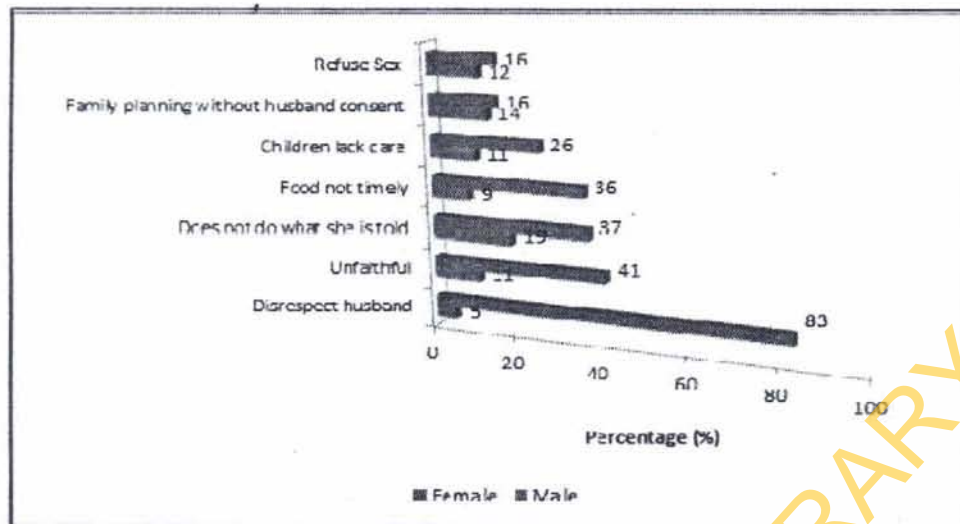


the three types of violence were researched, now more researchers have begun to report on this abuse. Also, the areas of further research that are required in Nigeria were identified for GBV researchers to address and published as chapters in 2 books (Fawole 2011). These books are used as advocacy tools by women groups and guide interventions by programme managers and researchers to improve Nigerian women's status and rights (fig. 13).



**Fig. 13:** Chapters in Book on Gender Abuse Violence Prevention.

Some of the results from these studies are shown in figures 14-17 and table 7. It is interesting to note that even women felt beating was acceptable (fig. 14),



**Fig. 14:** Justifications for IPV by male and female civil servants.

Source: Fawole et al. 2005

### ***As regards the 5Ws of GBV:***

**Who?** We found that both sexes were victims and perpetrators of GBV, but male against female violence was far more common. We found that all ages experienced GBV (Fawole et al. 2002), however, adolescents and young women were more vulnerable because of their limited life experiences (Fawole et al. 2010c; Umana et al. 2014). Women with low socioeconomic status were more likely to be victims because of poverty (Fawole et al. 2013a), while education was protective (Fawole et al. 2004). The protective effect of education started only when women's education progressed beyond secondary school (Fawole et al. 2008). Poverty increased the risk of violence because low income for livelihood forced girls into occupations with risk of sexual violence (Fawole and Dagunduro 2014), caused marital disagreements, or made it difficult for women to leave violent relationships (Fawole et al. 2013a).

**Where?** The family was the primary site of GBV. The community/society also justified the behaviour of male abusers, and supported traditional practices such as beating, verbal abuse and early marriage (fig. 9). We found that, particularly in informal work sites - motor parks, stalls and brothels - violence was common (Fawole et al. 2002; Fawole



et al. 2005b; Fawole and Dagunduro 2014). Violence also occurred in training institutions namely; secondary schools and the university (Umana et al. 2014). The state encouraged violence through its male officials who found women easy prey to harass for money (Fawole 2008).

**How?** Most of our studies reported psychological violence such as verbal abuse and controlling behaviour to be the commonest form of violence women experience (Fawole et al. 2002; Fawole et al. 2005a; Fawole et al. 2008; Balogun et al. 2012; Adejimi et al. 2015). This was followed by physical violence, while sexual violence (thankfully) was least. However in our project with brothel based female sex workers, sexual violence was commonest (42%) form of violence experienced (Fawole and Dagunduro 2014). Economic abuse was reported by hawkers, apprentices and sex workers (Fawole et al. 2002).

**Why?** The primary factor that gives rise to GBV is the power inequality between women and men. However, it is reinforced by the entrenched patriarchal values system, poverty and the low status of women in the society. Also, some aspects of the statutory and religious provisions made women vulnerable to violence. Other contributory factors we found included:

- **Harmful alcohol use** – Violent individuals were much more likely to be heavy and regular users of alcohol (Adejimi et al. 2015; Fawole et al. 2005b). Alcohol abuse results in diminished ability to avoid violence, having multiple sexual partners, partner neglect which fuels a couple's discord and violence.
- **Witnessing parental violence** – Our surveys found that respondents who were exposed to interparental violence during childhood had increased likelihood of being a victim (UN Women 2014). We also found that children who experienced sexual abuse in childhood were more likely to be FSWs and victims of violence (Fawole and Dagunduro 2014).

- ***Acceptance of violence*** – Acceptance of intimate partner violence as the norm in relationships; was found to perpetuate its occurrence (Fawole et al. 2005a; Adejimi et al. 2015). Unfortunately, this accepting attitude can be transferred to subsequent generations. Negative peer pressure increased perpetration of violence among male university students (UN Women 2014).
- ***Having multiple partners*** – The results of our community-based study of men in Ibadan (Fawole et al. 2010a), and workplace study of male civil servants in Oyo State (Adejimi et al. 2015) found that multiple partnership was strongly associated with both male perpetration and women experience of intimate partner violence (Fawole et al. 2005a). Multiple partnerships may result in intimate partner violence (IPV) and IPV in turn can cause having multiple partners.
- ***Low status of women in the community*** – Our findings from the population survey of married women of reproductive age confirmed the hypothesis that when women have very low status, violence is not needed to enforce male authority. On the other hand, where women have a high status, they usually have sufficient power to avoid violence. Thus, violence among women (VAW) is highest in societies where the status of women is in a state of transition (Fawole and Adeoye 2015).
- ***Social norms supportive of violence*** – Examples of social and cultural norms that we found to support violence against women included:
  - A man has a right to physically discipline a woman for “incorrect” behaviour
  - Beating is an acceptable way to resolve conflict in a relationship
  - Sexual coercion (including rape) is a marker of masculinity
  - Girls are responsible for controlling a man’s sexual desire (Fawole 2014)



The health consequences of GBV may be fatal or non-fatal. Fatal include homicide and suicide, while non-fatal include depression, low self esteem, HIV and unwanted pregnancies (fig. 15). Women who experienced violence were more likely to have obstetric problems than those who did not (table 6), therefore there was the need to ensure that medical students were skilled right from the period of their training to detect and manage victims (table 7).

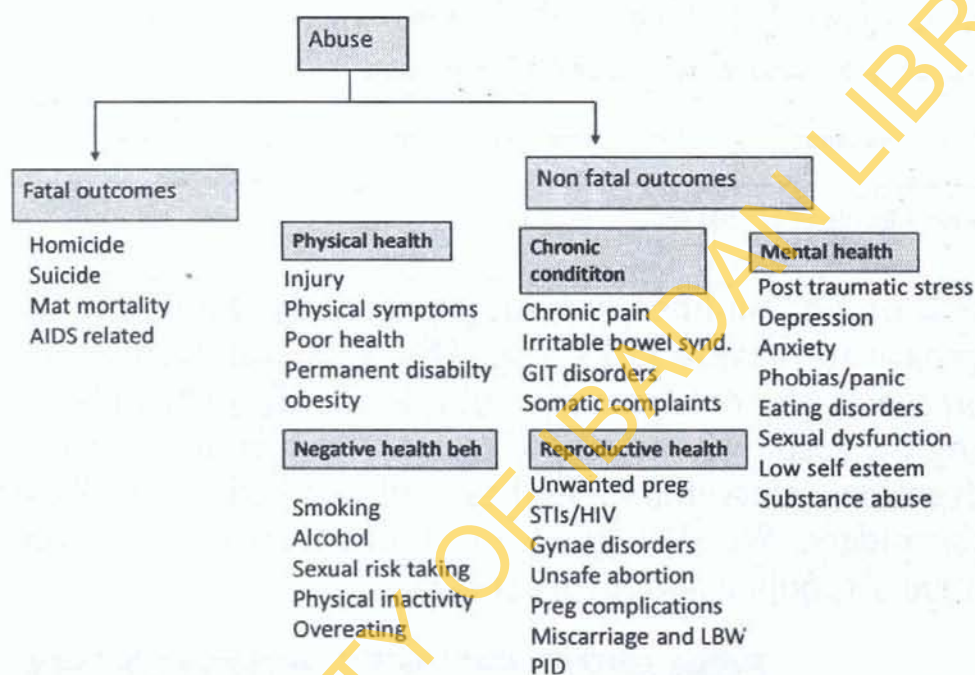


Fig. 15: Health Complications of GBV. (Source: Heise et al. 1999)

Table 6: Comparison of Obstetric Complications in Women who Experience Violence in Pregnancy with those that did not

Characteristics	Violence in pregnancy N=54	No violence in preg N=252
Bleeding (Hemorrhage)	4 (7.4)	12 (4.8)
Premature labour	9 (13.1)	8 (3.2)
Miscarriage/intrauterine death*	3 (5.6)	6 (2.4)
Mean birth weight (kg)*	3.0 + 1.1	3.2 + 0.6

\*Statistically significant

Source: Fawole et al. 2010

**Table 7: Final year Medical Students from Three Medical Schools in SW Nigeria's Self Reported Skills to Manage Intimate Partner Violence (N = 388)**

Activity	Skilled
Recognizing intimate partner violence	209 (53.4)
Taking history on abusive episodes	199 (51.2)
Examining victims	155 (39.9)
Treating and medical care for victims	195 (50.3)
Counseling and developing safety plan with the victim	160 (41.3)
Counseling the abusive partner or the "perpetrator"	137 (35.3)
Discussing coping skills for victims of violence	148 (38.1)

Source: Fawole et al. 2013b

Based on our findings, we sought to apply the public health approach to prevent GBV (fig. 16). This approach considers violence as the outcome of multiple risk factors, rather than being the result of one single factor. We therefore conducted prevention intervention studies and worked with different stakeholders. We dialogued and trained drivers, instructors, journalists, police and legal officers.

