EFFECT OF EDUCATION ON KNOWLEDGE OF ACUTE FLACCID PARALYSIS REPORTING AMONG PRIVATE MEDICAL DOCTORS IN ONDO STATE, NIGERIA

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MATRIC 140449

JANUARY, 2014

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(MATRIC NO: 140449)

MBBS (IL)

A DISSERTATION SUBMITTED TO THE DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS (EMS), UNIVERSITY OF IBADAN, IBADAN IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS OF PUBLIC HEALTH IN FIELD EPIDEMIOLOGY

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JANUARY, 2014

DEDICATION

This dissertation is dedicated to God Almighty, who has granted me the grace to complete this programme. I give him all the glory.

CERTIFICATION

I certify that this work was carried out by Aladeniyi Isaac Olugbenga in the Department of Epidemiology and Medical Statistics, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan, Nigeria.

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ABSTRACT

Acute Flaccid Paralysis (AFP) surveillance system in Nigeria remains largely dependent on reporting from public health facilities while other potential reporting sources such as private medical facilities are neglected. An understanding of the knowledge and practice gaps on AFP surveillance among private medical doctors is essential to the design of programmes to enhance their involvement. This study therefore investigated the effect of education on knowledge of acute flaccid paralysis reporting among private medical doctors in Ondo State.

This study was conducted in two stages. Stage one was a cross sectional survey, which involved the use of a semi-structured questionnaire. Eighty-two private medical practitioners who consented out of the 112 available were interviewed. The questionnaire, which contained WHO surveillance criteria, was used to obtain baseline information. Stage two was a pre and post test design, where respondents were divided into four groups based on their specific locations. A one-day training was conducted on AFP surveillance and reporting, using WHO reference standard, with a ten point knowledge scale. Good knowledge score was categorised as a score $\geq$5. Data were analysed using descriptive statistics and student *t-test* at 5% level of significance.

The mean age of respondents was 43.0 $\pm$ 6.3years and they were predominantly male (82.9%). Majority (73.8%) of respondents were MBBS graduates while 20.0% had fellowship as additional qualification. Only 25.6% of respondents had ever reported AFP cases. Identified constraints to reporting included inadequate logistics support (90.2%), poor supervision by local government area officers (100.0%), lack of involvement of private medical doctors in surveillance trainings and activities (85.4%), and lack of request for feedback from government agency (91.5%). However, there was a general willingness to report if provided with the necessary logistics (100.0%). After the training, knowledge improved significantly from pre-test score of 6.97 $\pm$ 0.09 to post-test value of 9.8 $\pm$ 0.01. At pre-test only 15.9% had the correct knowledge of AFP case definition compared to 95.0% at post-test. The proportion of respondents who had ever seen an AFP form improved from 37.8% to 97.5% post intervention. Respondents who knew local government as the appropriate notification authority increased from 73.2% to 91.7% post intervention. Knowledge of stool as the specimen to be collected in AFP cases increased from 86.6% at pre-test to 96.3%. Also, respondents with knowledge of ice

packs as the storage and transportation requirement for specimens increased from 70.7% at baseline to 98.8%.

Education through training improved knowledge of acute flaccid paralysis reporting among private medical doctors. Therefore, training and provision of necessary logistic support may translate into improvement of acute flaccid paralysis reporting cases among private medical doctors.

Keywords: Acute flaccid paralysis, Disease notification, Private medical doctors
Word count: 432

ACKNOWLEDGEMENT

My profound gratitude goes to God Almighty who has made it possible for me to complete this programme despite all odds.

I am indebted to an amazing, God fearing and virtuous woman, Dr. Mrs Ikeoluwapo Ajayi, Acting Head of Department of Epidemiology and Medical Statistics. Her believe in us has made this difference. She has succeeded in enhancing our destiny. I am forever grateful.

I will like to express deep appreciation to my Supervisor, Dr. Magbagbeola David Dairo for his mentorship in the course of this programme, I appreciate his personal sacrifices and advices at various stage of my project. I am profoundly grateful.

Dr. Matthew Onoja Akpa, although my teacher but has been more like my brother, surely, there is a friend that is worth more than a brother. I cannot quantify your passion for my success.

I most humbly appreciate the role and contribution of Dr. Oyewole, who devoted his time and energy to ensure that this work is worth the while. I am deeply grateful.

I also wish to acknowledge the fatherly role of Prof. Olorunnisola, Dean, Postgraduate school, University of Ibadan, a man whose humility commands obedience, graceful in words and character. Thank you Sir.

My gratitude also goes to Dr. Fatiregun, whose work in disease surveillance has been of immense help to me in the course of this project. I also appreciate your firmness on some couple of issues. They were indeed helpful.

I humbly appreciate the profound support given me by Dr. Olola Akintimehin, the then Chief Medical Director, State Specialist Hospital, Ondo and my former, Head of Department and now the Chief Medical Director, State Specialist Hospital, Ondo, Dr. Adiji.

I am eternally grateful to my Uncle, Dr. Baderinwa Lawal Omoloja, who gave me all the necessary encouragement to enrol for this programme and to complete it too. Thank you Sir..

My great mother, I will continue to ever revere you for your love and support even in the absence of my dear late father and friend.

Finally, I am eternally grateful to my best friend and wife, Olayemi Rhoda Aladeniyi. You are a virtuous woman. I acknowledge the support and understanding of my Children, Ayomide, Oluwa feranmi and Ikeoluwapo Aladeniyi.

Isaac Olugbenga Aladeniyi

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LIST OF ACRONYMS

AFP – Acute Flaccid Paralysis

AGPMPN – Association of General and Private Medical Practitioners of NIgeria

CDC – Centre for Disease Control

DSN - Disease Surveillance & Notification

ERC- Expert Review Committee

FMOH – Federal Ministry of Health

GPEI – Global Polio Eradication Initiative

GPLN – Global Polio Laboratory Network

HIV – Human immunodeficiency Virus

IDSP – Integrated Disease Surveillance Programme

IDSR – Integrated Disease Surveillance & Response

IGA - Immunoglobulin A

IPD - Immunization Plus Days

LCD – Liquid Crystal Display

LGA – Local Government Area

LID - Local Immunisation days

MDGs – Millennium Development Goals

MEPB – Ministry of Economic Planning and Budget

MNCH- Maternal New born and Child Health

MMWR - Mortality and Morbidity Weekly Report

NBS – National Bureau of Statistics

NHMIS – National Health Management Information System

NPAFP – Non- Polio Acute Flaccid Paralysis

ODSMOH – Ondo State Ministry of Health

OPV – Oral Polio Vaccine

PPHI – People's Primary Healthcare Initiative

RNA – Ribonucleic Acid

SID – Supplemental Immunization days

Unicef - United nation Children's Fund

VAPP – Vaccine Associated Paralytic Poliomyelitis

WHA – World Health Assembly

WHO – World Health Organization

WHO-AFRO – World Health Organization, African Regional Office

WPV – Wild Polio Virus

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CHAPTER ONE

INTRODUCTION

1.1 Background

Surveillance for various specific diseases and toxic agents have become an established feature of public health system especially in effective and efficient monitoring and evaluation of communicable diseases and the impact of interventions. (Beate, et al., 2005; Veenema & Toke, 2006; Sahal, Reintjes and Ira, 2009). Disease surveillance is critically important, especially in developing countries where 90% of the world's disease burden are found and of which communicable diseases contribute the most (Lown and Banerjee, 2006). In 1998, the World Health Organization, Africa Region (WHO AFRO) member countries adopted the Integrated Disease Surveillance and Response (IDSR) as a strategy to improve the availability and use of surveillance and laboratory data for control of priority diseases that are the leading causes of death, disability and illness in the African region.

Poliomyelitis, an acute viral communicable disease was found all over the world prior to the vaccination era (WHO, 1999). However, the discovery of polio vaccine in 1954 and it's subsequent introduction in 1963, has helped to eliminate the disease in most countries of the world (Parks, 2005 and Adu et al 2005). In 1988 the World Health Assembly (WHA) resolved to eradicate poliomyelitis globally (Parks 2005) and in 15 years of implementing this resolution, the number of polio endemic countries reduced drastically from over 125 countries to only 6. Countries in which polio remained endemic then included: Afghanistan, Egypt, India, Niger, Nigeria and Pakistan (Durrheim, Massey and Kelly, 2006 and Parks 2005).

In 2006, the World Health Organization reclassified Egypt and Niger as no longer polio endemic because the wild polioviruses isolated in both countries were found to be imported. (Durrheim et al, 2006; CDC 2006).

The implementation of the World Health Organization strategies on polio eradication recorded huge successes across the globe with phenomenal reduction in the number of paralytic poliomyelitis from 350,000 cases in 1988 to less than 1,000 in year 2001. These 1000 cases were reported only in 15 countries globally and Nigeria accounted for 202 of these paralytic polio cases for that year (Adu et al 2005). In 2003, 217 confirmed cases of wild polio were reported in Nigeria (Adu et al 2005) thus, making Nigeria accountable for 94% of total wild poliovirus in Africa and 45% global prevalence (WHO 2003). In September 2008, Nigeria accounted for 85% of Type 1 wild poliovirus cases, 10% of type 3 and reserves 91 % of Africa Wild poliovirus burden (WHO, 2008). Consequent upon the foregoing, Nigeria automatically became a reservoir for local transmission within Africa and a global exporter of wild polioviruses, especially to hitherto polio free countries, thereby, threatening the attainment of global interruption of wild poliovirus transmission (Durrheim et al; 2003, WHO; 2003, Jenkin et al; 2008).

The success recorded by the Global Polio Eradication Initiative (GPEI) suffered significant set back in Nigeria in 2003, when one State in the Northwest of Nigeria, temporally suspended Immunization, which led to a national epidemic of Poliomyelitis and re infection of at least 20 previously wild-type poliovirus free countries. Although immunization was recommenced later in the following year, the initial momentum of successes recorded has not yet been regained (Durrheim et al 2006; Jenkins, Hayward et al 2008,).

Till date, Nigeria accounts for 61.9% global burden of wild polioviruses, which are predominantly, the type 1 strain. This strain has been implicated in most of the continuing outbreaks of cases of paralytic Poliomyelitis in Nigeria, specifically in Northern Nigeria, where Katsina state, accounts for 40% (GPEI, 2012).

Poliomyelitis was reported to be the commonest cause of Acute flaccid paralysis for children less than 15 years (Fatunde and Familusi 2001) though the study by Talhatu and Temiloluwa indicated that acute flaccid paralysis from poliomyelitis comes second after traumatic sciatic nerve injury. Others causes implicated are non - polio enteroviruses e.g coxsackie, Echoviruses, Mump viruses, Adenoviruses and the Coxsackie's B virus infection.

Medical conditions that are differential diagnosis of acute flaccid paralysis are said to differ by geographic locations in Nigeria. Talhatu and Temiloluwa ranked in order of precedence, the causes of acute flaccid paralysis in south west to be traumatic sciatic nerve injury, Poliomyelitis, Acute polyneuritis, neuropathies, Gullaine barre syndrome and transverse myletilies. (Talhatu K, Temiloluwa O,2006; WHO 2008).

Ondo State is one of the Southwest states of Nigeria with population of 4,142,000 people, 40% of whom are urban dwellers while the remaining 60% are rural residents. The state has 798 health facilities. There are 452 (56.0%) public health facilities in the State while 346 (43.4%) are private health facilities. There are 129(37.3%) duly registered private medical practitioners out of the 346 private health facilities in the state while the 63.7% are owned by nurses/ Midwives. Four hundred and eighteen (418) of the government health facilities are primary healthcare

centres managed by Community health Extension Workers (CHEW), Community Health Officers (CHO) and nurse/midwives.

1.2 Justification for Study

Reports of continued outbreaks of paralytic poliomyelitis in some parts of Nigeria indicate that the wild poliovirus has not yet been completely subdued. More importantly, that Nigeria is currently leading the pack of three nations of the world that has remained persistently endemic in Wild poliovirus epidemiology (GPEI, 2012). The exit of India from the WPV endemic nations, with whom we share similar lot of health determinant factors, means it is also possible for Nigeria to exit this group perhaps by looking at and adapting the methods that India had used.

Most States in the Nigeria have remained polio free for at least 4years now except the Northwest and North east zone, where even now about one third of children are still being missed for polio vaccination (GPEI, 2012). This poses a great challenge both to the states that have attained polio free status within the country and the border countries, which have commonly, suffered from exportation of the virus from Nigeria. Also, very important is the consideration that there is a funding gap of $128million out of $272million that is required to sustain and continue the fight against polio in Nigeria. If eradication is not achieved soon, the program may begin to experience donors' fatigue, which will definitely jeopardize the gains achieved so far made (GPEI, 2011; Cooke & Tahir, 2012).

The experience of India, with the integrated disease surveillance project, in partnership with National Polio surveillance project in Karnataka, Bangalore, in which private medical practitioners were fully integrated into the immunization scheme project, may be a strategy that could help us to accelerate poliomyelitis vaccine coverage and also expand our network of search for missed cases of AFP (Sathyanarayana, 2005).

The last reported case of acute flaccid Paralysis from Wild poliovirus in Ondo State, was in 2008 at Ilaje Local government area, which was confirmed at the National Laboratory Ibadan (Ondo SMOH, 2008, WHO, 2008). The State wide coverage for oral polio vaccine for 2012 was 84% (WHO, 2012) and a total of 77 acute flaccid paralyses were reported as at the month of September, 2012, none of it was from a wild polio virus. There are 133 surveillance and reporting sites in Ondo State and all the sites are located in government health facilities. Out of all the 346 private health facility in the state only one private health facility (0.20029%) send report to the State Ministry of Health (SMOH) frequently (ODSMOH; 2008).