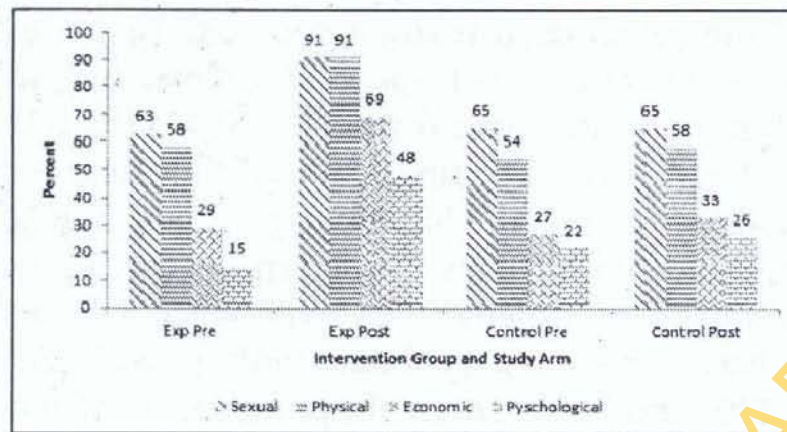


**Fig. 16: Primary prevention of gender based violence.**

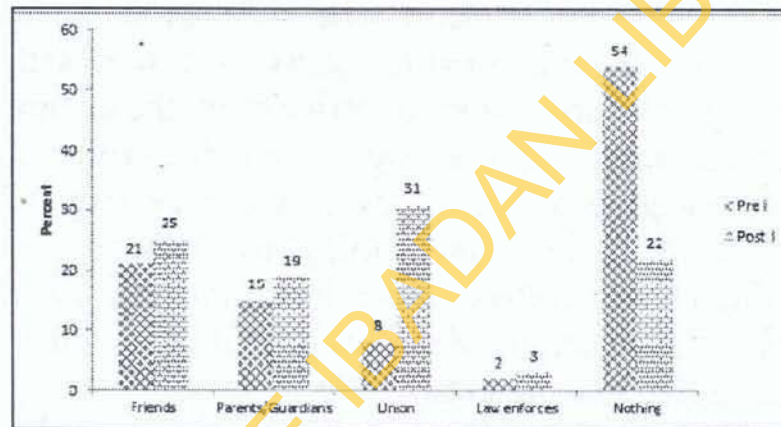


I was the principal investigator of our first intervention study titled, "Interventions to prevent violence against young female hawkers in Southwestern Nigeria" funded by UNIFEM, New York. The first phase of the quasi experiment was a baseline survey of 345 young female hawkers from Oyo, Ogun and Osun States, to determine the nature, extent and determinants of violence they experience. We found that violence was a common problem with prevalence ranging between 27% and 76%. The main perpetrators of abuse were drivers and bus conductors. However, most victims did not seek care or help after the abuse (Fawole et al. 2003). A multi-stakeholder intervention was conducted to reduce the incidence of violence against the girls, and then with drivers, instructors, police and judicial officers in these three states. Post intervention, there was significant improvement in the hawkers knowledge on the types of violence (fig. 17), better appreciation of their vulnerability to violence and more victims sought help following violent acts (fig. 17). The rate of violence experience decreased but did not reach a significant level (Fawole et al. 2003).

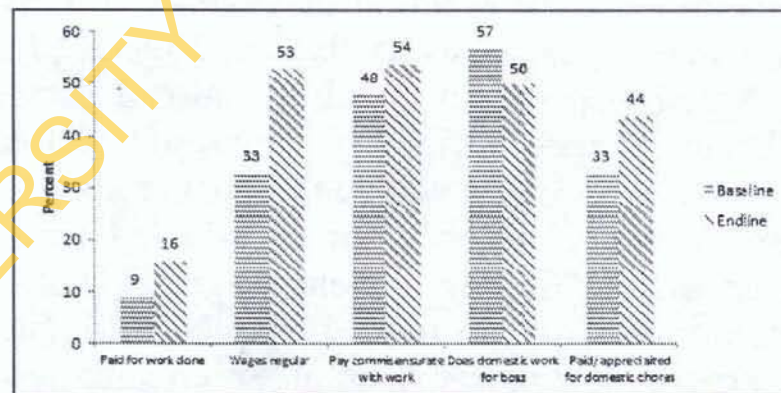
This was followed in a quick succession by other funded studies. I led the research team of another intervention study on apprentices titled "Prevention of violence against women in young female apprentices in Ibadan, Nigeria" funded by British Council-Department for International Development (DFID), United Kingdom (fig. 17). The result of this study is shown in figure 18. Again, we won a grant from UN Women to implement another intervention in which I was the lead investigator titled, "Ending violence against women using media practitioners", again funded by UNIFEM, New York. I received two senate research grants to conduct research on GBV among university students (SRG/FCS/1999/5<sup>A</sup>) and medical students (SRG/FPH/2010/2<sup>A</sup>) and was Co-investigator in the research team of two studies funded by WHO/Human Reproductive Health Programme (HRP) and Union African Population Studies (UAPS).



(a)



(b)



(c)

**Fig. 17:** (a) Pre and post intervention: Knowledge of types of GBV among hawkers; (b) Pre and post intervention: Seeking of redress following experience of violence among hawkers; (c) Pre and post intervention: Experience of economic exploitation by apprentices.

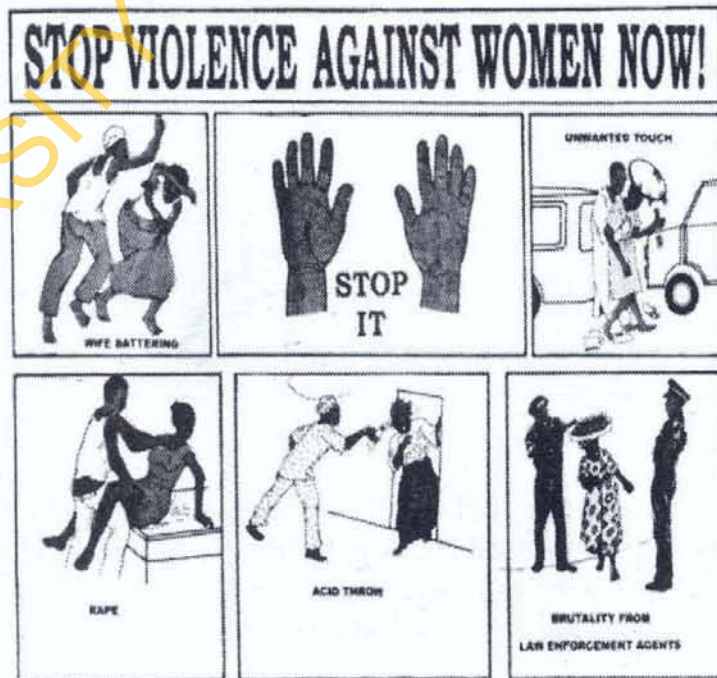
Source: Fawole et al. 2002 and 2005b



The summaries of some of my funded intervention studies on GBV are shown in table 8. My experiences on researching violence and HIV/AIDS prevention among youths in Southwestern Nigeria was summarised in a paper that highlighted the lessons learnt from these interventions (Fawole et al. 2004). Two of the educational materials developed are shown in figure 18. There is no excuse for abuse.

Our studies were not limited to women alone. We also studied men and children. We dispelled the myth that men do not experience sexual violence from women (table 9). While after school care of children, a period they may be vulnerable to abuse was not optimal (fig. 19).

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Fig. 18: Posters on types of gender based violence.



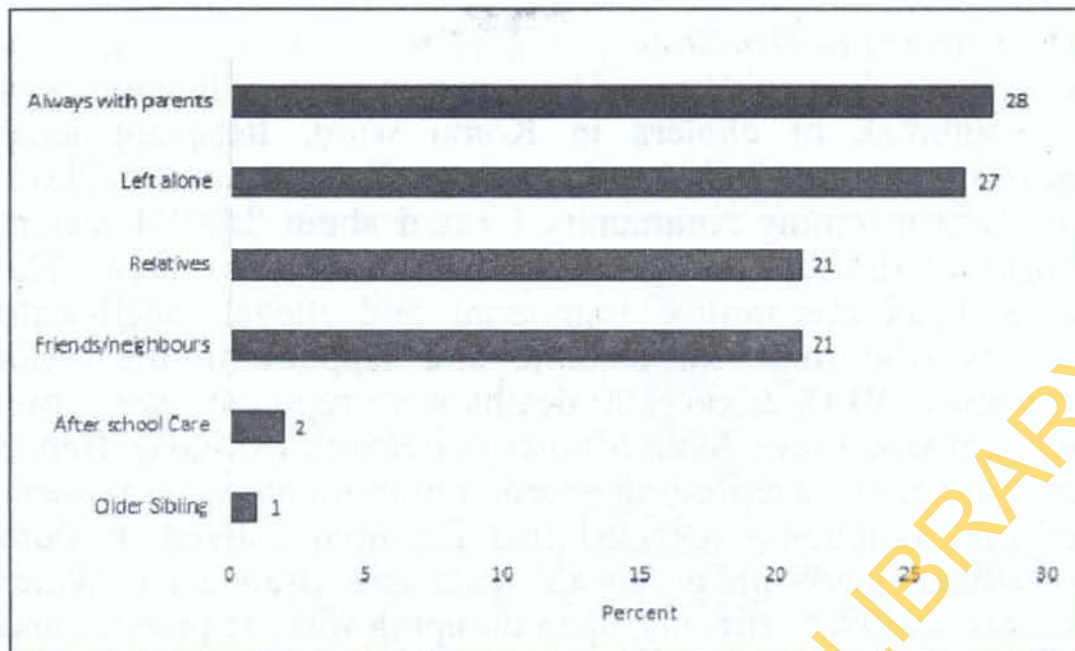
**Table 8: Summary of Funded Intervention studies on Gender Based Violence (GBV) .**

<b>Authors</b>	<b>Targets</b>	<b>Intervention</b>	<b>Outcome</b>
Fawole et al. 2003	Primary target - 595 hawkers Secondary - 254 drivers 212 traders 65 police officers 38 judicial  In Oyo, Osun, Ogun States	Training for hawkers (5 days) Sensitization - for drivers, traders, police & judiciary. Development and distribution of poster, handbills, T-shirts, face caps. Linkage with family planning, STI services, sources of redress Provision of microcredit and textbooks	Intervention improved knowledge and attitudes. Help seeking behaviour
Fawole et al. 2005b	Primary target -323 apprentices Secondary – 54 instructors 30 police officers 25 judicial  In Oyo State	Training for hawkers (5 days) Sensitization - for drivers, traders, police & judiciary. Development and distribution of poster, handbills, T-shirts, face caps. Linkage with family planning, STI services & sources of redress Training on income generating activities	Improvement in knowledge and attitudes. Help seeking behaviour Reduction in experience of violence

Table 8 contd.

Fawole and Asekun-Olarinmoye 2005	35 media practitioner	Training of journalist (2 days) Distribution of flyer and fact sheet.	500 flyers/fact sheet distributed  Enlighten public, portray women in better light on media create awareness among journalist
Ajuwon, Fawole et al. 2011	Oyo State 450 secondary school students	Training on violence prevention Distribution of flyer and fact sheet Peer educators	Improvement in knowledge and attitude scores. Acquisition of skill for preventing violence increased. Reported experience and perpetration of violence in last 6 months reduced.
Fawole 2013	Ibadan, Oyo State Students in 2 tertiary institutions - 750	Sensitization and Training Video show	Improvement in knowledge on GBV
Fawole et al. 2013	Ibadan, Oyo State Medical students-120 Ibadan; SW Nigeria-366	IEC materials Sensitization programme (1 day)	On going





**Fig. 19:** Main person who cares for under-five child(ren) on return from school.

Source: Ige and Fawole 2011

**Table 9: Experience of Sexual Violence by Male Students in Three Tertiary Institutions in Ibadan, Nigeria**

Experience	No(%)
Ever experienced any form of sexual harassment	350 (53.6)
Unwanted kissing, pecking or necking	102 (29.1)
Ever forced to have unprotected sex	94 (26.9)
Unwanted touching of genitals in a way not liked	93(26.6)
Ever forced to have anal sex	38 (10.7)

Source: Adeleke, Fawole et al. 2016

### Outbreak Investigation

Despite the fact that epidemiology has expanded beyond early definition as being the study of epidemics (Lilienfeld 1978), investigating outbreaks still constitutes an important epidemiologic activity as sadly enough, epidemics continue to occur. Recently, we experienced outbreak of Lassa fever and even more recently, Meningitis. I have promoted public health by participating in the investigation and control of epidemics, otherwise called outbreaks.

### ***(1) Cholera in Oyo State***

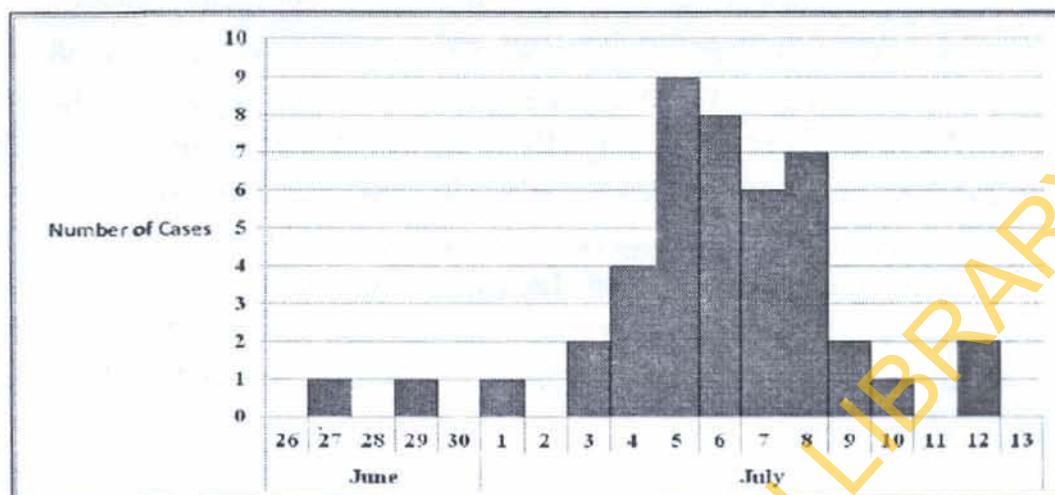
One of the first epidemics I took part in its investigation, was an outbreak of cholera in Komu ward, Itesiwaju local government area (LGA) of Oyo State. This occurred in 2002, in Kusa a mining community located about 350 kilometers north of Ibadan and a very 'hard to reach' area. The inhabitants are mostly immigrant and illegal small-scale miners who mine for tantalite and sapphire in the rocks (Musbau 2014). About 100 deaths were reported over a two week period to the State Ministry of Health (SMOH). Hence investigations were commenced. Environmental assessment of the community revealed that the miners lived in slum dwellings made up of plastic tents and straw huts. Water supply was from streams, open dumping was the practice and human waste was disposed by 'bush attack'. There were two interesting lessons learnt after the investigations. Firstly, despite the severity of illness families denied they had ill persons and hid the cases out of fear of forceful evacuation. Secondly, the local health authorities avoided response stating that it would be wasteful spending resources on immigrants. One of the LGA executives repeatedly stated "*they are not part of us, they are from Dahomey, why should we waste our money treating them*"? However, after several advocacy visits and education of the executives on the risk of spread to general public they provided the resources to curtail the outbreak (Fawole and Kolude 2003).

### ***(2) Cholera in Ogun State***

Another cholera outbreak investigation I contributed to its control was in Abeokuta, Ogun State in 2013. Stool sample of the index case, 25-year-old male apprentice, confirmed *Vibrio cholera* (the bacteria that causes the infection). In conjunction with the Disease Surveillance and Notification Officers (DSNOs) 37 cases and 5 deaths (attack rate of 7.32/100,000 and case fatality rate-CFR of 11%) were detected and reported to the SMOH from the four LGAs in Abeokuta metropolis over a period of three weeks; therefore, a case control study was instituted (fig. 20 and table 10). Protective factors identified after investigations were: hand washing



with soap and water before eating. Also, cases were more likely to have drunk sachet water or had contact with a diarrhoea case.



**Fig. 20:** Epidemic curve of cholera outbreak in Abeokuta, Ogun State, June-July, 2013.

*Source:* Adedire, Fawole et al. 2016b

**Table 10: Logistic Regression of Risk Factors for Cholera Infection in Abeokuta, Ogun State, June – July, 2013**

Term	OR; 95% C.I	P-Value
Rice	5.8 (0.9- 39.4)	0.07
Semovita	0.6 (0.07- 5.5)	0.7
Sachet water	14.5(9.1 - 26.5)	<0.01
Tap water	0.6 (0.2 - 2.4)	0.5
Hand washing with soap & water before eating	0.08 (0.01 - 0.7)	0.02
Hand washing after toilet	1.3 (0.2 - 7.5)	0.8
Household with toilet facility	0.2 (0.03 - 1.0)	0.06
Contact with diarrhoea case	5.1 (1.2 - 22.4)	0.03

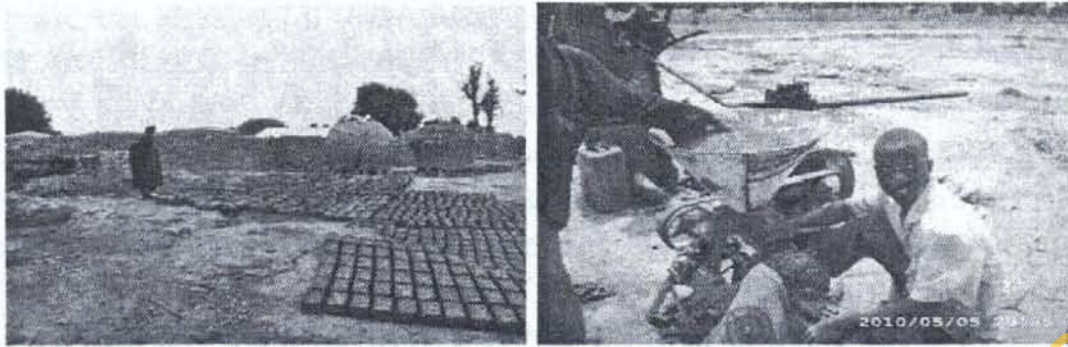
*Source:* Adedire, Fawole et al. 2016b

The outbreak was caused by consumption of certain brand(s) of sachet water due to the disruption of tap water supply within city, due to the road expansion works. Poor environmental hygiene and poor personal hygiene by contacts promoted person-to-person transmission of the infection. In conjunction with state officials and postgraduate students, we carried out intensive health education emphasizing the importance of hand washing with soap and environmental hygiene. Based on our recommendations, sanitary inspection of sachet water producing factories was done by the state authorities. Thus, our interventions succeeded in reducing the morbidity and mortality and thereby saved lives (Aiyelotan et al. 2013).