This great disparity in acute flaccid paralysis and other infectious disease reporting between the public and private health facilities in Ondo State called for concern and may affect the validity and sensitivity of our disease surveillance and notification system. The volume of patronage of private hospitals by the populace further underscores their importance to attaining the goal of polio eradication in Nigeria. Anecdotal evidence shows that they may be the second line reference point for most rural patients after the traditional health providers.

Ondo state is a critical gateway to both the north and south of Nigeria. A lot of commerce that aggregates people of different age group especially from the North makes the state a rendezvous for possible transmission of wild poliovirus, especially in places like, Akure, Ikare, Ogbese and at Ore town. Identification of gaps that may affect the effectiveness of our immunization coverage and disease surveillance and reporting is imperative. (ODSMOH, 2012)

One of the criteria for declaring a country free of poliomyelitis is a surveillance performance that provides 1 case of AFP per year per 100,000 populations aged less than 15years. Active involvement of private medical doctors in surveillance may help to accelerate the eradication of poliomyelitis from the country.

There are records that only one private health facility in Ondo State gets actively involved in surveillance and reporting of diseases. Anecdotal evidence show that residents of rural communities are more likely to seek care from traditional healthcare set up and private healthcare facilities for their health needs than come to public health centres because of manpower and logistic problems in government owned health facilities. (ODSMOH, 2008)

1.3 Importance of the Study

There are 774 hard to reach settlements in the state with some being isolated by virtue of their difficult terrains. The populations in these settlements are commonly missed out on immunization campaigns because health workers sometimes find it difficult to reach them especially during raining seasons and because some of the communities are on water.

Private health facilities are located in some of these hard to reach settlements and statutorily, they should participate in Disease intelligence and reporting however, that has not been the case as data harvesting has always been from public health facilities mostly. It is therefore important to attempt to identify possible factors that may have been responsibility for the apathy of private medical facilities towards disease surveillance and reporting since these private health facilities could give additional 40% spread to coverage in both Immunizations and disease reporting (ODSMOH, 2012)

It is apparent that reporting from public health facilities are just tips of the icerberg (Lucas and Gilles 2003). Field reports from DSN officers at the local surveillance sites, indicated that, cases of acute flaccid paralysis in the rural setting were more likely to be seen by the traditional healers (called by various names such as *elewe omo, arogun, babalawo etc),* the tradition bone setter or the local private clinics especially in most areas where government health facilities are either not present or are dilapidated and in some cases, where there are no health workers to manage the facilities (Okitipupa L.G. PHC Office WHO, 2010).

The benefits of involving the private health sector in disease surveillance were emphasized in the work of Durrheim and Harris et al (2001). They conducted a before and after intervention study for hospital based infection control nurses in all of the 32 public (*upumalangas*) and private hospitals in South Africa and concluded that there was statistically significant improvement in timelines of outbreak detection especially in cholera cases and in the detection of acute flaccid paralysis.

Therefore, identification of challenges and constraints to participation of the private health care providers in disease surveillance and reporting may be important to facilitating decisions and

policy formulation that will include the private medical doctors and other stakeholder in health, in disease surveillance and reporting. The benefit may result in improvement in our disease surveillance sensitivity as well as the completeness in reporting of the surveillance system.

The outcome of this study would be used to facilitate advocacy to decision and policy makers to provide an enabling environment that will persuade and encourage the Private medical doctors, traditional bone setters, elewe omo's and others to join in AFP surveillance and reporting (WHO, 2002).

1.4 Research Questions

1. What is the level of knowledge of private medical doctors about acute flaccid paralysis surveillance and reporting?
2. How has the training on acute flaccid paralysis surveillance and reporting been able to raise the knowledge of private medical doctors on acute flaccid paralysis reporting?
3. What are the constraints to reporting of AFP cases among private medical doctors?

1.5 Broad Objectives

To determine the effect of education through training on the knowledge of AFP surveillance and reporting among private medical doctors in Ondo State, Nigeria

1.6 Specific Objectives

To assess the baseline knowledge of AFP surveillance and reporting among private medical doctors in Ondo State;

To determine the effect of educational intervention through training on the knowledge of AFP surveillance and reporting among private medical doctors;

To identify constraints to acute flaccid paralysis surveillance and reporting among private medical doctors.

CHAPTER TWO

LITERATURE REVIEW

Poliomyelitis (also called infantile paralysis), is a highly infectious viral disease that commonly affects children and in its acute forms cause inflammation of motor neurons of the spinal cord and brainstem, leading to paralysis, muscular atrophy, and often deformity. Poliomyelitis, although, a disease of antiquity, was first recognized as a distinct disease condition by Jakob Heine in 1840 and the causative virus isolated in 1909 by Karl Landsteiner and Erwin Popper. The disease began to gain public health significance following epidemic outbreaks in Europe in the late 19th and 20th century (WHO, 2010). The significance of the disease on a global scale is not so much for its mortality rate but for its ability to cause permanent deformity and disability and at a point prior to the onset of global polio eradication initiative, poliomyelitis was implicated as the most important cause of physical disability worldwide (Osowole and Obute, 2005). A very important characteristic of Poliomyelitis is the fact that it exists worldwide except where it has been eradicated. It continues to remain endemic in some countries of world namely India, Afghanistan, Pakistan and Nigeria. However, India appear to be exiting the list with current WHO reports (GPEI, 2012; Daniel and Robbins, 1999;).

2.10. The Biology and Dynamics of Poliomyelitis

2.11 Causative Agent

Poliovirus, the causative agent of poliomyelitis, is a human enterovirus and member of the family of Picornaviridae virus. It is composed of an RNA genome and a protein capsid. The genome is a single-stranded positive-sense RNA genome (i.e the genome enclosed within the

viral particle can be used as messenger RNA, which is immediately translatable to protein by the host cell). This has ability to hijack host cell translation machinery and cause inhibition of cellular protein synthesis in favour of virus–specific protein production. Thus, a single host cell may turn out as much as 10,000 virions on lysis. The virus gains entry into the host cell by endocytosis via an immunoglobulin like receptor, CD155 also known as the poliovirus receptor (PVR) on the cell surface. The CD155 is found only on the cells of humans, higher primates, and Old World monkeys. However, the virus does not naturally infect any other species besides humans. Therefore, Humans remain the single most important reservoir of the virus (Mueller, *et al.* (2003); Yin-Murphy and Almond (1996)).

The Poliovirus has three serotypes, which are poliovirus type 1 (Brunhilde), type 2 (Lansing) and type 3 (Leon), each with a slightly different capsid protein. These Capsid proteins define their cellular receptor specificity and viral antigenicity. The virus grows well in tissue culture and resists desiccation. They are killed at a temperature of sixty degree centigrade and inactivated by chlorine; formaldehyde and UV light (Fatiregun, 2006). All the three serotypes has ability to cause paralysis, although type 1 is implicated as the most frequent cause of paralysis and epidemic outbreaks, type 3 is less frequent, and type 2 rarely, in fact, it was thought to have been eradicated in 1999 until an outbreak was reported in Nigeria in 2006. In 2009, one hundred and twenty-six (126) cases of paralytic polio from type 2 were reported in Nigeria (Robert, L. 2009) The re-emergence of the type 2 virus was traced to it's presence in the trivalent OPV which had been administered until 2003 when some part of Nigeria suspended vaccination though it was assumed to have been eradicated but it was all the while circulating in humans. Type 2 and 3 are known to be causes of paralysis associated with OPV.

However, the probability of occurrence of vaccine associated paralytic poliomyelitis (VAPP) is one in 3 million doses of OPV with the greatest risk being associated with the first dose (Robert, 2009; WHO, 2005; Lucas and Gilles, 2003)).

2.12 Transmission

The poliovirus like other enteroviruses has the alimentary tract as its portal of entry and exit. Hence, transmission occurs predominantly through the faeco-oral route especially, where sanitation and hygiene are poor. This mode of transmission is common in the tropics and in polio endemic regions in Asia (India, Pakistan and Afghanistan), where an average preschool child would have developed antibodies against at least one of the strains of the virus (Lucas and Gilles, 2003; Parks 2005). Other means of transmission include; oropharyngeal and nasopharyngeal routes, which are the common route in areas with good sanitation and hygiene and rarely by foodstuffs contaminated by faeces (Racaniello, 2006; Lucas and Gilles, 2003; Parks, 2005).

Importantly, the virus ability to survive the hostile strongly acidic environment of gastrointestinal tract helps it to avoid invasion by the body defence cells while it establishes itself via the intestinal lymphatic (Maramorosch & Frederick, 2010; Fatiregun, 2006.).

The incubation period from exposure to the virus until the onset of symptoms is 5- 35days with average range of 7 – 14 days.

However, it continues to be excreted in the stool for 6 to 8 weeks. Infected persons are most infectious during the first seven days before and after the onset of symptoms while the virus is able to survive for another 2 –11 day in the sewage in a warm climate and spread of infection through sewage can only occur during this period (Racaniello, 2006)

Epidemiological evidence suggests that the most important factor in the incidence of poliomyelitis is the host immunity status. Infants born to mothers with antibodies are passively protected naturally against paralytic disease for about six months while active immunity is acquired via infection by the wild virus or through vaccination (especially OPV). Paralytic outcome of infections with polioviruses can be potentiated by factors such as exercise, pregnancy, dental extractions, intramuscular injections and tonsillectomy (bulbar polio). Susceptibility is also higher among patients who are immune-compromised, such as those with Human Immunodeficiency Virus (HIV) infection, B-cell dysfunction, immunoglobulin A (IGA) deficiency, or severe combined immunodeficiency when exposed to both wild-type polioviruses and vaccine-attenuated viruses present in the oral poliovirus vaccine.(Estrada, 2009;Lucas & Gilles. 2005).

2.13 Clinical Features

The Clinical presentations of poliomyelitis infection have remained the same as recorded by different authors. They are variable and depend on the severity of infections (Orbison, 1912; Lucas and Gilles, 2007; Fatiregun, 2006; Estrada B et al, 2012). Commonly, presentations are:

Asymptomatic or non-apparent (90 -95%) infected persons without symptoms shed virus in the stool and are able to transmit the virus to others.

Minor illness (4 –8%): This is also called “Abortive poliomyelitis”. Presentations in this category consist of minor, nonspecific illnesses without clinical or laboratory evidence of central nervous system invasion and is characterised by complete recovery in less than a week. Three syndromes are observed under this form of poliovirus infection: Upper respiratory tract infection

(Oropharyngeal hyperaemia, sore throat, fever); Gastrointestinal disturbances(nausea vomiting, abdominal pain, diarrhoea); Influenza-like symptoms, these symptoms are indistinguishable from other viral illnesses (Atkinson, 2007; Fauci, 2008; Estrada,2012)

Non-paralytic aseptic meningitis (1-2%): May present with symptoms such as Nuchal rigidity, severe headache, back and lower extremity pain. It may last 2-10 days, and it's followed by complete recovery (Atkinson, 2007; Fauci, 2008; Estrada, 2012).

Paralytic poliomyelitis (0.1-0.5%): Presentations in these groups are also variable depending on the area of pathology. The paralysis affects motor neurons only and does not involve sensory or cognitive functions.

Many persons with paralytic poliomyelitis recover completely and, in most, muscle function returns to some degree. Weakness or paralysis that persists beyond 12 months after onset is usually permanent.

Types of paralytic poliomyelitis include: Spinal poliomyelitis (79%), which is the most common of paralytic cases. The anterior horn cells of the spinal column are destroyed and thus resulting in muscle weakness and paralysis.

It is characterised by asymmetric paralysis that most often involves the legs. However, any of the limbs or even the four limbs may be affected. Bulbar polio, another type of paralytic polio, leads to weakness of muscles innervated by cranial nerves and accounted for 2% of cases during this period; bulbospinal polio, a combination of bulbar and spinal paralysis, accounted for 19% of paralytic polio cases.

The death-to-case ratio for paralytic polio is generally 2%–5% among children and up to 15%–30% for adults (depending on age). It increases to 25%–75% with bulbar involvement commonly in the adult population (PPHI, 2009).

2.14 Management

The clinical management of the disease is essentially conservative as there is no known cure for now and the most important form of treatment of the disease is prevention (Estrada; 2012).

The care of patients is multidisciplinary involving the pulmonologist, neurologist, paediatrician, physiotherapist, Nurses, public health experts, Infectious disease specialists, Immunologist, Orthopaedic surgeon etc. (Estrada; 2009, Russel; 1959, Sanofi Pasteur;2007).

Clinical care, essentially include: Analgesia, which are indicated in cases of muscular pains or headache, and are also common in post polio syndrome; Mechanical ventilation, may be required in patients with bulbar paralysis; Physiotherapy may be of help especially for patients experiencing some recovery while permanent disability case may benefit to avoid complication of muscular disuse; Frequent ambulation of paralytic patients may be required to avoid development of chronic decubitus ulcerations; Faecal impaction is a frequent occurrence in cases of paralytic disease and can be treated with laxatives as soon as it develops;

Total hip arthroplasty is a surgical therapeutic option for patients with paralytic sequelae of poliomyelitis, who develop hip dysplasia and degenerative disease (Estrada; 2012, Russel;1959, Sanofi Pasteur; 2007).

2.15 Complications of Poliomyelitis

Complications associated with paralytic poliomyelitis are: Aspiration pneumonia, cor-pulmonale, impaired movement, paralytic ileus (loss of intestinal function), permanent muscle paralysis, disability, deformity, pulmonary oedema, shock, and urinary tract infections, post-polio syndrome, which is a complication that develops in some patients, usually 30 or more years after their initial infection. Weakness may get worse in muscles that were previously weakened.

Weakness may also develop in muscles that previously were thought not to be affected (Hoyt, William Graves; Miller, et al; 2005, Sanofi Pasteur; 2007)

2.16 Implications of Poliomyelitis

The implications of paralytic poliomyelitis transcends physical disability or deformity, it carries some social, psychological and economic implications, not just to the victim and the immediate relatives but to the nation and the international community at large.