### ***(3) Lead Poisoning***

I documented the series of Lead poisoning outbreaks linked to artisanal gold processing that killed at least 400 young children in Zamfara State and later Niger State, Nigeria (Dalhat et al. 2016). The first official notification of the lead poison outbreaks was in February 2010, while the State and Médecins Sans Frontières (MSF) officials were conducting routine meningitis surveillance; they identified more than 200 children less than 5 years of age with convulsions in four villages. Later, over a three-month period approximately 40 of these children died (Biya et al. 2010). A multidisciplinary team (CDC, WHO, NFELTP, MSF and Zamfara State public health officials) investigated and responded to the outbreak (fig. 21). Epidemiological, laboratory and environmental investigations found high lead levels in venous blood, soil and water samples (Dooyema et al. 2012). The therapeutic use of the oral chelating agent, (meso-2, 3-dimercaptosuccinic acid) was approved and used for the area.





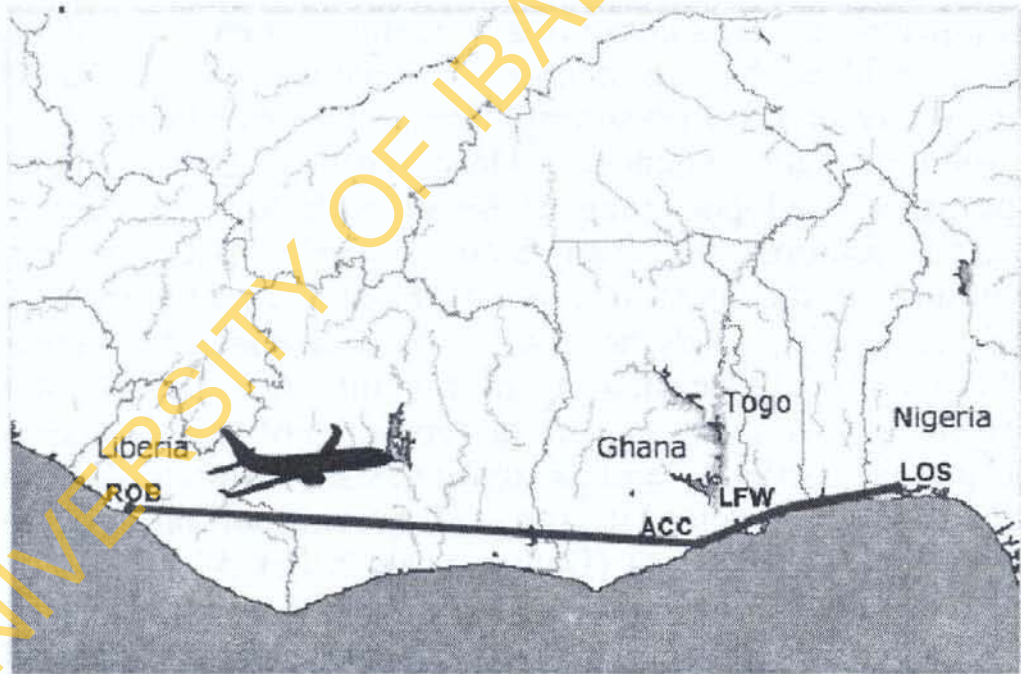
**Fig. 21:** A flour mill was being used to process gold ore and brick making process for homes in the village the bricks being made were highly contaminated with lead contributing to the death of children.

Source: FMOH 2015

In August, 2010, the Zamfara State Ministry of Health reported another episode of unexplained deaths in children below 5 years in another village not among those under surveillance for Lead poisoning. Later in the year, the public health professionals continued to identify other new villages with children having history of convulsions and deaths suggestive of Lead poisoning. Hence, the investigations and response were extended. However, in 2015, another confirmed lead poisoning outbreak with 65 cases and 28 deaths, occurred in Niger State, Nigeria. With this new outbreak, a statement was issued from the Presidency that *'illegal mining shall no longer be tolerated in Nigeria!'* These outbreaks resulted from mining for gold and were driven by poverty as seen in the repetition of these outbreaks despite the morbidity and mortality in their children. We were requested to develop it into a training tool on outbreak investigations in Africa (Dalhat et al. 2016). We learnt two main lessons—First, was the need to obtain an alternative source of livelihood for the poor agrarian communities with the restriction in mining activities. Secondly, was the rebound effect of the sudden application of stringent control measures without keeping in mind the risk of 'more underground' mining activities especially in new villages. We carried intensive health education to protect children, in particular, and supported the SMOH with introduction of other income generating activities in these communities.

#### (4) *Ebola Virus Disease*

Mr. Vice-Chancellor, Sir, I contributed to certification of Nigeria as being Ebola free, as declared by the WHO and partners on 20<sup>th</sup> October, 2014. This was a feat that received commendation and international acclaim because of the rapid response by the Federal, State Ministry of Health and their implementing partners. Ebola Virus Disease (EVD or Ebola) is highly fatal and currently lacks a treatment or vaccine. It is endemic in some parts of Africa and may emerge as sporadic outbreaks (WHO Ebola Response Team, 2014). We can still recall the story of the ill traveller from Liberia to Lagos who was confirmed to have Ebola after being admitted to a private hospital in July, 2014 (fig. 22). After completing the investigations, 19 laboratory-confirmed and one probable Ebola case, with 899 contacts were identified. The last cases occurred in August, 2014 (Shuaib et al. 2014).



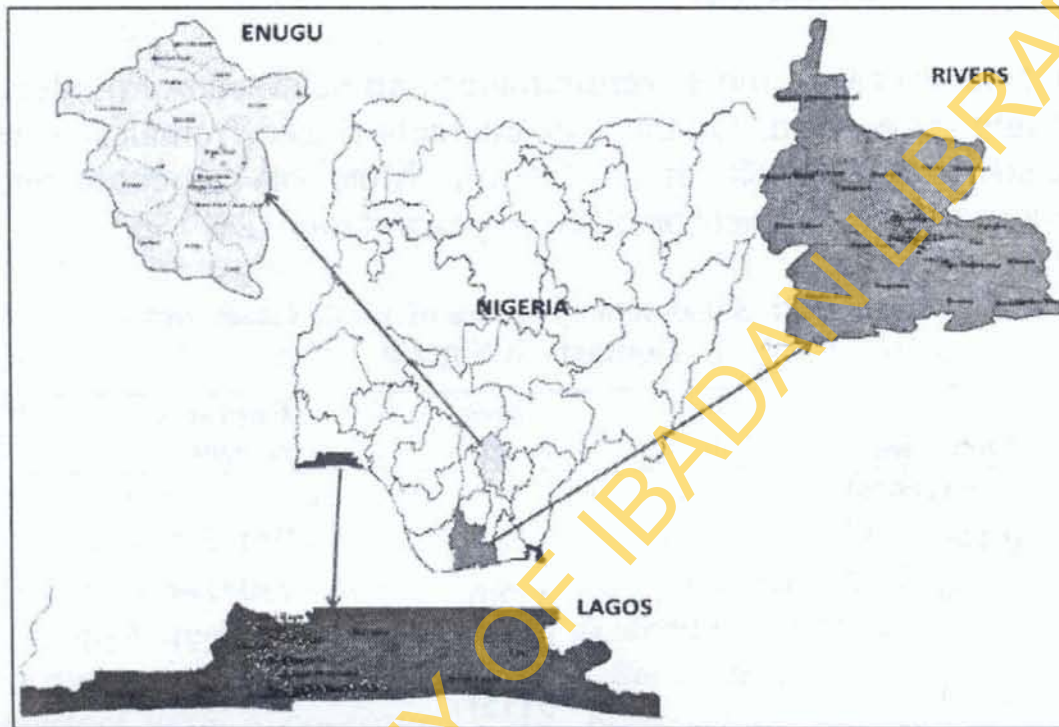
**Fig. 22:** The flight pattern of first EVD case from Roberts International Airport [ROB] in Monrovia to Kotoka International Airport (ACC) in Accra to Lome-Toikoin Airport (LFW) in Lome and finally to Murtala Muhammed International Airport (LOS).

Source: Fawole et al. 2016b



## Epidemiological Investigations

The outbreak investigation was carried out in these three cities namely Lagos, Port-Harcourt and Enugu (fig. 23) (Shuaib et al. 2014; Ki 2014; WHO 2014). We traced contacts, managed alerts and rumours, and implemented community surveillance (Fasina et al. 2014; Fawole et al. 2016b).