This disease is known to have caused disability in about 20 million people worldwide as at 2001(post polio health, 2002). The economic implication for preventing 1.1million cases of paralytic polio and 160,000 deaths globally is about $1.7billion annually (Thompson, Tebbens; 2010 WHO, 2005). Although, the eradication of polio is really at hand, with over 99% reduction in the incidence of the disease yet a sum of $1.26 billion is required to finance Wild poliovirus interruption between 2009-2013 by the GPEI (Fatiregun, 2006; Thompson, Tebbens, 2010; WHO, 2005; GPEI, 2009).

If interruption is not achieved by 2013, for example in Nigeria, additional $143 million would be required annually to conduct polio campaign (GPEI, 2009). Therefore, eradication of the disease will make resources currently being expended on the control programme to be available for meeting other important global health needs.

Social implications of this disease for those in the developing countries may not be very encouraging. Social discrimination & deprivation is not uncommon. Therefore, getting jobs may pose challenge for victims of the disease except they acquire some vocational skills for subsistence, although, this significantly contrast happenings in developed world (Farbu, & Gillus, 2002).

Poverty may worsen among the families owing to the fact that access to health care is financed almost exclusively on out of pocket basis. Children who suffer disability may have limited access to good education because of social stigma.

The dependence on family members may result in loss of productivity, which would have been contributed by the victim of the disease as well as on the part of the guardian (FMOH; 2006). Persons living with disability from polio may experience depression as psychological sequealae to post polio syndrome.

2.20 Global Epidemiology and Polio Control Programme

2.21 Control Programme

The WHO drawing from the success of the smallpox eradication initiative between 1967 and 1977 when the last case was reported, initiated the Global polio eradication initiatives in 1988 with the goal to ensure that no child will ever again be paralysed by either a wild or vaccine-derived poliovirus by the year 2000. Although, the target date has been reviewed thrice, first 2005 then 2008 and currently set at 2013, the strategy has recorded enormous success in that well over 99% of the disease worldwide is now controlled (Fatiregun; 2006; GPEI, 2008; Jennifer & Farha, 2012).

The global polio eradication initiative based on the knowledge of the disease process, the availability of vaccine to prevent the transmissions and identification of the weak link (man being the only reservoir) adopted vaccination and surveillance as key strategies to eradication of the disease; Given the high proportion of asymptomatic infections (95% of all infections) it is almost impracticable to find the source of a case. The detection of even one case of polio indicates that transmission of wild polioviruses is occurring in the community.

The surveillance of all cases of acute flaccid paralysis occurring in children aged <15 years will identify the areas with continuing transmission of poliovirus and help in targeting interventions (MMWR, 2005; Estrada, 2012, Fatiregun, 2006)

The oral poliomyelitis vaccine (OPV) contains live attenuated polioviruses. The vaccine, administered orally (mimicking the natural route of infection) is expected to stimulate immune response as if it were a wild polio infection.

The immune responses are humoral, with the production of antibodies in the blood and mucosal, which is strong enough to inhibit wild poliovirus replication in the intestine (WHO; 2012, Stefanie et al; 2001). However, it may become neuro-virulent in some cases (1 in 3million cases) and transmit infection from recently vaccinated person to close contacts that have not been immunized (GPEI; 2010). The administration of vaccine to a large group of children (children < 5 years of age) in the shortest possible time as in case of National Immunization Days gives rise to more extensive dissemination of excreted virus than occurs during epidemic cycles of natural disease. The net result is abrupt interruption of the transmission of wild poliovirus in the community, a result that cannot otherwise be achieved in areas of poor sanitation by year-round routine immunization alone.

2.22 Polio Eradication Strategies

Vaccination Strategy Recommended by Global Polio Eradication Initiatives

Routine Immunization Program, this is structured to achieve and maintain the highest possible vaccination coverage through the administration of oral polio vaccine (Sabin vaccine). The program offers the primary series of vaccines (oral polio vaccine inclusive) that are given to a child in the first year of life. It is administered usually at the primary health care facilities and the normal schedule of immunization under this program as it relates to oral polio vaccination are : OPVo, given at birth; OPV1 is given at 6 weeks ; OPV2 is given at 10 week; OPV3 is given at 14 weeks. The vaccine is administered in doses of 2 drops orally for every of the immunization appointment. (MMWR, 2004)

Supplemental Polio Immunization, these are conducted on a nationwide scale on national immunization days and usually during the low transmission season to improve on routine immunization coverage and control out-breaks situations. Classical supplemental immunization activities or catch up campaigns are done in some of the following days: Immunization Plus Days (IPDs), Local immunization Days (LIDs), Child Health Week and MNCH week (MMWR, 2004). The frequency of these exercises may have created a lot of awareness about polio immunization yet poor knowledge about the disease among parents may allow the thriving of wrong perceptions that are inimical to the success of the campaign especially in the northern part of Nigeria where the wild poliovirus is still actively being transmitted.

This was the finding in a descriptive cross sectional study to determine the level of parents' awareness and perception of the polio eradication programme in Gombe Local Government Area. Majority (83.6%) of parent perceived that polio is a serious disease but 50.7% of respondents believed that their children are not susceptible to the disease. There were 40.8% who perceived that the frequency of the campaign was too much while another 39.6% think that the frequency of vaccine administration may result in over dosage (Osowole & Obute, 2005, GPEI, 2012).

In a house hold survey conducted across 15 countries in the sub-Sahara Africa to determine participation in polio supplementary immunization activities among users and non-users of routine immunization services and among compliant and non- compliant with the routine OPV schedule. It was discovered that large number of children participated in supplemental polio immunization.

However, prior use of routine immunization services and compliance with routine immunization schedule showed a strong positive association with supplemental immunization participation.

Mop Up Immunization Campaign are house to house immunization conducted during the final stage of polio eradication and done when it is limited to focal areas or when a case of polio is confirmed within a geographical area (MMWR, 2004; Obionu, 2007). Two doses of OPV are given irrespective of immunization history of the children. The mop–up helps to interrupt ongoing transmission of polio outbreak. Interruption of WPV is enhanced when synchronous supplemental immunization is done together among contiguous communities along with the mop-up of the affected community.

Surveillance for AFP

Surveillance and reporting of acute flaccid paralysis (AFP) is aimed at early detection of every AFP case with the aim of confirming polio cases for immediate health action and attaining certification for a polio free status (Fatiregun, 2006; Albertha, 2005)

The objectives of acute flaccid paralysis surveillance are: To track where wild poliovirus is in circulation; to identify high risk areas or groups of people; to monitor the progress of the interruption of poliovirus transmission; to provide evidence for certification of a country/region as polio free.

Sensitive Surveillance remains fundamental to disease eradication (WHO 2001; Sathyanarayana, 2005; parks, 2005) because until global eradication is achieved, every nation of the world continues to be at risk.

Therefore, surveillance for AFP require finding and reporting children with acute flaccid paralysis (AFP); Collecting adequate samples and transporting stool samples for analysis; isolating and identifying poliovirus in the laboratory; Mapping the virus to determine the origin of the virus strain.

Surveillance may be described as sustained scientific methodology of data collection, consolidation and analysis required to objectively detect every case rapidly enough for immediate health action.

For poliomyelitis, the linear mode of transmission makes it susceptible to eradication especially with the strategy adopted by global polio eradication initiative. However, eradication of the disease appears to be taken longer than envisaged in spite of three consecutive elongation of the target date (now 2013). Paralytic polio from Wild polio is still being reported in three of the four endemic countries with India reporting her last case over a year ago (GPEI, 2011).

An article on epidemiology and control of poliomyelitis identified the peculiar epidemiological divide between poliomyelitis and the eradicated smallpox disease and sub national surveillance gap as major threats to poliomyelitis eradication (Fatiregun, 2006). He noted the apparent asymptomatic characteristics of 90- 95% of cases and the ability of the poliovirus to spread by enteric transmission as a challenge to early detection. Also, logistic problem of maintaining optimal temperature to sustained vaccine potency was noted. These observations are germaine especially when it is considered that the three countries (Nigeria, Pakistan and Afghanistan) that continues to abhor and export indigenous polio virus are developing countries with large populations and high poverty level (Fatiregun, 2006)

Expectedly, majority of the population are rural residents and some of the people are found in hard to reach areas. (Fatiregun, 2006; GPEI, 2008). The import of these is that, it may be needful for surveillance network to be expanded to include every stakeholder that is likely to be consulted or see cases of acute flaccid paralysis. AFP surveillance and reporting in Nigeria, is essentially, a government facilities show, for example, in Ondo state, there are 133 focal site for disease reporting and notification and all are government facilities, supervised by employees of the state. Records have shown that only one private facility do report IDSR diseases in the State (SMOH, 2008). In October 2008, the National laboratory, Ibadan confirmed that the AFP case discovered that year in Ilaje Local Government area of Ondo state was WPV 1. The local government has 12 political wards and over 400 communities, 90% of which are on water. They source water supply from the same river where they dispose their faecal waste. Immunization coverage here is far below average and thus the people are high risk group to contract and perpetuate the disease (SMOH, 2012)

Beyond the technical challenges facing AFP surveillance, Community factors in polio eradication may actually be more important considering the findings of Osowole and Obute in Gombe as earlier described in this chapter. Also, in a study conducted to determine the value of community participation in disease surveillance: a case study from Niger republic, identified lack of basic knowledge about poliomyelitis and existing sociocultural belief as major contributors to poor presentation of cases of paralysis and reporting at health facilities (Ndiaye et al; 2010)

Similar study conducted in Ilorin, Kwara State, Nigeria to determine community awareness and sensitization on Acute Flaccid Paralysis Case Reporting, showed that only 19.9% of the study population were aware of any surveillance for AFP while only 6.6 % could tell the purpose of the surveillance. The study identified that 23.7% of those who are aware of AFP surveillance got their information from health workers.

Table 2.1: percentage Immunisation coverage for Ilaje Local Goverment

Ondo State and Ilaje LGA: DPT3 and OPV3 Coverage since 2005.					
S/N	DATE	DPT 3		OPV 3	
		STATE	ILAJE	STATE	ILAJE
1	2005	42%	25%	41%	19%
2	2006	47%	29%	45%	29%
3	2007	62%		65%	
4	2008	68%	68%	55%	35%

Source: WHO office,Akure, Ondo state;2008

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2.23 Criteria For Certification

Table 2.2: Surveillance Indicator for Polio Free Certification

S/N	Indicators	Minimum levels for certification standard surveillance
1	Completeness of reporting	At least 80% of expected routine (weekly or monthly) AFP surveillance reports should be received on time, including zero reports where no AFP cases are seen. The distribution of reporting sites should be representative of the geography and demography of the country
2	Sensitivity of surveillance	At least one case of non-polio AFP should be detected annually per 100 000 population aged less than 15 years. In endemic regions, to ensure even higher sensitivity, this rate should be two per 100 000
3	Completeness of case Investigation	All AFP cases should have a full clinical and virological investigation with at least 80% of AFP cases having 'adequate' stool specimens collected. 'Adequate' stool specimens are two stool specimens of sufficient quantity for laboratory analysis, collected at least 24 hours apart, within 14 days after the onset of paralysis, and arriving in the laboratory by reverse cold chain and with proper documentation
4	Completeness of follow - up	At least 80% of AFP cases should have a follow-up examination for residual paralysis at 60 days after the onset of paralysis
5	Laboratory performance	All AFP case specimens must be processed in a WHO-accredited laboratory within the Global Polio Laboratory Network (GPLN

Source: epidemiological report of Global Polio Eradication Initiatives on surveillance,2010

T o attain polio free status, Nigeria is expected like every other nations of the world to meet the International standards of polio free certification which are: Ability to detect at least one case of non-polio acute flaccid paralysis (AFP) for every 100 000 children under 15 years of age;

Take two adequate specimens from at least 80% of cases of acute flaccid paralysis; All specimens processed at a WHO accredited laboratory(MMWR; 2011).

The data in table 2.1 is given to underscore the urgent need for an effective surveillance network not only on human subjects but also on the environment otherwise, our reporting may miss out undetected transmissions especially among populations living in hard to reach areas, who do not have sufficient herd immunity. Majority of infected LGAs in the country are on state borders or riverine areas, and are hard to reach during standard vaccination rounds.(ERC, 2007; Ilaje LGA, 2008, Pallansch & Sandhu, 2007).

2.24 Limitation to Polio Eradication in Nigeria

The 12th meeting of the Expert Review Committee on polio eradication in Nigeria and GPEI (2009) in their reviews of Nigeria's internal surveillance, identified ongoing surveillance gaps, specifically, in areas and children in hard-to-reach locations that are still being missed by Immunisation Plus Days (IPDs). These views are also held by a couple of authors (Fatiregun, 2006, pallansch & Sandhu, 2007).

Other limitations to the country's drive for polio eradication included: Polio not being perceived by the communities as priority against important health and utility challenges like: measles, malaria, lack of access to safe drinking water etc (Awosika, 2005; Rubicam, 2008; Akande et al, 2009; Obute & Osowole, 2005); Competing social development priorities i.e Millennium Development Goals (MDGs); and challenges to sustaining the commitment especially at the state level and local government level;

There is insufficient engagement of local health facilities and personnel in immunisation campaign and surveillance activities (MMWR, 2010).

It is generally agreed that Nigeria has consistently maintained certification-level AFP surveillance performance indicators as reflected in the yearly performance assessment below (*ERC;2007, WHO; 2009,MMWR;2011)*

Table 2.2: AFP surveillance performance indicators progress in Nigeria

Indicators	2006	2007	2009	2010	2011
Non polio AFP rate	5.1	8.0	7.0	7.8	8.8%
AFP case with adequate specimens	82%	90%	95%	>80%	94%

Sources: ERC; 2007, WHO; 2009.MMWR; 2011

The increased engagement of traditional, religious, and political leadership at the federal, state, and local levels was adduced to be responsible for the significant gains or improvement in vaccine acceptance and SIA implementation more importantly, in the north.