**Fig. 23:** States involved in the Ebola outbreak investigations: Lagos, Enugu and Rivers.

*Source:* Fawole et al. 2016b

The contact tracing team was composed of Federal/State officials, army personnel and implementing partners (NFELTP, WHO, Red Cross). We trained the contact tracers on EVD procedures and tools, including safety precautions, before they embarked on their activities. We followed up contacts daily and those that completed 21 days of follow up without developing any signs or symptoms were discharged. The number of cases and contacts from the three sites is shown in table 11.

**Table 11: Data on Number of Ebola Cases and Contacts in Nigeria**

Place	Cases		Contacts	
	N	%	N	%
Lagos	16	(80)	356	(39)
Port Harcourt	4	(20)	536	(60)
Enugu	0		7	(1)
Total	20		899	

Source: Fawole et al. 2016a

Of the 20 cases, more were females and healthcare providers. Eight cases died. Of the 899 contacts traced, females were also more (Fawole et al. 2016a). Most of the cases and contacts were in their productive years (table 12).

**Table 12: Socio demographics of Ebola Cases and Contacts in Nigeria**

Variables	Cases N=20	Contacts N=899
<b>Age (years)</b>		
0-19		97 (12)*
20-29	4 (20)	230 (28)
30-39	8 (40)	219 (27)
40-49	3 (15)	149 (18)
>50	5 (25)	118 (15)
<b>Sex</b>		
Male	9 (45)	390 (43)
Female	11 (55)	509 (57)
<b>Source of Infection</b>		
Health facility	17 (85)	300 (33)
Household	3 (15)	599 (67)
<b>Outcome</b>		
Survived	12 (60)	896 (99)
Died	7 (35)	3 (1)

\* n= 812

We provided technical support to contact tracers and mediated for contacts that experienced challenges, while at their work. Three of such scenarios are described below:



Scenario 1 - In Port Harcourt, Mr. PH, a contact under follow-up, chased away a contact tracing team as they approached his home for the daily physical examination. Additionally, the contact tracers were verbally abused by four of Mr. PH's neighbour's, all hefty young men. One neighbour even physically assaulted a team member and promised to beat him up more thoroughly if he ever returned.

Scenario 2 - In Lagos, there was a report about Mrs. LA, a 40-year-old mother of four children. Mrs. LA was identified as a high risk contact of the first case and therefore was visited by a contact tracing team. Suddenly, her neighbours refused to talk to her or enter her home. The neighbours forbade their children from playing with Mrs. LA's children, refused to buy groceries from her shop, and persuaded other community members to do the same by telling them Mrs. LA had Ebola. Additionally, when Mrs. LA's husband went to pay monthly rent, the landlord gave him a quit notice to leave his house in the next four weeks.

Scenario 3 - A report was received on 1<sup>st</sup> September 2014 by the Rumour Management Team in Lagos, of a 55-year-old man with fever and vomiting in the previous three days. A contact tracing team was requested to investigate the report. Through investigation, the team determined that the reported suspect case was not a true case due to a lack of history of contact with a confirmed case. Rather they found that the report was by a neighbour with whom he had had several disagreements in the past and who had promised to deal with him.

We had Swift Action Teams (SWAT) that resolved very challenging situations we could not address, by involving employers, families, community leaders and in some cases even security agents. This enhanced tracing of contacts and therefore the successful containment of the outbreak.

### **Training in Epidemiology**

Mr. Vice-Chancellor, Sir, I am happy to report that we are blazing the trail of Epidemiology training in Nigeria. The University of Ibadan is the first institution in Nigeria to



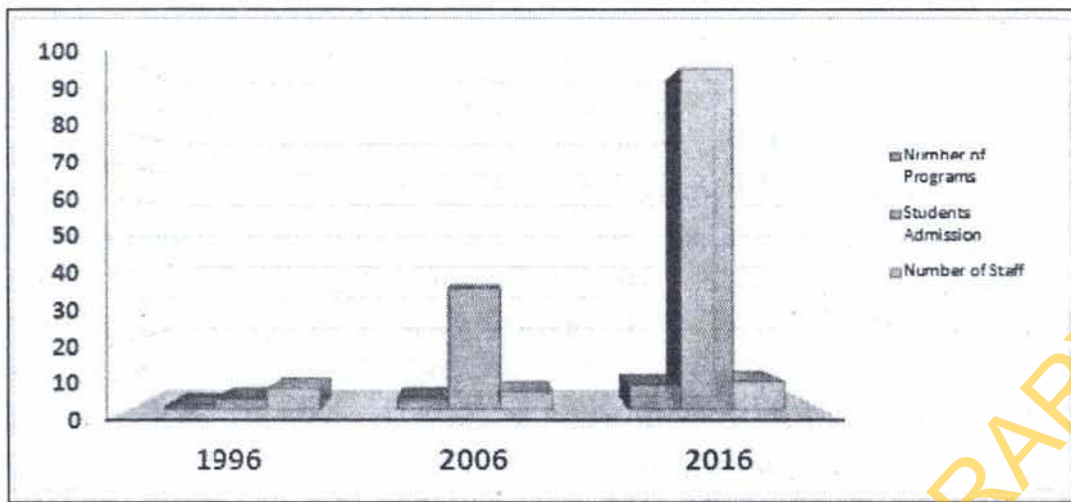
establish a postgraduate Epidemiology training curriculum. We developed and commenced the following postgraduate training programmes (EMS Department 2014):

- M.Sc Epidemiology (1999/2000)
- M.Sc Epidemiology and Medical Statistics (2001/02)
- M.P.H Field Epidemiology (2003/04)
- M.P.H Field Epidemiology Practice (2007/08)
- M.Sc Clinical Epidemiology (2010/11)

This was later adopted by other tertiary institutions in the country including – Universities of Lagos, Ilorin, Uyo and Ahmadu Bello Zaria. I am happy to state that based on the legacies of my teachers in the Discipline: Professors A.B.O.O. Oyediran (Former Vice-Chancellor of the University); O.O. Kale (Former Director, Nigeria Guinea Worm Eradication Programme and First Dean of the Faculty of Public Health) and Oyenike O. Oyejide, we are blazing the trail of Epidemiology training in Nigeria.

As pioneer members of EMSEH, Dr. Lola Dare and I developed and established the curriculum for undergraduate and postgraduate training in the then sub-Department of EMSEH, under the headship of Professor E.A. Bamgboye. This commenced with three professional (M.Sc) training programmes; this was increased to four to meet national demands for training in Field Epidemiology. Later on, as Acting Head of Department (December, 2009 to February, 2012) and in conjunction with other colleagues, Drs. A.A. Fatiregun and M.D. Dairo, Ikeoluwapo O. Ajayi, Ikeola Adeoye and B. Adedokun, I spearheaded the development and approval of a new programme in the Department - the M.Sc Clinical Epidemiology. I initiated the first curriculum review of academic programmes in the Department in November, 2011 in conjunction with colleagues. Currently, we have had an increase in both the number of our programmes and student admissions but have not had a proportionate increase in the number of epidemiologist (fig. 24).





**Fig. 24:** Student's admission and number of programmes versus staff recruitment in epidemiology.

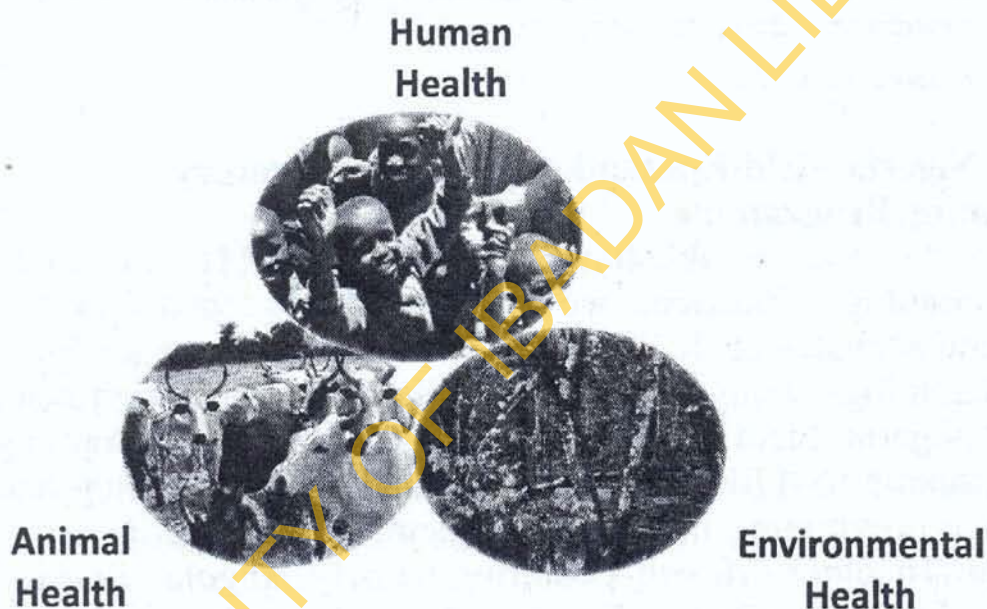
Source: Fawole et al. 2017

### **The Nigeria Field Epidemiology and Laboratory Training Programme**

Prior to the establishment of the M.P.H in Field Epidemiology Practice, we paid advocacy visits to the Federal Ministry of Health (FMoH), Abuja to ensure the Field Epidemiology training was domiciled in our Department. The Nigeria Field Epidemiology and Laboratory Training Programme (N-FELTP) is a two-year, full-time training and service programme in applied Epidemiology. Nigeria is one of the 16 other African countries namely Angola, Burkina Faso, Ethiopia, Ghana, Kenya, Mali, Mozambique, Niger, Rwanda, South Africa, Southern Sudan, Tanzania, Togo, Uganda and Zimbabwe who are part of the African Field Epidemiology Training Network (AFENET). Incidentally, today is the United Nations declared "*Africa Day*". I am happy to note that Nigeria is the lead in Africa and is looked up to and used as the gold standard by other African FELTPs. The same network exists in Asia, Latin America and the Pacific.