For this progress to be sustained there may be need to bring in private health practitioners for the purpose of increasing coverage, sharpening sensitivity and assuring validity of AFP surveillance.

2.25 Engagement of Private Medical Practitioners in Polio Eradication

In 1998, the Pan American Health Organization held a meeting of the countries in the Central America with the aims of analyzing the experiences of countries that have incorporated the private medical sector into immunization and surveillance activities for vaccine preventable diseases.

The meeting was also to facilitate the incorporation of the private medical sector into immunization and surveillance activities in any country of Central America that were yet to buy

into the concept. The result is the consistent absence of both wild poliovirus and vaccine derived polio virus in the America for 16 years running now.

Sathyanarayana, (2005) in his proposal to the government of Karnataka state, India, advocated the integration of integrated Disease Surveillance Programme (IDSP) into the national AFP surveillance system structure. This recorded enormous success, because of the geographical spread of the network, which had 30.3% of its' National Polio Surveillance network to be private hospitals. Presently, India has been delisted from the polio endemic countries of the world; the last reported case of WPV was on 13th January 2011 (GPEI, 2012).

One of the major challenges of Nigeria health system is the lack of formal integration of the private sector and weak partnerships between public and private sectors in spite of the geographical wide spread of this sector and their presence in remote locations and hard to reach areas where public health services are either not present or not functional (Odubanjo et al, 2009). In a descriptive study done in Ilorin to determine the awareness and level of involvement of private clinic operators towards the National Health Management Information System. Majority (67.3%) were aware of NHMIS, only 29.7% had ever been supplied with the form. 10.8% of the respondent were able to correctly mention two Disease Surveillance Notification Form and were the only one (10.8%) who ever returned form in the last six month prior to the study (Akande & Monehin, 2004)

Similarly, in the study conducted by Mugume & Kanayo et al about Rapid Assessment of acute flaccid paralysis (AFP) Surveillance in Plateau State, Nigeria, there was report of inadequate

knowledge and understanding of AFP case definition by LGA DSNO, focal person, Doctors' Nurses and other clinical staffs (Mugume & Kanayo et al, 2011).

In another descriptive study conducted in Taiwan to determine private doctors' practices, knowledge, and attitude to reporting of communicable diseases. 83.5% of respondent are experienced in reporting while 16.5% do not report. The 3 most common constraint to reporting identified by the non-reporting doctors were that they do not want to violate the patient's confidentiality (32.8%), 31.1%, perceived the reporting procedure as being cumbersome while 29.5% were not sure whether the diagnosed disease is reportable. (Tan & Yeh et al; 2009).

CHAPTER THREE

METHODOLOGY

3.1 Study Design

This study was conducted in two stages. Stage one was a cross sectional survey, which involved the use of a semi-structured questionnaire. The stage two was an intervention design conducted as training.

3.2 Description of Study Area

Ondo State was created in 1976, when it was carved out of the defunct Western Region. In 1996, about one-third of the state was excised for the creation of Ekiti State. Ondo State has about 80 km coast line in its southern part along the Atlantic Ocean. The state has a land mass 14,606km2 and lies within latitudes 50 45' and 80 15' North and longitudes 40 45' and 6' East. It is bounded in the north by Ekiti and Kogi States in the East by Edo and Delta States and in the West by Osun and Ogun States. The State has a population of 4,124,724 and accounts for 2.5 percent of Nigeria's population. Males constitute 51.18%, while females are 48.82%. Women of reproductive age constitute 24% and under-5 children are 13.5% of the population. About 40% of the population is urban dwellers while the remaining 60% are rural residents. The state has 798 health facilities 452 (56.0%) are public health facilities while 346 (43.4%) are private health facilities. The doctor to population ratio is 1: 6057. The state is endowed with crude oil and gas, bitumen, agricultural resources and forestry. Oil and crop production jointly accounts for 90 percent of its gross state product with agriculture being the dominant employer of labour, providing income and employment opportunities for over 70 percent of the population. 57.0% of the state population lives in relative poverty (NBS 2010)

The state comprises 18 Local Government Areas (LGAs) with 203 political wards. Revenue for the state is predominantly allocations from the federal revenue account (85%), while internally generated revenue (14.8%) is next in rank is supports from development agencies like Unicef, WHO and World Bank working in the state contribute about 0.2% (MEPB, 2011).

State wide coverage for oral polio vaccine for 2012 was 84% (WHO, 2012) and a total of 77 acute flaccid paralyses were reported as at the month of September, 2012, none of it was from a wild polio virus. However, 2013 reports showed significant improvement in oral polio vaccination coverage with a performance of 116%, 92 cases of AFP reported from all the local government areas of the State and 89% of the LGAs meeting the 2 key WHO surveillance criteria; The Non-Paralytic AFP (NPAFP) reporting rate of 6.8 and stool adequacy of 93%. The last wild poliovirus paralytic poliomyelitis reported was in 2008 at Ilaje local government area (ODSMOH, 2008, WHO, 2008).

There are 133 surveillance and reporting sites in Ondo State and all the sites are located in government health facilities. The records showed that out of all the 346 private health facility in the state only one private health facility (0.20029%) send report to the State Ministry Of Health (SMOH) frequently (Ondo State MOH, 2008).

3.3 Inclusion Criteria

All private medical doctors, whose premises were registered with the Ondo State Ministry of Health.

3.4 Exclusion Criteria

All medical doctors who works in public health facilities and also maintain a registered premises for the purpose of private practice were excluded.

Also, all private medical doctors who have registered premises with the ministry of health but have been closed down either officially by the Ministry of health or have wind down for other reasons were similarly excluded.

3.5 Ethical Considerations

Ethical clearance for the conduct of this study was gotten from the Ondo State Ministry of Health Ethical Review Committee. Permission was also sought from the Association of General Practice Medical Practitioners of Nigeria (AGPMPN) Ondo State branch.

Informed Consent was obtained from each respondent before commencement of the administration of the questionnaires and after due explanation of the purpose of the study.

3.6 Method of Data Collection

A cross sectional survey was conducted with the use of a semi-structured questionnaire to determine the baseline knowledge of the private medical doctors on integrated disease surveillance and reporting and acute flaccid paralysis reporting. The questionnaires were administered on respondents at their respective place of practice by research assistants, who were fresh graduate of Nursing and Midwifery school. The data collection personnel were trained on the instrument before they were sent to the field.

The challenge of bringing all the private medical doctors together under one roof because of distance from their places of practice to a preferred venue in Akure and the time constraint of having to leave their practice for the period of the training necessitated the respondents being purposively divided into four groups based on their convenience with specific locations agreeable to each group. The locations chosen were Akure, Ondo town, Ore town and Owo.

One-day training intervention was conducted on AFP surveillance and reporting, using WHO reference standard. The WHO reference standards in which the participants were trained include:

1. The case definition age bracket of under 15years;

2. The type of specimen to be collected and how it should be collected;

3. The standard time frame for specimen collections;

4. The mode of storage of specimens from the patient;

5. The mode of transportation of specimen back to the National polio laboratory.

The baseline instrument, which assessed the participants on the WHO reference standards for AFP surveillance as indicated above, were also used at the post intervention test, which was conducted three months after the training at their respective place of practices.

3.7 Sample Size

$$\frac{(V + U)^2 (P_1 (1-P_1) + P_2 (1-P_2)}{(P_1 - P_2)^2}$$

V = Normal probability at 95% Confidence interval (1.96)

U = Power of the test at 90%

P_1 = Pre-test proportion 50%

P_2 = Expected post test proportion 80%

Therefore $$\frac{(1.96 + 1.68)^2 (P_1 (1-P_1) + (P_2 (1-P_2)}{(P_1 - P_2)^2}$$

$$\frac{(1.96 + 1.68)^2 \ (6.5 \times 0.5) + \ (0.8 \times 0.2)}{0.09} = 60$$

12% attrition = 67

Therefore minimum sample size is 67.

Total sampling technique was used because of the small size of the study group so all the 82 consenting respondents were included in the study.

3.8 Sampling Procedure

All subjects in the sampling frame were recruited into the study. There were 129 registered private medical practitioners in the state (List in appendix). One medical doctor was selected per private medical facility.

All facilities that were no longer functional or closed were excluded from the study so also were doctors who were in the employment of the State government. Out of the 112 private medical doctors left, only 82 consented to participate in the study. Therefore, 82 participants were administered with questionnaires during the first stage of the study and underwent the second stage of the study too.

3.9 Data Collection Instrument

The study was conducted between 27th March, 2012 to 19th September, 2012. The first stage, which is the survey component lasted 6 weeks and involved the use of questionnaires administered on respondents by trained interviewers (Nurses/Midwives) at their individual place of practice across the State. The questionnaires contained sections on socio demography backgrounds, Knowledge of Integrated Disease Surveillance & Reporting (IDSR), Knowledge of

Acute Flaccid Paralysis (AFP) surveillance and Reporting. WHO standard criteria for acute flaccid paralysis surveillance. A few of the questions assessed their perceived constraints to acute flaccid paralysis surveillance and reporting and their willingness to participate if all constraints are removed. The second stage is the training component. The respondents were purposively divided into four groups based on the centrality of the training venues to majority of the doctors' place of practice. The need to decentralize the training was based on the complaints of the distance of the proposed venue (Akure) from their place of practice and the issue of time constraint.

The instruments used at pre-intervention were administered 3 months later as the post intervention instrument. The WHO standard acute flaccid paralysis surveillance criteria were used to assess knowledge gained on a 10 point knowledge scale from the training. There were five questions on the WHO standard AFP surveillance criteria, which were used for the knowledge score. Each question carried a score of 2 points if gotten correctly. A good knowledge score was categorized to be score of ≥ 5.

3.10 Training on Acute Flaccid Paralysis as an Intervention Strategy

The acute flaccid paralysis surveillance and reporting training intervention was conduct in four centers which were purposively chosen at the convenience of respondents in order not to take them too far away from their place of practice. The objective of the training was to impart the knowledge of acute flaccid paralysis surveillance and reporting on private medical doctors in Ondo State. This training was sequel to the outcome of the baseline survey of the knowledge of acute flaccid paralysis surveillance and reporting among private medical doctors in Ondo State being poor.

It was a one day seminar conducted one week apart for each of the centers. Some adult learning techniques, which included brainstorming, experience sharing, demonstration and group work were used.

The training had three component namely: Disease process of poliomyelitis, which focused on poliomyelitis epidemiology, clinical features, complications and management; secondly, The search for poliomyelitis vis-à-vis WHO case definition criteria and the responsibility to report the disease at the appropriate time to the appropriate place in the appropriate manner. Thirdly, the eradication goal, explained the four strategies being used by the Global Polio Eradication Initiative (GPEI).

There were 82 participants in all: 36 participants were from the Akure group consisting of private medical doctors from Akure South, Akure North, Ifedore, and Idanre; The Ondo group were 18 participants and were from Ondo West, Ondo East and Ile-Oluji; The Ore group were 16 participants and were from Odigbo, Irele, Okitipupa and Ilaje; The fourth group(Owo) comprised of 12 participants from Owo, Ose, Akoko North East, Akoko North West and Akoko South West. The training guide of the training is shown below:

Table 3.1: Training Guide for the One Day Workshop for Private Medical Doctors in Ondo State on Acute Flaccid Paralysis Surveillance and Reporting.

Specific Learning Objectives	Content	Process/Methodology	Didactic Materials	Evaluation
The participant will be able to : Identify the disease processes. Identify the five WHO surveillance criteria; Identify the four strategies for polio eradication and the various reporting levels	Disease processes: Polio epidemiology, clinical features, complications & management. The Search: the polio case definition used in surveillance; surveillance criteria: >14 yrs, stool specimen, reverse cold chain e.t.c The eradication goal: GPEI strategies of vaccination, surveillance & reporting	Through brainstorming, the facilitator will highlight the essential of poliomyelitis disease process and both global and national burden. Then, there will be power point presentation through which the facilitator will explain the global control strategies and the WHO surveillance criteria Thereafter there will be questions and answers.	LCD projector and screen, flipcharts and markers, photocopies of test questions	Post training test

3.10 Data Entry, Management and Analysis

The completed questionnaires were retrieved back from the data collection personnel on weekly basis and reviewed for completeness. The data entry began immediately after the 6th week of data collection. Data were entered into SPSS statistical package. Unstructured responses were coded and entered as numerical variables. Data were presented in tables of frequency, graphs and associations. Similarly, the analyses of the pretest and post test data were done together at the end of all the group training. The data were analyzed using descriptive statistics and student's t-test at 5% level of significance.

3.11 Limitation of Study

The possibility of knowledge sharing between members of different groups cannot be ruled out in this study. Similarly, individual respondents especially those in the second, third and fourth groups may research into the topic or possibly pick information from the media prior to the time of the conduct of the pretest.

Due to financial constraint, the study could have been expanded to assess the post training knowledge translation in acute flaccid paralysis surveillance and reporting among the respondents.

The limitation of this study to only private medical doctors may have created room for further research opportunity to compare the knowledge and practice of acute flaccid paralysis surveillance and reporting among private medical doctors and their Public sector medical counterparts.

CHAPTER FOUR

RESULTS

4.1 Background Information on Private Medical Practice

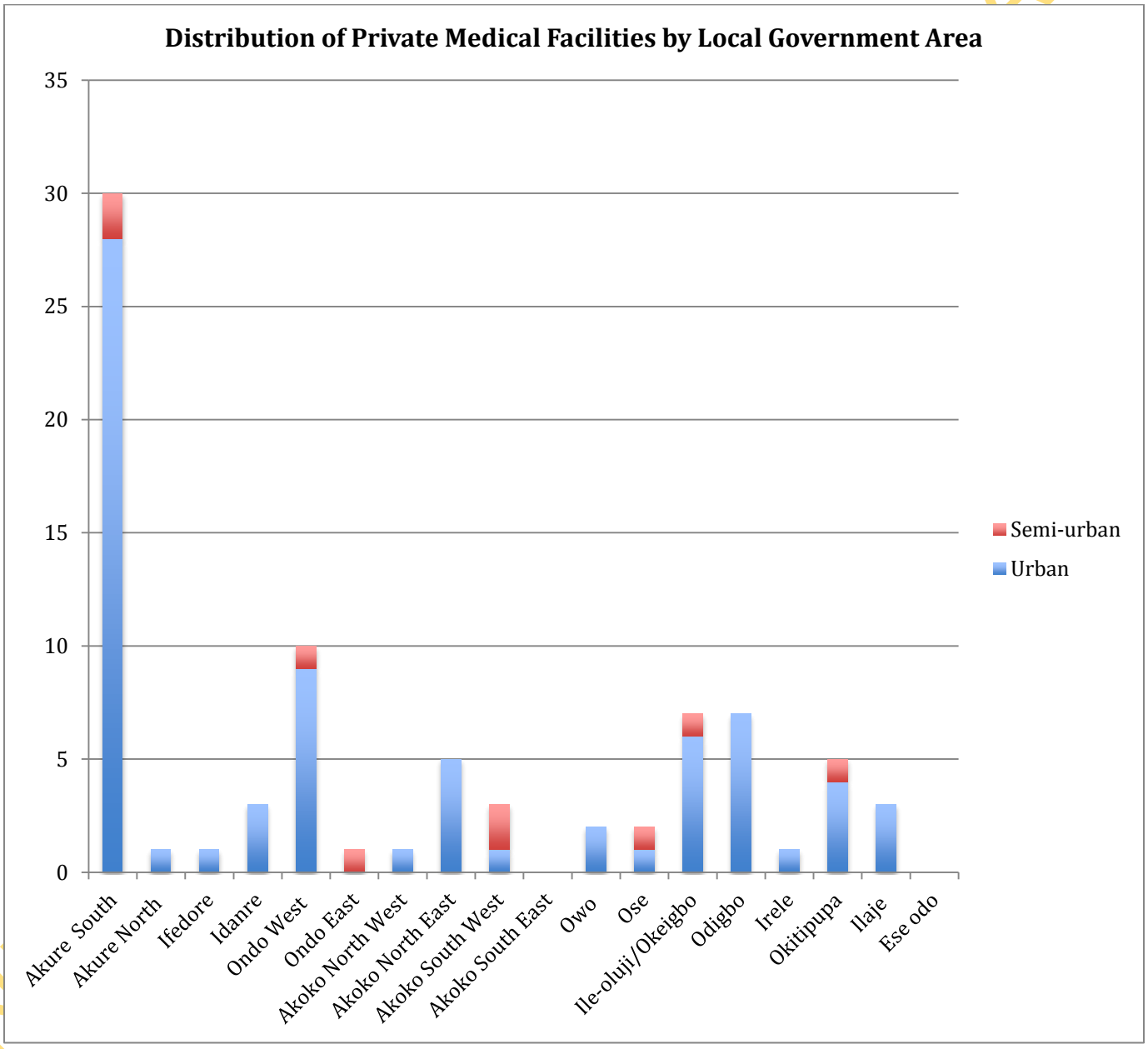

Fig 4.1: percentage distribution of private medical health facilities by local governments.

S/N	Local Government Area	No. of Private Medical Facilities		
		Urban	Semi-Urban	Total
1	Akure South	28	2	30
2	Akure North	1		1
3	Ifedore	1		1
4	Idanre	3		3
5	Ondo West	9	1	10
6	Ondo East	1		1
7	Akoko North West	1		1
8	Akoko North East	5		5
9	Akoko South West	1	2	3
10	Akoko South East			0
11	Owo	2		2
12	Ose	1	1	1
13	Ile-Oluji/Okeigbo	6	1	7
14	Odigbo	7		7
15	Irele	1		1
16	Okitipupa	4	1	5
17	Ilaje	3		3
18	Ese-odo	0		0
	Total	74	8	82

Table 4.1: Location of private medical practice disaggregated by urban/ rural site

Table 4.1 showed that majority 74 (90.25%) of the private health facilities were located within the urban center of the local government areas and only few 8 (9.75%) were located in semi urban areas. None of the Health facilities existed in core rural settings in the state.

4.2 Background Characteristics of the Respondents

Table 4.2 Background characteristics of Private Medical Doctors in Ondo State.

Variables	Frequency	Percentage(%)
Gender		
Male	68	82.9
Female	14	17.1
Age		
20-29	24	29.3
30-39	25	30.5
40 and above	33	40.2
Designation		
Medical Officer	52	63.4
Medical Director	30	36.6
Qualification		
MBBS only	60	73.2
MBBS with Additional degree	6	7.3
MBBS with Fellowship	16	19.5
Specialization		
Medicine	10	12.2
Surgery	6	7.3
General Practice	66	80.5
Status of Employment		
Temporary	45	54.9
Partners	9	11.0
Owner	28	34.1

The age of respondents ranged from 26- 87years old. The mean age was 43 ± 6.3 years. The respondents were predominantly male (82.9%). Most respondents had MB;BS only (73.2%); about 20% had fellowship of postgraduate medical colleges in addition while 7.3% had other postgraduate qualifications.

Those respondents who were medical director of facilities were 36.6% out of which 93.3% were sole proprietors. Other respondents were medical officers (63.4%) either working on temporary basis or were in some form of partnership with the owners.

The specialization of the respondents were broadly classified into three, with those in general practice being predominant (80.5%), medicine as specialty distantly followed with 12.2% and surgery was 7.3%

Table 4.3: Baseline Knowledge of IDSR and AFP among Private Medical Doctors in Ondo State.

Variables	baseline (%)
Ever seen IDSR form	40 (48.8)
Ever seen AFP investigation form	31(37.8%)
Knew all the reportable diseases under IDSR	2(2.4%)
Correctly interpret all the IDSR form codes	44 (53.7%)
Having knowledge of differentials of AFP	24 (29.3%)
Have the knowledge of the right place to report to	60(73.2%)
Correct information on AFP investigation form.	43 (52.4%)
Identified stool as correct specimen for AFP investigation	71 (86.5%)
Knew the correct age at which AFP is reportable	13 (15.9%)
Knew that specimen must be collected within 14 days of onset of AFP	79 (96.3%)
Knowledge of ice pack as the medium of storage and transport for AFP specimen	58 (70.7%)
Aware of reverse cold chain	54 (65.9%)
Define reverse cold chain correctly	65 (79.3%)

Table 4.3 showed that substantial knowledge gap exist among the private medical doctors with only 2.4% of them having knowledge of all the reportable diseases, 29.3% have knowledge of the differentials of AFP. The table also showed that majority of respondents 48.8% and 37.8% are neither familiar with the IDSR forms nor AFP reporting forms respectively.
Majority of the respondents (86.5%) identified stool as the specimen to be collected but only 15.9% could correctly identify the age range stipulated in the AFP case definition.

Table 4.4: Knowledge of correct reporting time frame

Variables	Baseline(%)
Poliomyelitis	63(74.4%)
Yellow fever	58(68.3%)
Chicken pox	44(51.2%)
Rubeolla	40(46.3%)
Rabies	58(68.3%)

The proportion of respondents who had correct knowledge of poliomyelitis as an IDSR disease for immediate notification and reporting was (74.4%) at baseline, however, the knowledge of measles or rubeolla as IDSR disease for immediate reporting was poor likewise for chicken pox. The knowledge of Yellow fever and rabies as immediate reportable disesse were 68.3% at baseline.

Table 4.5: Proportion of respondents having knowledge of differentials of AFP

Variables	Pretest
Poliomyelitis	82(100%)
Gullian Barre	71(84.1%)
Coxsackie Virus	48(56.1%)
Transverse Myelitis	64(75.6%)
Trauma	65(76.8%)
Polyneuropathies	59(69.5%)

Table 4.6: Knowledge of IDSR and AFP among Private Medical Doctors in Ondo State after the training

Variables	(%)
Ever seen IDSR form	82 (100.0%)
Ever seen AFP investigation form	82(100%)
Knew all the reportable diseases under IDSR	40 (47.5%)
Correctly interpret all the IDSR form codes	77(93.8%)
Have knowledge of causes of AFP	72 (87.5%)
Have the knowledge of the right place to report to	75(91.7%)
Correct knowledge on AFP investigation form.	80 (97.5%)
Who identified stool as the specimen for AFP investigation	79 (96.3%)
Who knew the age criteria for which AFP is reportable	78 (95.0%)
Who knew that specimen must be collected within 14 days of onset of AFP	82 (100.0%)
Knowledge of ice pack as the medium of storage and Transport for AFP specimen	81 (98.8%)
Aware of reverse cold chain	80 (97.5%)
Define reverse cold chain correctly	82 (100.0%)

The effect of knowledge among the private medical doctors improved significantly after the training with 100% now having knowledge of both the IDSR and AFP forms. There was also noticeable improvement in the proportion of those who knew all the reportable disease (from 2.4% to 47.5%).

Table 4.7: Knowledge of correct reporting time frame after the training

Variables	Post test
Poliomyelitis	77(93.8%)
Yellow fever	77(93.8%)
Chicken pox	77(93.8%)
Rubeolla	77(93.8%)
Rabies	78(95%)

There was uniform improvement (93.8%) in the knowledge of poliomyelitis, yellow fever, chicken pox, rubeolla and rabies which had 95% as IDSR immediate reportable disease

Table 4.8: Proportion of respondents having knowledge of differentials of AFP

Variables	Post test
Poliomyelitis	82(100%)
Gullian Barre	82(100%)
Coxsackie Virus	73(88.8%)
Transverse Myelitis	80(96.5%)
Trauma	79(96.5%)
Polyneuropathies	81(98.8%)

There was obvious significant improvement in the knowledge of respondents with respect to the differentials of acute flaccid paralysis except for poliomyelitis, which remained at the optimum of 100% both at baseline and post test

Table 4.9: Comparison of Proportion of respondents with the correct Knowledge of IDSR and AFP at baseline and after training.

Variables	Baseline training(%)	After training(%)	p-value
have ever seen IDSR form	40 (48.8)	82 (100.0%)	< 0.001
have ever seen AFP investigation form	31(37.8%)	82(100%)	< 0.001
knew all the reportable diseases under IDSR	2(2.4%)	40 (47.5%)	< 0.001
could correctly interpret all the IDSR form codes	44 (53.7%)	77(93.8%)	< 0.001
have knowledge of differentials of AFP	24 (29.3%)	72 (87.5%)	< 0.001
have the knowledge of the right place to report to	60(73.2%)	75(91.7%)	0.002
correct information on AFP investigation form.	43 (52.4%)	80 (97.5%)	< 0.001
identified stool as correct specimen for AFP investigation	71 (86.5%)	79 (96.3%)	0.054
knew the correct age at which AFP is reportable	13 (15.9%)	78 (95.0%)	< 0.001
knew that specimen must be collected within 14 days of onset of AFP	79 (96.3%)	82 (100.0%)	0.083
knowledge of ice pack as the medium of storage and transport for AFP specimen	58 (70.7%)	81 (98.8%)	< 0.001
aware of reverse cold chain	54 (65.9%)	80 (97.5%)	< 0.001
could define reverse cold chain correctly	65 (79.3%)	82 (100.0%)	0.001

Table 4.10: Comparison of changes in proportions of private medical doctors with Knowledge of correct reporting time frame at baseline and after training

Variables	Before the training	After the training	P- value	Chi- square
Poliomyelitis	63(74.4%)	77(93.8%)	< 0.001	11.26
Yellow fever	58(68.3%)	77(93.8%)	< 0.001	16.96
Chicken pox	44(51.2%)	77(93.8%)	< 0.001	36.51
Rubeolla	40(46.3%)	77(93.8%)	< 0.001	43.14
Rabies	58(68.3%)	78(95%)	< 0.001	17.41

Table 4.10 showed statistical significant improvement in the knowledge of reporting time frame for the above listed important IDSR reportable disease as disease for immediate reporting.

The proportion of private practicing physicians who knew the right time frame for reporting poliomyelitis increased from the baseline of 74.4% to 93.8% after the training. This change is statistically significant (X^2= 11.26, p= 0.0008).

In the same manner the proportion of respondents who knew the correct time frame for yellow fever showed statistical improvement from 68.3% to 93.8% (X^2= 16.96 , p= 0.00003)

Similarly, the knowledge of respondents about chicken pox as an immediate reportable IDSR disease significantly increased from 51.2% to 93.8 %(X^2= 36.51, p= 0.0000).

The knowledge of Rubeolla or measles as immediate reportable disease also recorded remarkable improvement from 46.3% to 93.8 %(X^2= 43.14, p= 0.0000)

Table 4.11: Comparison of changes in Proportion of respondents having knowledge of differentials of AFP baseline and after the training

Variables	Before the training	After the training	P- value
Poliomyelitis	82(100%)	82(100%)	0.990
Gullian Barre	71(84.1%)	82(100%)	0.208
Coxsackie Virus	48(56.1%)	73(88.8%)	< 0.001
Transverse Myelitis	64(75.6%)	80(96.5%)	< 0.001
Trauma	65(76.8%)	79(96.5%)	< 0.001
Polyneuropathies	59(69.5%)	81(98.8%)	< 0.001

Table 4.11 showed that the proportion of respondents who knew coxsackie virus infection, transverse myelitis, trauma (injection neuritis) and polyneuropathies were statistically significant compared to their knowledge before the training. Although the change in proportion of those who had the knowledge of Guillain barre as differentials for AFP was not statistically significant but their was marginal improvement while the knowledge about poliomyelitis remained unchanged as all respondent knew at pretest that poliomyelitis was a differential for AFP.