We train Epidemiologists in three tracks - Medical, Laboratory and Veterinary practice. Nigeria is among the first countries to implement a veterinary track to address the ever-increasing threat of zoonotic infectious diseases and

strengthen the collaboration between the human, animal and environmental health sectors – thus promoting the One Health Concept of disease control (fig. 25). Unlike many training opportunities FELTP is a fundamentally field-based programme, the field assignments/activities make up 75% of the programme hence the term “Shoe Leather Epidemiology” – indicating the walking the training entails (Nguku et al. 2014; AFENET 2016). The programme is supported by the US Centre for Disease Control and Prevention (CDC), PEPFAR, Presidents Malaria Initiative (PMI) and other partners. It is implemented in conjunction with ABU, Zaria under the auspices of the FMOH and FMARD.



**Fig. 25:** One health concept, a multidisciplinary approach to public health.

The Programme was established in the Department through the efforts of Professors E.A Bamgboye, Gbemisola Oke, and Drs. L.V. Adekunle, I.O. Ajayi, A. Fatiregun and M.D. Dairo. The role of the then HOD, Professor E.A. Bamgboye, in establishing the programme is again acknowledged. Together with Dr. Ajayi, we supported the programme when there were ‘teething problems’ in the second year and saved it from a premature death. Mr. Vice-Chancellor, Sir, during my sabbatical leave, I worked as the Academic Coordinator with the NFELTP programme and on my return served as the



University Focal Person to the programme, during this period, I strengthened the standing of our Department on the programme and ensured that only the very best applicants were admitted into our dear University. Also, our admissions have continued to increase over the years (table 13). I have supported the students who have done the nation proud by participating in local and national outbreak investigations - Ebola, Lead Poison, Cholera and Lassa Fever (Adedire et al. 2016a). Our students participated in outbreak investigation and response in Nigeria, Sierra Leone and Liberia (Ilesanmi et al. 2016). My mentees have evaluated disease surveillance systems (Adeyemi et al. 2014), assessed immunization coverage (Adedire et al. 2016a), conducted population surveys and trained health workers on the vaccine preventable diseases hence together we have been able to impact positively on the health of Nigerians and the West African subcontinent. The Malaria and HIV/AIDS research prioritization compendium will address the needs of the country on these two diseases for the next few years (Fawole et al. 2014; Poggensee et al. 2014). The Ebola outbreak and Nigeria's response experience was so commendable that, we were requested by AFENET and with the support of faculty from Emory University, USA to document it as a case study for Epidemiology training in Africa (Fawole et al. 2016b).

**Table 13: Number of Residents from University of Ibadan**

<b>Cohort/Year</b>	<b>Med</b>	<b>Vet</b>	<b>Lab</b>	<b>Total</b>
1-2008	2	1	-	3
2-2009	0	0	0	0
3-2010	3	2	4	9
4-2011	3	0	6	9
5-2012	12	4	1	17
6-2013	16	3	5	25
7-2014	13	3	7	23
8-2015	19	6	2	27
9-2015	12	3	5	20

Mr. Vice-Chancellor, Sir, I wish to end this section by seizing this opportunity to humbly reiterate our earlier request for more staff to meet training demands of our Department. We plan to continue to blaze the trail of training in Epidemiology in Nigeria and beyond.

### **Mentorship of Students and Staff**

Mr. Vice-Chancellor, Sir, together with others I have contributed to the provision of competent human resources in several public health institutions by mentoring/supervising students who have taken up positions at various institutions at home and overseas. Till date I have supervised to completion **145** postgraduate students (135 Masters, 2 Ph.Ds and 8 Fellows of West African/National Postgraduate Medical Colleges) and taught 20 sets (cohorts) of medical students.

We have built the capacity of our students who have done the university proud by receiving acclaim at national and international conferences. The graduates of our programmes have been employed up and now work at:

(1) *International Organisations* – The organizations include AFENET, NFELTP, WHO, UNICEF, PATH, SFH, MSH and NCDC.

(2) *FMOH/SMOH/LGA* – They serve as Directors, Assistant Directors, Programme officers, State Epidemiologist and Primary Health Care Coordinators.

(3) *University and Hospital System* – Our mentees include Medical Consultants and Residents Doctors from various Departments of the College of Medicine. This includes Current and Past Heads of Departments, Ex- Deans, Deans and Professors. My mentees are also in other faculties and are in Universities all over the federation where they are putting their epidemiological skills into use to improve public health. My prayer is for all our students to be successful Epidemiologist, greater than us and do the nation proud. Amen.



(4) *Diaspora* – West Africa Subcontinent, UK, US and Canada.

### **Community Service**

#### ***Aladura Outreach Clinic***

Aladura Rural Health Outreach Programme is a public/private partnership between the University College Hospital/University of Ibadan and the Joseph Ijaola Memorial Foundation [JIMF]. It is a brain child of Dr. Olajide Ijaola, a physician based in the United Kingdom who requested that I established the clinic (fig. 26). The village is a border community located between Oyo State and Ogun State, along the Ibadan-Ogunmakin-Abeokuta Road. It was officially commissioned in June 2008 when Dr. Lola V. Adekunle was the Acting Head of Department. The facility provides outpatient care, home visits, referral, community outreaches and opportunity for research and community interventions to a cluster of 13 villages and manages an average of 10 patients/clinic day. A 7-seater Nissan bus donated by the Joseph Ijaola Memorial Foundation conveys the medical team to the clinic. The family has been so impressed with the activities of the Department such that eight years later (March 2016); they again donated an Opel Mervia 1.7 car for activities in the villages (fig. 27).



**Fig. 26:** Medical mission from the US at the Aladura Outreach Clinic.



Fig. 27: Vehicles donated for the running of the clinic.

### *Polio Eradication Initiative*

I contributed to the progress the global community and Nigeria has made towards Poliomyelitis eradication. As recently as 2012, Nigeria accounted for more than half of all polio cases worldwide. On the 25<sup>th</sup> of September 2015 WHO, Geneva announced that polio was no longer endemic in Nigeria. This is the first time that Nigeria was this close to interrupting transmission of wild poliovirus, bringing the African Region closer than ever to being certified polio-free (WHO 2015). This was after 25-years of concerted effort by all levels of government, international organizations, civil society, religious leaders and thousands of dedicated health workers (CDC 2014). Mr. Vice-Chancellor, Sir, I am happy to state that I participated in this 'historic achievement' in global health. However, on 1 August 2016, the Government reported the deeply saddening news that two children had been paralyzed by the disease in the northern Borno State (WHO 2016).

Poliomyelitis is a highly infectious disease that affects mainly children and can result in permanent asymmetrical paralysis, usually of the legs. The best treatment is prevention with oral vaccine and protection is for life (fig. 28). Every case detected constitutes an outbreak (CDC 2014; Moturi et al. 2014).



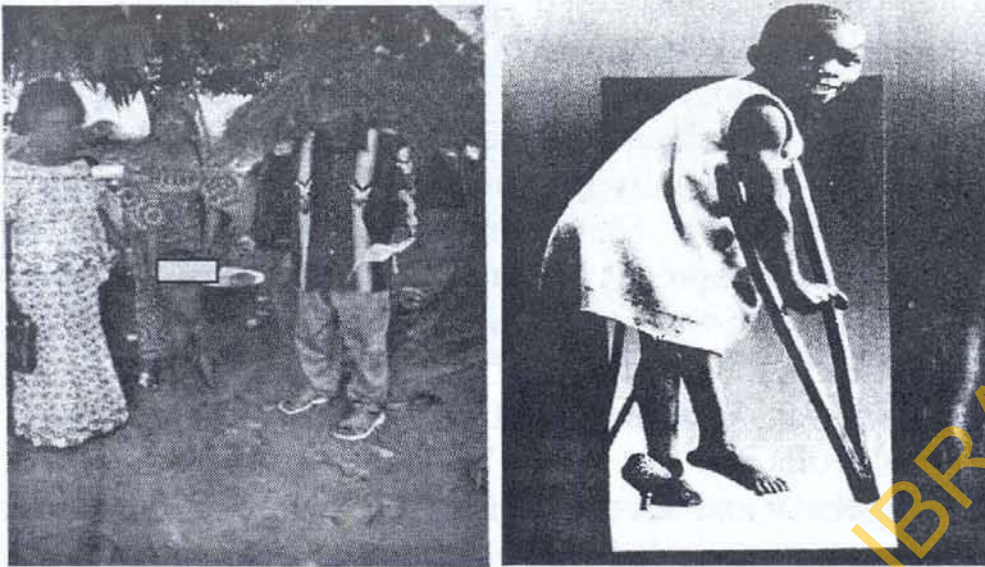


Fig. 28: Active case search to a child with poliomyelitis.