Table 4.12: Association between sociodemographic characteristics of the private medical doctors and reporting of AFP

Variables	Total Subjects (n=82)	Respondents who have ever Reported AFP	Respondents who have not Reported AFP	P-value
Gender				
Male	67	17 (25.4)	50 (74.6)	0.92
Female	15	4 (26.7)	11 (73.3)	
Age				
20-29	24	5 (33.3)	11 (66.7)	0.41
30-39	25	8 (28.0)	20 (72.0)	
40 and above	33	7 (18.2)	31 (81.8)	
Designation				
Medical Officer	52	12 (23.1)	40 (76.9)	0.49
Medical Director	30	9 (30.0)	21 (70.0)	
Qualification				
MBBS only	60	14 (23.3)	46 (76.7)	0.45
MBBS with Additional degree	6	1 (16.7)	5 (83.3)	
MBBS with Fellowship	16	6 (37.5)	10 (62.5)	
Specialization				
Medicine	11	2 (18.2)	9 (81.8)	0.51
Opthalm.&Surgery	6	1 (16.7)	5 (83.3)	
General Practice	43	14 (32.6)	29 (67.4)	
Others	22	4 (18.2)	18 (81.8)	
Status of Employment				
Temporary	45	9 (20.0)	36 (80.0)	0.44
Partner	9	3 (33.3)	6 (66.7)	
Owner	28	9 (32.1)	19 (67.9)	

Table 4.12 showed a probability level of 0.92 for the gender category thereby implying that there may not be any significant dependence of those who have ever reported acute flaccid paralysis on gender. So also are the ages of the respondents not related to their reporting pattern of AFP (p= 0.41).

Similarly, there is not any statistical significant association between those who have ever reported acute flaccid paralysis and the specialization of respondents (p= 0.51). Same is applicable to the association between those who had ever reported and their qualification (p= 0.45)

There is no statistically significant association between the status of employment and those who have ever reported acute flaccid paralysis (p=.0.44).

Table 4.13: Bivariate analysis of the knowledge score of WHO standard AFP surveillance and reporting criteria among medical doctors in Ondo State.

Variables	Pre Intervention		Post Intervention		P-value
	Cumulative score	Mean Knowledge score	Cumulative score	Mean Knowledge score	
identified stool as correct specimen for AFP investigation	142	1.73 ± 0.02	158	1.93 ± 0.02	0.0537
knew the correct age at which AFP is reportable	26	0.32 ± 0.02	156	1.90 ± 0.07	< 0.001
knew that specimen must be collected within 14 days of onset of AFP	158	1.93 ± 0.02	164	2.00 ± 0.00	0.0830
Knowledge of ice pack as the medium of storage and transport for AFP specimen	116	1.4 ± 0.03	162	1.98 ± 0.02	< 0.001
could define cold chain correctly	130	1.59 ± 0.01	164	2.00 ± 0.00	< 0.001
Total		6.97 ± 0.09		9.8 ± 0.01	<0.001

The mean knowledge score of respondents who identified stool as the correct specimen for AFP investigation was high at pre intervention (1.73 $\pm$ 0.018) and increased to 1.93 $\pm$ 0.02 at post intervention. There was statistically significant improvement in the mean knowledge score of respondents, who knew the correct age at which AFP is reported from pre intervention score of 0.32 $\pm$ 0.02 to 1.90 $\pm$ 0.07 at post intervention. The mean knowledge score of respondent who knew ice pack as the medium of storage and transport for AFP specimen improved from 1.4 $\pm$ 0.03 at pre intervention to 1.98 $\pm$ 0.002. Similar improvement occurred at post intervention for respondents who could define cold chain correctly with a mean score of 2.00 from a pre intervention mean knowledge score of 1.59 $\pm$ 0.01.

Table 4.14: Constraint to reporting of AFP among private medical doctors

Constraints	Frequency(%)
Poor supervision by local government health authority	82(100%)
Inadequate Logistic support for AFP reporting	74(90.2%)
Lack of involvement of Private medical doctors in surveillance training and activities	70(85.4%)
Lack of feedback from the government	75(91.5%)

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

A total of 82 private medical doctors consented to participate in this study and their distribution with respect to their location of practice disaggregated by local government is as indicated in table 4.1. The number of doctors who participated in the study represents 73.2% of accredited private medical practitioners in the state. Hsiu-Fen & Chia-Yu, et al (2009) conduct a study on similar group with only 87.4% consenting to participate.

Private medical doctors rarely contribute to disease surveillance and reporting in developing countries because they are often excluded from the routine health information system (Thirsch, 2004). This is reflected in the level of involvement of private medical doctors in AFP surveillance and reporting as shown in this study, which is abysmally low(0.01%) . It is comparable to findings in the international review of AFP surveillance in Myamnar, where no private medical doctor was involved in AFP reporting(WHO, 2002). Although in Ilorin, 29.7% of private medical doctors were involved through provision of logistics by the kwara state ministry of health in reporting but only 0.1% made returns in 6 months (Akande, 2004). The situation appears to be fair in the study conducted in Malta to determine the general practitioners role in notification of communicable diseases where all the general practitioners were involved in the reporting system but only 54% get to report (Gauci, et al, 2007). The State of Karnataka, India had a very strong National Polio surveillance system because the private sector were involved at the start of the program and became a best practice that was recommended for scale up in the country of India, this level of integration may have contributed immensely to the eradication of polio in the country (Sathyaranayana, 2005).

The need to expand coverage in order to capture more AFP cases and improve on surveillance sensitivity is critical to eradicating the polio disease from Nigeria. Therefore motivating private medical doctors to participate effectively in AFP surveillance may help to achieve this goal. Although Ondo State has been without polio for 4years now, but the lesson learnt from this study may be of interest to the Northern part of the country, especially, the seven local government areas that are still endemic for the wild polio viruses reported in the country (WHO, 2012).

One of the critical findings in this study is the fact that substantial knowledge gap exist among private medical practitioners in Ondo state as evident by the fact that only 2.4% knew all the IDSR reportable diseases. Only 15.9% had the correct knowledge of the age criteria for AFP reporting. Few (29.3%) of them had knowledge of the differentials of acute flaccid paralysis. Previous studies in other centres have corroborated the finding of this study with respect to knowledge gap on disease surveillance and notification among physicians and health workers. In a study conducted in Benin city to determine the knowledge of disease notification among doctors in government hospitals showed that only 11.9% of the respondents had good knowledge of disease notification (Ofili et al, 2003) Similar study done among health workers in Yobe showed 38.2% of respondents having knowledge of the national disease surveillance system(Bawa et al, 2005). Also, a rapid assessment study on AFP surveillance in Plateau State, Nigeria reported that only 13% of clinicians have the correct knowledge of the age criteria for AFP reporting. The foregoing underscores a potential danger of underreporting from inadequate knowledge of the reporting requirement and method not just among private medical practitioners

but among all health workers critical to AFP surveillance. The sensitivity of our surveillance system may be affected by this constraint.

Knowledge is a critical factor in disease surveillance and notification, particularly for polio eradication in Nigeria. This study has revealed that training has significant effect on the knowledge of AFP among private medical practitioners. There was significant improvement in knowledge score from 6.8 ± 0.5 at baseline to 9.8± 0.1 at post training test.

Similar effect was also recorded among health workers in a quasi experimental study that showed increased proportion of respondents among the experimental group from 35.6% to 91.9% who were aware of the national surveillance system and had knowledge score improvement from 0.85± 1.38 at baseline to 6.15± 2.64 post training (Bawa & Olumide , 2005). The integrated nature of the services offered by private medical doctors makes their participation very important in the active surveillance and notification of acute flaccid paralysis.

Therefore, effective knowledge transfer of acute flaccid paralysis reporting modalities/ guidelines will help them to know what to look for, why they should look for it and how to manage and report cases of AFP encountered.

Obviously, knowledge alone does not automatically translate to improve AFP reporting among private medical doctors. This study has been able to identify other factors that are constraint to reporting of acute flaccid paralysis among private medical doctors. Inadequate logistics support (90.2%) was identified as one of the constraints to reporting AFP, the primary logistic concern

was the AFP reporting forms. A study conducted in two south western States to determine logistic challenges in disease surveillance and reporting identified inadequate reporting forms and poor funding as key logistic constraints (Dairo et al, 2010). Other logistic challenges are communication facilities to reach the DSN officer, specimen bottles for collecting stool samples and transport means.

For Poor supervision by local government officers (100.0%), all the respondents were unanimous in identifying that DSN officers from the Local government do not visit to request for data nor do they provide any information about AFP except during local immunization days when they come around to immunize children.

Lack of involvement of private doctors in surveillance trainings and activities (85.4%), It is common knowledge that government health department commonly exclude the private sector from major training events and information. (Kirsch and Harvey, 1994). This was evident from this study with only 37.8% acknowledging to have seen the AFP investigating form at baseline. Lack of request for feedback from government agency (91.5%) was found to be the outcome of non-reporting on the part of the private medical doctors.

However, the general willingness (100.0%) of the private medical doctors to report if provided with the necessary logistics may be an important leverage for the surveillance system to capture many more unreported cases of AFP that continue to re-infect both the environment and the vulnerable, especially now that all eyes are on Nigeria for the final countdown to eradication of polio from our world.

CONCLUSION

This study has shown that education through training improved knowledge of Acute Flaccid Paralysis surveillance among private medical doctors. Therefore, training and provision of necessary logistic support may translate into improvement of acute flaccid paralysis reporting among private medical doctors and also the Disease Surveillance and Notification (DSN) system. Furthermore, an investigation into the knowledge translation effect of training on AFP surveillance practice among private medical doctors may need to be explored in future research work since a sizable proportion of the population visit the private medical doctors hence they are key to sustaining the disease surveillance and notification system

RECOMMENDATIONS

Private medical doctors should be integrated into the routine health management information system, so that reporting of AFP can be easily undertaken by them.

Logistics for reporting should be made available to the private medical doctors along with the necessary trainings and incentives for reporting.

Local government DSN officers should provide supportive supervision to private medical doctors on AFP surveillance and reporting.

Private medical doctors need to be given top up training on acute flaccid paralysis (AFP) surveillance guideline.

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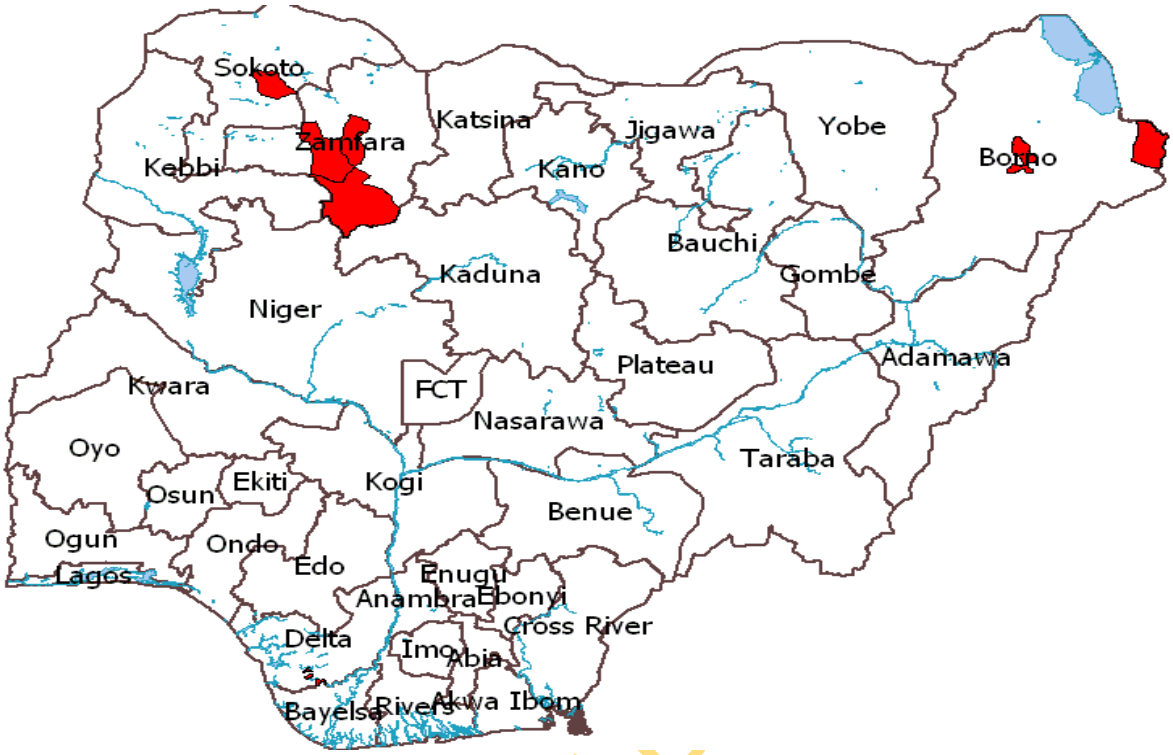

Fig 1.1: Distribution of WPV in Nigeria in 2010

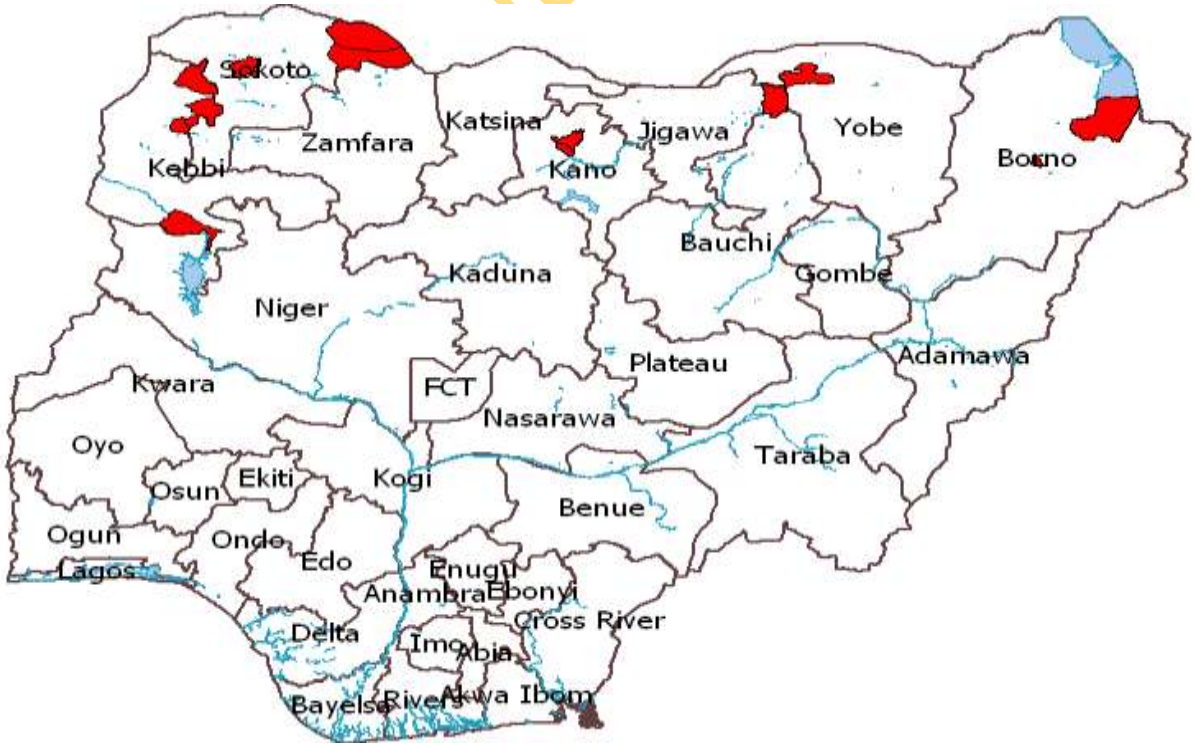

Fig 1.2: Distribution of WPV in Nigeria in 2010

ONDO STATE MINISTRY OF HEALTH

REGISTER OF LICENSED HEALTH INSTITUTIONS

S/N	NAME OF HEALTH INSTITUTIONS	NAME OF PROPRIETOR		ADDRESS	L/GOVT AREA	REMARKS
1	Ibikunle Hosp.Ikare	Dr. F. Ibikunle		Owo Road Ikare	Akoko N/East	
2	Abimbola Hosp Ikare Akoko	Dr. Falaye		CD/3 Semu-Semu Estate Ikare Akoko	Akoko N/East	
3	Oke Royal Hosp Ikare Akoko	Dr. J. Oke		Oke Royal Hos Ikare	Akoko N/East	
4	Inland Med. Centre Ikare	Dr. J.K. Oni		P.O. Box 555 Ikare	Akoko N/East	
5	Terebo Omowetan Hosp Ikare	Dr.M.O. Terebo		CH/1 Eshe Ikare Akoko	Akoko N/East	
6	New Life Hosp Ondo	Dr. T. O. Ireo		26 Otasora St Ondo	Akoko N/West	
7	Aduloju Memorial Hosp. Akungba	Dr. Aduloju B.A		No. 70 Iwaro Rd Akungba,Akoko	Akoko S/West	
8	Adekanye Mem Hosp Ifira Akoko	Dr. C L.O. Adekanye		Kaba Rd Ifira Akoko	Akoko South West	
9	Wole Ayo Hospital Ondo	Dr. O. Olakunde		1 Olorunsogo St. Off Brig. Ondo	Akoko South West	
10	Omosanya Hosp Ondo	Dr. O. Omosanya		100 Sabo Rd Ondo	Akoko South West	
11	St Leo's Hosp. Akure	Dr. Aladegbaye		Oba Adesida layout Ikesha Rd Akure	Akure	Closed
12	St. Micheal's Hosp. Akure	Dr. M. A. Alabi		1 Odundun Rd off Arakale Akure	Akure	
13	Our Lady of Fatima Clinic Akure	Dr. O. Alliu		5 Oladimeji St. off Ijoka Rd Akure	Akure	
14	Bada Hosp. Akure	Dr. O.Bada		24A Obanla St. Akure	Akure	
15	Shalom Hosp Complex akure	Dr. Ogunleye		93 Ijoka Rd Akure	Akure	
16	Optimum Clinic Hospital Akure	Dr. Sule		FUTA GRA	Akure	
17	Jobarteh Hospital, Akure	Dr. Jobarteh		Oba Adesida Rd	Akure	
18	Sckye Hospital Clinic Akure	Dr. Thomas S. Wilson		83B Oba Adesida Rd Akure	Akure	
19	Kolade Med. Centre, Akure	Dr. V.M. kolade		Obodulu Layout Akure	Akure	
20	K & B Medical Foundation Akure	D. A. A. Odesanmi		14 Idanre Rd. Akure	Akure	
21	City Specialist Hosp. Akure	Dr. A. I. Ogunleye		59 Okearata St. Akure	Akure	
22	Ola Oluwa Specialist Hosp Akure	Dr. Ijarotimi		Adinlewa St Akure	Akure	
23	Bewaji Mem Hospital Akure	Dr. J.I. Bewaji		38A Araromi St. Akure	Akure	
24	County Dentist Clinic Akure	Dr. O.O. Taiwo		96 Hospital Rd Akure	Akure	
25	Adedewe Okunrinboye Hosp Akure	Dr Okunrinboye		Agunloye St. Celestrial Rd Akure	Akure "	
26	Crown Hosp Akure	Dr. Adegbenro		37A Oja Oshodi St. Akure	Akure "	
27	Olutnde Medical Centre Akure	Dr. Aladesuru		Agunloye St. Celestrial Rd Akure	Akure "	
28	Ajewole Clinic Hosp Akure	Dr. D. Ajewole		Box 1909 Akure	Akure "	
29	Mosjo Dental Clinic Akure	Dr. J. O. Obidapo		Elemuletu layout Ijoka Rd Akure	Akure "	
30	Dairo & Dairo Hosp Akure	Dr. O. Dairo		1 Dayo Ige lane Oshile Qrt. Akure	Akure "	
31	Royal Med. Centre Akure	Dr. O.A. Adeleye		3B Omoniyi St. Okuta Elerinla St. Akure	Akure "	
32	Ayo Spec. Hosp. Akure	Dr. V.A. Ojo		Ilesha Rd. Akure	Akure "	
33	Oludare Hosp Akure	Dr.P.B.Oludare		2 Oludare Hosp. Rd. Fanibi Layout akure	Akure "	

34	Christ Love Hosp Ita-Ogbolu	Dr. M.O. Akintayo		34, Simija St Ita -Ogbolu	Akure North	
35	St. John & Mary Hospital Akure	D. A. A. Oni		Oke Aro Titun Akure	Akure South	
36	Sijuwade Specilaist Hospital Akure	D. B. A. Sijuwade		Oluwatuyi Qrts Akure	Akure South	
37	Temidayo Hospital Akure	Dr(Mrs)O.A. Oke		10 Ondo Bye-pass Akure	Akure South	Not functioning
38	Abitoye Medical Centre akure	Dr, A. Abitoye		Opp. Schl. Of Agric Akure	Akure South	
38	Network Hosp. Akure	Dr. (Mrs) C.G. Ogunleye		Housing Corp Akure	Akure South	
40	Momaak Specialist Hosp. Akure	Dr. A. A. Akenroye		Omoniyi St. Lafe Inn, Akure	Akure South	public servant
41	Lafia Medical Centre Akure	Dr. A. Adebayo		18, Isola St. Akure	Akure South	
42	Modupe Hospital & maternity Akure	Dr. A. Modupe		14 Leo Clinic Rd. Off Ilesa Rd Akure	Akure South	
43	Ade-Tade Hospital Akure	Dr. A. O. Tade		13 Tuyi Ayedun Qrts. Akure	Akure South	
44	Shekinah Hospital Akure	Dr. Adeyeri		Ado Rd Akure	Akure South	public servant
45	Orunmila Clinic Akure	Dr. Akerele Adu		Ayetoro Street Akure	Akure South	
46	Top Scanning Centre Akure	Dr. Akinkoye		Hosp Rd Akure	Akure South	Closed
47	Virtue Med. Clinic Akure	Dr. Akpatamu G.		38 Oba Adesida Rd Akure	Akure South	
48	Metro Hosp Akure	Dr. Alonge		59B Hosp Rd Akure	Akure South	
49	Welbak Hosp Akure	Dr. Animasaun		78C Arakale Rd Akure	Akure South	
50	Babalola Ninewells Spec. Hosp Akure	Dr. Babalola		10 Irepodun St Isolo Akure	Akure South	
51	Mercy Specialist Hospital Akure	Dr. Babatunde		Gbogi Street Akure	Akure South	
52	J & E Fatunla Hosp Akure	Dr. D. Fatunla		13 Arisoyin Oke Aro-Titun Akure	Akure South	
53	Con. Specialist Clinic Akure	Dr. Falaye		21B Stadium Rd Akure	Akure South	Closed
54	Niyi Specilaist Hospital Akure	Dr. G. O. Thontteh		22 Ayegunle St. Akure	Akure South	Closed
55	Jide Mac Clinic Akure	Dr. J. A. Marcus		Ijoka Road Akure	Akure South	
56	Falaye Memorial Hospital Akure	Dr. J. Falaye		Afunbiowo Street, Akure	Akure South	
57	Fujah Specialist Hosp. Akure	Dr. J.A. Funmilayo		53 Owo tutun St Off Igbogi Akure	Akure South	
58	Oluseun Specialist Hosp Akure	Dr. J.F. Kolawole		Arakale St. Akure	Akure South	
59	Calvary Clinic Akure	Dr. J.O. Ojediran		Ondo Rd Akure	Akure South	
60	Liberty Hosp Akure	Dr. L.A. Adegbemiro		28 Oluwatuyi Qrts Akure	Akure South	
61	Grace Med. Cenre Akure	Dr. M. A. Nzegwu		50 Adeyeye St, OkeIjebu St, Akure	Akure South	Closed
62	MAO Clinic Akure	Dr. M. A. Ojo		13 Gbangbalogu St Akure	Akure South	public servant
63	Stephen Medical Cenre Akure	Dr. O. Akinyosoye		70 Oyemekun Rd. Akure	Akure south	
64	Rohi Specialist Clinic Akure	Dr. O.O. Akinboboye		1`65 Oyemekun St. Akure	Akure South	
65	Banjo Memorial Med. Centre Akure	Dr. R. A. Adegoroye		Ondo Road Akure	Akure South	
66	Rhoda joy Medical Clinic Akure	Dr. Rhoda Adejuyigbe		Off Oda Rd Akure	Akure South	
67	Kharis Medical Centre, Akure	Dr. Stanley Orji		20, Ondo Bye Pass, Akure	Akure South	
68	Charity Hosp Akure	Dr. Suberu E.J.		40 Araromi St. Akure	Akure South	Closed