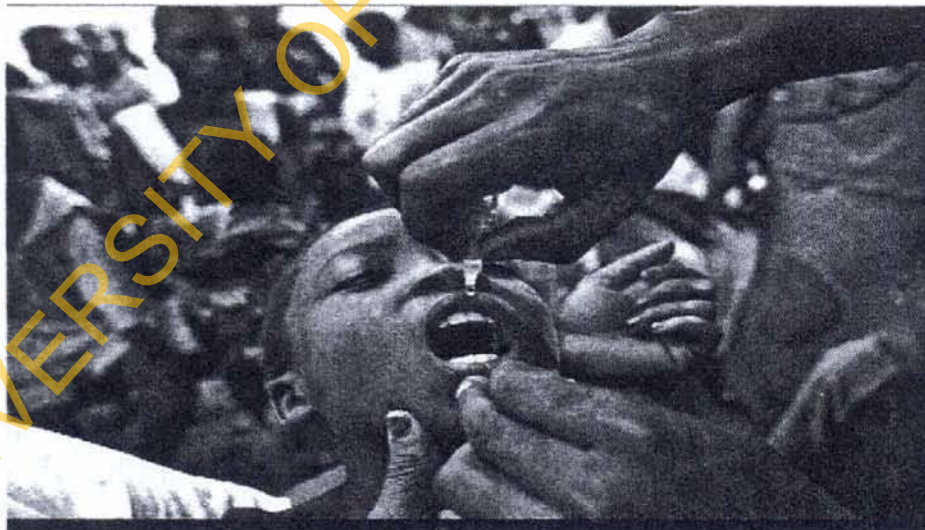
Mr. Vice-Chancellor, Sir, some of my polio eradication activities and progress in Nigeria during the period I was a consultant (State Coordinator and Surveillance Officer for Oyo State) with the WHO is highlighted below. During the period I headed the WHO team and implemented the 4 strategies to eradicate polio namely:

(1) *Routine Immunization* – We provided guidance and training for planning, implementation and monitoring routine immunization to drive national decisions in the state. The trainings empowered immunization managers and cold chain officers with the competencies to do their work. We facilitated routine immunization for polio prevention in infants and children throughout the state with trivalent OPV at fixed posts and/or outreaches. In addition to OPV, we facilitated uptake of all other vaccine preventable diseases (DPT- Diphtheria, Pertussis, Measles, TT- Tetanus, Yellow fever, Hepatitis B) for children in the state (NPHCDA 2014).

(2) *National Immunization Days* – Together with other members of the WHO state team, Dr. Funmilola Kolude, Mr. Leonard Ugheigele and Ms. Pelumi Adesanya, we provided technical guidance for the planning, implementing and reporting supplemental immunization activities (SIAs).

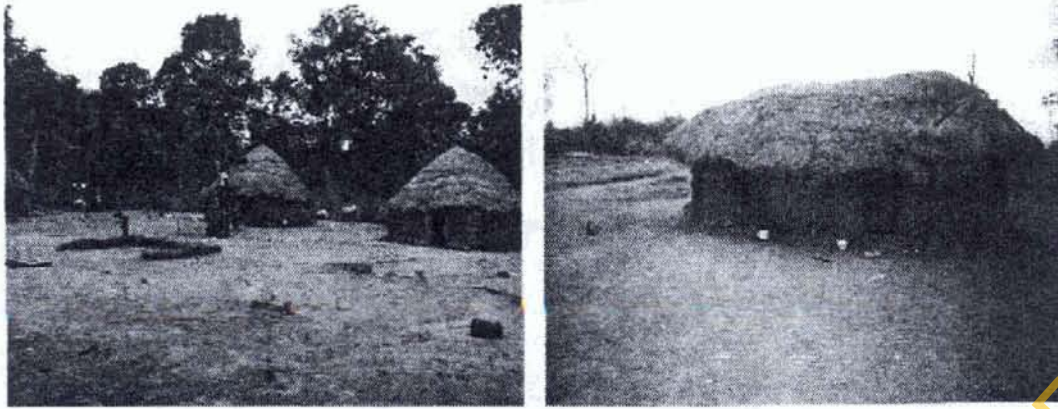


We implemented more than 20 SIAs popularly known as National Immunization Days (NIDs), to interrupt the circulation of poliovirus by giving 2 drops of OPV (fig. 29). The idea was to catch children less than five years of age who are either not or partially immunized, and to boost immunity in those who have been immunized (National Primary Healthcare Development Agency 2014; FMOH/NPHCDA 2015). To achieve this, we made repeated visits to different communities in the 33 LGAs of the state. Distant LGAs such as Iwajowa, Saki East and West, Irepo; hard to reach areas in Afijio, Oluyole and the Fulani's "Gaa's" in Okeogun were visited regularly and severally (fig. 30). Also, communities at international borders in Iwajowa, Itesiwaju, Atisbo and Saki West were reached in a bid to reach every child. In addition, to OPV, measles vaccine, Vitamin A and long lasting insecticide treated nets were sometimes distributed during the NIDS. Also, I was enlisted to support NIDS in Kano, Jigawa and Kebbi States during the period when there was refusal of the OPV in the northern part of Nigeria and also in Akwa Ibom State as an NID Consultant.



**Fig 29:** A child receiving OPV.



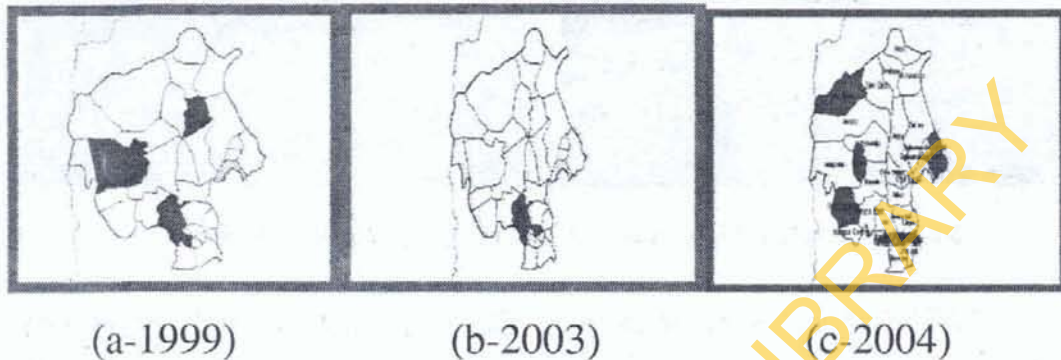


**Fig. 30:** Fulani Gaas visited in active search for AFP cases.

(3) *AFP/IDSR Surveillance* – During that period, I coordinated and implemented acute flaccid paralysis (AFP) surveillance activities with a focus to eradicate Polio. In conjunction with the LGA Disease Surveillance and Notification Officers (DSNOs), we conducted active search for AFP cases in health facilities and communities. Health facility records were reviewed, clinicians and community members were sensitised and home visits were made to examine AFP cases. Our surveillance results guided immunization activities and national policies on Polio eradication. The scope of our work was expanded to include Integrated Disease Surveillance and Response (IDSR) for 22 priority diseases and later again to 40. These activities enabled me to contribute to strengthening the surveillance system of the country. Working on AFP and SR provided me yet another opportunity to address **4 of the Ws** of descriptive epidemiology namely - **Who?, Where?, When? and What?**

(4) *MOP-ups* – We detected WPV in the state in 1999, 2003 and 2004, therefore it was imperative we mopped up these areas (fig. 31). This entailed door-to-door immunization around the radius of homes of cases where the virus is suspected to still be circulating and a cross sectional survey of residents of these homes to identify the “**Why?**” of the outbreak and to guide implementation of the appropriate public health action. We found incomplete immunization and

poor environmental sanitation as important factors contributing to occurrence of WPV and addressed these gaps by educating caregivers and community members.



**Fig. 31:** WPV status in Oyo State, 1999-2004.

*Source:* Fawole and Kolude 2004

### **Conclusion**

This lecture has highlighted some of my contributions to improve using the **5Ws** through research into locally endemic diseases (Malaria, STIs and HIV) and newly appreciated health events (Gender based violence) including investigating epidemics (Polio, Ebola, Cholera). The use of epidemiological methods and the **5Ws** has guided National policy (Polio eradication initiative, Disease surveillance), Programme management (STIs/HIV/Women empowerment), Disease control (Outbreak investigation); Research (project prioritization for students and faculty); Service Provision (Rural outreach clinic, immunization, active case search and community mop ups), and Training (Short and long term). Epidemiology has enabled me to contribute to Public Health in Nigeria and abroad. I have tried to employ my epidemiological skills to impact service provision, training and research in Nigeria and thus have tried to contribute to national development. I will continue to contribute my quota to this discipline so that the next generation of Epidemiologists can still be guided by the **5Ws - Who?, Where?, When?, What? and Why?** - for the control of public health events. For these are the Epidemiologists Quest!



## Recommendations

Mr. Vice-Chancellor, Sir, from my experiences, I humbly make the following recommendations:

- (1) There is the need to promote interdisciplinary research and collaboration across departments, faculties and sectors. Epidemiologists can also make invaluable contributions to studies, projects and programmes. Researches that include epidemiologists amongst other experts are more likely to obtain funding and to be accepted by high impact journals.
- (2) As the leading Epidemiology programme in Nigeria's higher institution, we need to train more epidemiologists for the country to enhance quantification of health events. Researchers, clinicians and programme managers need to acquire basic epidemiological skills to enable them have good practice and conduct good research. Training in epidemiology will promote robust study designs, guide appropriate response to public health action, shape policy decisions and evidence-clinical based practice. I use this as an opportunity to reiterate our humble request for more Epidemiologists in my Department! Sir we need more staff!
- (3) More community based studies/projects and implementation research are required to improve public health. Community oriented projects have the advantage of improving the health of large number of persons and quickly too.
- (4) Epidemiological methods can be used to address not only diseases but also public health events, therefore research into more contemporary health events of which we know very little about is recommended. Such events may include migrant health, substance abuse, alcohol abuse, gun violence, juvenile delinquency, even the social ill-community violence, religious fundamentalism (boko haram), kidnapping, suicidal tendencies - to mention a few.



## **Acknowledgements**

Mr. Vice-Chancellor, Sir, I cannot conclude this lecture without expressing my gratitude to the Almighty and also to other persons who helped me to get to where I am today. My greatest gratitude is to the Creator of all. Firstly, for life and then for all the opportunities that have come my way professionally and in other sphere of life. I remain eternally thankful.

I wish to thank my parents both of blessed memory, Professor Eric Akinniyi Lewis an Internal Medicine Physician (gastroenterologist) who believed I could study Medicine when I lacked the confidence in myself, then as a young secondary school student. He never pressured us about schooling but gently encouraged us. Unfortunately, he never lived long enough to know I was admitted into medical school. I also thank my mother Mrs. Taiwo Lewis (nee Tejuoso), a business woman, who was left alone with our upbringing, with the early demise of my father. The success of her children became her primary concern, her wish was to see us surpass her in life and she worked hard to make sure that we did not lack. Her support and care enabled us to get to where we are now.

Next, I thank my brother and sisters. My elder sister, Folasade Omobola, a Consultant Geriatrician in Birmingham; my brother Olumide Lewis a Lawyer and Information Technology Specialist with Santander in Milton Keynes; and younger sister, Tolulope Lewis-Tamoka a Lawyer who is the Regional Advisor for Africa with the UN, New York. They all supported me throughout my academic pursuits and watched out for my progress. My success was their joy. They always wanted me to join them, especially after our mother died. I also thank my in-laws, especially my brothers-in-law from the Fawole (Barrister Gbenga, Mr. Toye and Leye and Dr. Yinka Fawole) and Lewis families (Dr. I. Colince, Tamoka and Lola Lewis), for the peace and love they extend to me.

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I thank the Vice-Chancellor, Professor Idowu Olayinka for his concern and support over the years. I acknowledge all the Principal Officers of the University, especially my fellow Deans. I thank the past and present administrations of the College of Medicine, University of Ibadan – Professors I. Adewole, O. Omigbodun, A. Akinyinka and B. Salako and the current provost Professor Bunmi Olapade Olopa. Similarly I am indebted to Professor Ilesanmi for giving me the position of a honorary consultant and Professor Temitope Alonge for his support to our Department. The tireless effort of the Faculty Ceremonial committee is also acknowledged. I acknowledge the help from Mr. Ife Awoyelu, Mrs. Fadeyi, Mr. O. Aduroja, Drs. A.S. Adebowale, F. Oluwatosin, O. Akinyemi, A. Fatiregun, Professors B. Fasola, A.O. Fawole and O. Akande in the preparation and review of the manuscript. I thank my friends and all adherents of The Grail Message at the Grail Centre, Ibadan and Grail Movement, Nigeria. Particularly, Dr. & Mrs. C.O. Fatokun and the late Dr. O. Olutogun and his wife. Coming across the Grail Message has been the greatest blessing in my life and I remain eternally grateful to the Almighty for this Grace.

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was ahead, however this was never an issue, your concern was for me to be happy and successful. I thank you immensely for this. May The Good Lord continue to bless our home. Amen.

Mr. Vice-Chancellor, Sir, Ladies and Gentlemen, I thank you all for your kind attention. By His Grace your own day of success will also come and will meet us all in good health. Then we shall listen to the 5Ws of your experiences! May The Lord grant it. Amen.

Thank you one and all!

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## **BIODATA OF PROFESSOR OLUFUNMILAYO IBITOLA FAWOLE**

Professor Olufunmilayo Ibitola Fawole was born in Ibadan, into the family of late Professor Eric Akinniyi Lewis and late Mrs. Taiwo Ololade Erinade Lewis (nee Tejuoso). Her father, was an Internal Medicine Physician (Gastroenterologist). Her mother was a successful Business woman. She is the second of four children.

She started her early education at the Maryhill Convent School, Ibadan. She attended the Queen's School Ibadan, for her 'O' levels from 1974 to 1979 and passed with flying colours and proceeded to The International School, Ibadan for 'A' levels (1979-1981). On completion, she got admission into the University of Ibadan to study Medicine and graduated in 1987. She started the residency training in Community Medicine at the University College Hospital, Ibadan in 1990 and completed in 1996 as a Fellow of both the National (1995) and West African College of Physicians in Public Health (1996). She joined the staff of the Department of Preventive and Social Medicine, University of Ibadan, Nigeria in 1996 as a Lecturer I. She was promoted to Senior lecturer in 1999, Reader in 2003 and Professor in 2009. She also attended The University of Witwatersrand, Johannesburg, South Africa and obtained a Master of Science degree in Epidemiology and Biostatistics. Also, she has a Fellowship in Medical Education from the FAIMER Institute in South Africa and Certificates in Clinical Epidemiology from University of Pretoria, South Africa and Case Study Development from Emory, Atlanta, USA. She is an Honorary Consultant to the University College Hospital, Ibadan.

Professor Fawole is the Dean of the Faculty of Public Health (2016 till date). She was the immediate past Head of Department of Epidemiology and Medical Statistics, College of Medicine, Ibadan, Nigeria (2014-2016). She was the Head of the Epidemiology unit for many years. She was the last Head (Acting) of the then Department of Epidemiology,



Medical Statistics and Environmental Health (EMSEH) (2010-2012). During this time she initiated and obtained National Universities Commission approval for the creation of two Departments Epidemiology and Medical Statistics (EMS) and Environmental Health Sciences (EHS). Under her leadership, a new programme the M.Sc in Clinical Epidemiology was developed. From her collaborations, she identified the Aladura village which was developed into the Department's Rural Outreach Clinic with support from the Joseph Ijaola Memorial Foundation. She was a member of the University of Ibadan/University College Hospital Ethics Review Committee from 2007-2012.

Professor Fawole has taught 20 batches of medical students. She taught and supervised postgraduate students from different Faculties in UI and other Universities in Africa. She has supervised to completion 145 Masters students, 2 PhDs and 8 Fellows of the West African Post Graduate Medical College in Public Health. She serves as external examiner to a number of Universities including: The Universities of Malawi, Malawi and Kwa-Zulu Natal, South Africa, The West Africa and National Postgraduate Medical Colleges in Public Health; Obafemi Awolowo University, Ile Ife; Lagos State College of Medicine, Lagos; Ahmadu Bello University, Zaria; Olabisi Onabanjo University, Ago-Iwoye; The Ladoke Akintola University of Technology, Osogbo and The Osun State University, Osogbo.

Professor Fawole is an avid researcher of international repute. Most of her works are focused on prevention of Gender Based Violence, STIs/HIV/AIDS and Malaria Prevention. She is a recipient of several awards, including the University of Ibadan Senate Research Grant, Witwatersrand Postgraduate Merit Scholarship, University of Kwa-Zulu Natal Research Award, ACSI-CCCD, UNIFEM/UN women, British Council-Department for International Development, World AIDS Foundation, Union for Africa Population Studies, International Agency for Research on Cancer, and WHO (HRP, TDR and MIM). Presently she has over 120

publications in peer reviewed journals. She is Reviewer to several international journals and Associate Editor to some others.

Outside the University, Professor Fawole worked with the WHO as a National Surveillance Officer and State Coordinator for Oyo State. Hence, she has several years of experience working on disease surveillance, immunization activities and outbreak investigation. In 2013/14, she went on sabbatical to the African Field Epidemiology Network (AFENET) as Academic Coordinator and on her return served as the University's Focal Person to the Programme. She still actively supports the programme. She provides technical expertise to the Federal Ministry of Health (FMoH). She serves as a Consultant to UN Women, Women Health and Action Research centre (WHARC), including the Nigeria Centers for Disease Control (NCDC). She is member of several national and international organizations including Nigerian Medical Association, National Association of Public Health Physicians, Towards Unity for Health, Association of School of Public Health and AFENET/TEPHINET. She is married to Adeniran Olubukola Fawole and they are blessed with two grown children – Ayodamope and Bolutife.



## NATIONAL ANTHEM

Arise, O compatriots  
Nigeria's call obey  
To serve our fatherland  
With love and strength and faith  
The labour of our heroes' past  
Shall never be in vain  
To serve with heart and might  
One nation bound in freedom  
Peace and unity

O God of creation  
Direct our noble cause  
Guide thou our leaders right  
Help our youths the truth to know  
In love and honesty to grow  
And living just and true  
Great lofty heights attain  
To build a nation where peace  
And justice shall reign

## UNIVERSITY OF IBADAN ANTHEM

Unibadan, fountainhead  
Of true learning, deep and sound  
Soothing spring for all who thirst  
Bounds of knowledge to advance  
Pledge to serve our cherished goals!  
Self-reliance, unity  
That our nation may with pride  
Help to build a world that is truly free

Unibadan, first and best  
Raise true minds for a noble cause  
Social justice, equal chance  
Greatness won with honest toil  
Guide our people this to know  
Wisdom's best to service turned  
Help enshrine the right to learn  
For a mind that knows is a mind that's free

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