69	Joe Jane Med. Cent. Akure	Prof. J.O. Olwasanmi		Oke Ijebu Estate Akure	Akure South	
70	Bethesida Faaith Clinic	Dr. K. Erhinorin		Ajayi Close Kajola Qtrs Akure	High Schl. Akure	
71	Hope Hospital Idanre	Dr. K. Ademujimi		16 Palace Rd. Idanre	Idanre	
72	Margeret's Hospital Idanre	Dr. O. Akinbobola		Commerical Rd Idanre	Idanre	
73	Olugunwa Hospital Idanre	Dr. O. Olugunwa		330 Olofin Rd Idanre	Idanre	
74	Adesokan Mem. Hosp Ijare	Dr. A.O. Adesokan		Bagbe Ondo/Ore Rd.	Ifedore	
75	Fashmola Oyeladun Med. Clinic Ifon	Dr. Fasina Ademola Adeusi		P.O. Box 214	Ifon	
76	Ayemafuge Hosp & Mat. Igbokoda	Dr. R. Malumi		Ayemafuge Hosp Igbokoda	Ilaje Ese - Odo	
77	Command Community Hosp Igbokoda	Dr. I.O. Omotehinse		12 Market St. Igbokoda	Ilaje Ese-odo	
78	Kings Med. Centre Igbokoda	Dr. J.I. Omojuwa		1 Milan St Igbokoda	Ilaje Ese-Odo	
79	Adefegha Mem. Clinic, Ile Oluji	Dr. A. O. Adefegha		Ile Oluji	Ile Oluji	
80	Christian Health Centre Ile-Oluji	Dr. Rev. B. Akintade		46 Ogbontitun St Ile-Oluji	Ile-Oluji Oke-igbo	
81	Mercyland Med. Centre Ondo	Dr. A.A. Adedoyin		3, Oke Ayo St. Rainbow Ondo	Ile-Oluji/Okeigbo	
82	Ajiboye Hospital, Ile-Oluji	Dr, C.B. Ajiboye		90 Ajeferere St Ondo Rd Ile-Oluji	Ile-Oluji/Oke-igbo	
83	St. Peter's Hosp Irele	Dr. Ikuemelo		Ode Irele	Irele	
84	Arif Med. Clinic Ore	Dr. Arifayan M.O.		Old Lagos Rd Ore	Odigbo	
85	Group Med. Clini Ore	Dr. B. Akintan		22A College Rd Ore	Odigbo	
86	Paragon Oluwaremilekun Clinic Kajola	Dr. Bode Akintade		Kajola via Ore	Odigbo	
87	Glory Field Hospital Ore	Dr. Cambell		Ondo Rd Ore	Odigbo	
88	Tolaj Hosp Ore	Dr. K. Ogunjobi		Old Lagos Rd Beside Police Station Ore	Odigbo	
89	Molasuru Mem. Hosp Ore	Dr. O. Akinwe		Ore	Odigbo	
91	Ore Medical Centre Ore	Dr. O. Akinyosoye		Ore Med. Centre Ore	Odigbo	
92	Pima Hosp Ore	Dr. R.A. Akinsuroju		63 Okitipupa Rd Ore	Odigbo	
93	Ejire Felbeth Hosp. Ore	Dr.A.Fella Awonu		Otu Custain Juction Ore	Odigbo	Closed
94	Ife Olu Clinic & Mat Home Oke-Igbo	Dr.A.O. Okedare		Ondo Rd Okeigbo	Odigbo	
95	Surulere Med. Centre Ile-Oluji	Dr. E. O. Ojo		Oduluwa st. Igbolawe Ile-Oluji	Oke-Igbo/Ile-Oluji	
96	Ogunsusi Spec. Hosp. Ile-Oluji	Dr. J. B. Ogunsusi		28 Temitope St Ile-Oluji	Oke-Igbo/Ile-Oluji	
97	Lucas Hosp. Ile-Oluji	Dr. J.A.Gbakinro		St. Lucas Hosp Ile-Oluji	Oke-Igbo/Ile-Oluji	
98	Es & Jay Hosp. Okitipupa	Dr. (Mrs) Okoro		5 Erinje Rd Okitipupa	Okitipupa	
99	Adeleke Mem Hosp Okitipupa	Dr. a. O. Adeuye		3 Erogunaye St. Okitipupa	Okitipupa	
100	Ibukun Olu Ayo Hospital Ode-Aye	Dr. A. O., Famore		Ibukun Olu clinic Ode -Aye	Okitipupa	
101	Mainland Hosp. Okitipupa	Dr. Adegun		18 Anjorin St. Okitipupa	Okitipupa	
102	Akingbola Hospital Okitipupa	Dr. Akingbola		2 Doctors Rd Okitipupa	Okitipupa	
103	Ayoval Hosp Okitipupa	Dr. Ojo		Ayo Val Hospital Okitipupa	Okitipupa	
104	St. Luke's Hosp. Okitipupa	Dr. S. Siloko		51-53 Halubi St Okitipupa	Okitipupa	
105	Adeyalo Clinic Hospital Ondo	Dr. A. A. Adeyalo		10, Arowolo St. Ondo	Ondo	"
106	Laju Hospital Ondo	Dr. A. A. Tuoyo		1 olorunsola Ondo	Ondo	
107	Yaba Clinic Ondo	Dr. A. Oladapo		2, Yaba Street, Ondo	Ondo	"

108	Alfa Med. Clinic Ondo	Dr. Adegoroye		Yaba Ondo	Ondo	
109	De-Lawrence clinic Ondo	Dr. C. Yele Adelankinnu		8 Sokoti St P.O. Box 361 Ondo	Ondo	
110	Emmanuel Clinic Ondo	Dr. E. A. Okunboladi		61 Brigadier Adenulegun Rd. Ondo	Ondo	
111	Christ Hospital Ondo	Dr. F.E. Olotu		91 Adeyemi college Rd. Ondo	Ondo	
112	May Medical Hosp. Ondo	Dr. I. Adeyemi		2, Omolere Lane Ondo	Ondo	
113	Banke Med Centre Ondo	Dr. I.O. Owoeye		2 Ilemoboro St. Ondo	Ondo	Closed
114	Ondo Med. Centre Ondo	Dr. Ife Ayodeji		4 Akinkugbe St. Ondo	Ondo	
115	Ndubusi Hosp & Mat Ondo	Dr. Mdubusi Olanegbo		18 Mode St Yaba Ondo	Ondo	
116	Mona Medical Clinic Ondo	Dr. Mimiko		Mona Clinic Ondo	Ondo	
117	Imani Hosp Ondo	Dr. O.O. Olariniwa		93 Surulere St. Ondo	Ondo	
118	High Chief Ogunye Meme Hosp. Ondo	Dr. Olu Ogunye		156 Surulere St Ondo	Ondo	
119	Babalola Med. Cenatre Ondo	Dr.B.O. Babalola		Opp Fed. Schl. of Art & Science Ondo	Ondo	
120	Emmanuel Akingba Mem Clinic Ondo	Prof J.B. Akingba		5 Ope Oluwa St Ondo	Ondo	Closed
121	Akinyemi Clinic Igba-Ondo	Dr. Akinyemi F. O.		28 Broad St. Igba-Ondo	Ondo East	
122	Welfast Olotu Hospital Ondo	Dr. A. O. Olotu		12 Stadium Rd, Ondo	Ondo West	
123	Ayofunmi clinic Ondo	Dr. A. O. Olowokere		25 Adekugbe St. Sabo Ondo	Ondo West	
124	Flower Garden Specialist Hosp Ondo	Dr. F. A. Dinehin		156 by Adesuper Bakary Ondo Ore Rd Ondo	Ondo West	
125	Victory Specialsit Clinic Ondo	Dr. O. Kuti		2 Unity Street off Ore rd Ondo	Ondo West	
126	Adelabu Med. Centre Ifon	Dr. Adelabu		Adelabu Med. Cent. Ifon	Ose	
127	St. David's Hosp. Owo	Dr. A. O. Adetola		P.O. Box 782 Owo	Owo	
128	Omololu Hospital Owo	Dr. M. A. Omololu		off Iyere Rd. Owo	Owo	public servant
129	Odji Mem. Hospital Owo	Dr. Odji		8A Aruwajoye St Owo	Owo	public servant

QUESTION ON AFP SURVEILLANCE PRACTICE AMONG PRIVATE MEDICAL DOCTORS IN ONDO STATE

Serial No [ ]

Participant's Consent: The purpose of the study and it's activities has been fully explained to me and I hereby voluntarily agree to participate in this study.

Signature _____ Date _____

Section A:- Demographic Data

1. Age 1. 20 - 29 [ ] 2. 30 - 39 [ ] 3. 40 Above [ ]
2. Sex [ ] Male 2. [ ] Female
3. Religion 1. Christianity [ ] 2. Islamic [ ] 3.Others, please specify [ ]
4. Tribe: 1. Yoruba [ ] 2. Ibo [ ] 3. Hausa [ ] 4. Others [ ] please specify [ ]
5. Designation: 1. Medical Officer [ ] 2. Medical Director [ ]
6. Qualifications 1. MBBS only [ ] 2. MBBS + Additional Degree [ ] 3. MBBS + Fellowship [ ]
7. Specialization 1. Medicine [ ] 2. Surgery [ ] 3. General practice [ ]
8. Status of employment 1. Temporary [ ] 2. Owner [ ]

Section B: - Knowledge of Integrated Disease Surveillance & Reporting

9. Have you heard of integrated diseases surveillance and response (IDSR) before Yes[ ] No [ ]

10. Tick any diseases reportable under the IDSR.

S/N	Diseases	Yes	No
1	Measles		
2.	Cholera		
3.	Cerebrospinal Meningitis		
4.	Viral hemorrhagic fever		
5.	Yellow fever		
6.	Highly Pathogenic Avian influenza Virus		
7.	Poliomyelitis		
8.	Dracunculiasis		
9.	Leprosy		
10.	Neonatal Tetanus		
11.	Lymphatic filariasis		
12.	Pneumonia in children under 5 years of age		
13.	Diarrhea in children under 5 years age		
14.	HIV/ AIDS		
15.	Malaria		
16.	Onchocerciasis		
17.	Sexually transmitted Infections		
18.	Severe acute respiratory diseases		
19.	Tuberculosis		
20.	Diarrhea will blood shigellosis		
21.	Pertusis		
22.	Hepatitis B		
23.	Plague		

11. Who do you report notifiable disease to?

a. Local government Health Office [ ]

b. State Ministry of health [ ]

c. Federal Ministry of Health [ ]

12. Tick the correct time frame relevant to each of the disease in the table below:

S/N	DISEASE	IMMEDIATE	WEEKLY	MONTHLY
1.	Poliomyelitis (AFP)			
2.	Yellow fever			
3.	Chicken pox			
4.	Rubeolla			
5.	Rabies			

13. Have you seen any IDSR form before? Yes. [ ] No. [ ]

14. If yes to question (13) identify the form(s) relevant to each time frame.

S/N	FORM	IMMEDIATE	WEEKLY	MONTHLY
1.	IDSR From 001			
2.	IDSR Form 002			
3.	IDSR Form 003			

Section C: Knowledge of Acute Flaccid Paralysis Surveillance and reporting

15. Have you heard of acute flaccid paralysis before? Yes [ ] No. [ ]

16. How would you define acute flaccid paralysis with respect to disease surveillance in Nigeria?

_____

17. What is the case definition for AFP?

_____

18. At what age is acute flaccid paralysis reportable under IDSR?

1. <15 [ ] 2. >15 [ ] 3. At any age [ ]

19.Tick the possible causes of AFP in the box below Yes No

1.	Poliomyelitis		
2.	Guillian barre syndrome		
3.	Coxsackie		
4.	Transverse myelitis		
5.	Traumatic Sciatic Nerve injury		
6.	Polyneuropathies		

20. Have you seen an AFP investigation form before?

1. Yes [ ] 2. No [ ]

21. what is the specimen collected for laboratory investigation

1. V blood [ ] 2. Stool [ ] 3. Sputum [ ] 4. None of the above

22. How soon from onset of AFP is the specimen to be collected

1. Within 14days [ ] 2. Within 2 months [ ] 3. Within 6 months [ ]

23. How is the specimen supposed to be stored and transported 1. in warm saline pack [ ]

2. in ice pack [ ] 3. in plastic pack [ ] 4. strictly at room temperature [ ]

24. Do you know about the term reverse cold chain? Yes [ ] No [ ]

25. What is reverse cold chain?

a. process of transporting the melted ice back to the laboratory

b. Transporting AFP patient stool specimen back to the national laboratory in ice pack.

c. Sorting out vaccines in other of priority.

26. Tick relevant information found in the AFP investigation form

S/N	INFORMATION	(√) IF CORRECT	(X) IF INCORRECT
1.	Date of Birth		
2.	Date of onset of paralysis		
3.	Date of notification		
4.	Date of case investigation		
5.	Vaccination history		
6.	Date of 1st specimen collection		
7.	Date of 2nd specimen collection		
8.	Date of 3rd and 4th specimen collection		
	Follow up examination		

27. The responsibility of the Local Government Health office of notifying Health facilities include:

a. Provision of Logistics [ ]

b. Investigation of reported case [ ]

c. Feed back [ ]

d. Transport case to SMOH [ ]

e. All of the above [ ]

Section D: Practice of Acute Flaccid Paralysis reporting.

28. Have you ever reported any of the IDSR disease before Yes [ ] No [ ]

29. When last did you report an AFP case?

1. 3 month ago [ ] 2. 6 months – 1 year ago [ ] 3. > 1 year ago [ ] 4. Never reported.

30. How did you report the case?

1. By phone [ ] 2. By form [ ] 3. Verbally to DSN Officer [ ]

4. Not applicable[ ]

31. Who is responsible for reporting any AFP case in your facility? (1) Medical Director (2) Medical officer (3) Nurse (4.) Nobody.

Section E: Perception of Acute Flaccid Paralysis Reporting

32. IF you have not been reporting, then what are the problems militating against your reporting?.

33. Suggest solutions for effective reporting of AFP

34. Given all the logistic support would you begin to report cases of AFP? 1. Yes [ ] 2. No. [ ]

35. Do you think awareness and education could improve reporting of AFP? Yes [ ] No [ ]

Tick the correct answer for these standard AFP surveillance criteria

A. what is the specimen collected for AFP laboratory investigation

1. V blood [ ] 2. Stool [ ] 3. Sputum [ ] 4. None of the above

B. How soon from onset of AFP is the specimen to be collected

1. Within 14days [ ] 2. Within 2 months [ ] 3. Within 6 months [ ]

C. How is the specimen supposed to be stored and transported

1. in warm saline pack [ ] 2. in ice pack [ ] 3. in plastic pack [ ] 4. strictly at room temperature [ ]

D. What is reverse cold chain?

1. process of transporting the melted ice back to the laboratory
2. Transporting AFP patient stool specimen back to the national laboratory in ice pack.
3. Sorting out vaccines in other of priority.

E. What is the age criteria for acute flaccid paralysis reporting under IDSR?

1. <15 [ ] 2. >15 [ ] 3. At any age [ ]

INFORMED CONSENT

Project Name: Effect of education on knowledge of acute flaccid paralysis reporting among private Medical doctors in Ondo state, Nigeria

Investigator Aladeniyi Isaac O. Mph field epidemiology student, Department of Epidemiology, Medical Statistic (EMS) Faculty of public health, University college Hospital, U. I Ibadan.

Sponsor: Aladeniyi Isaac O.

Introduction The study you are being recruited to participate in, is a requirement in partial fulfillment for the award of Masters of Public health in field epidemiology. It 's main goal is to assess the effect of education on the knowledge of acute flaccid paralysis surveillance and reporting among private medical doctors in Ondo State and to recommend their involvement in AFP surveillance and reporting .

Study: In the course of the study**,** you shall be required to truthfully and honesty fill some questionnaire forms. This may take a little of your time.

Confidentiality: All information collected in the course of this study, shall strictly and absolutely be used only for the purpose of this research, your name and identity remains anonymous and will not be published.

Participation: Your participation in this study shall be voluntary. Your decision to participate or not, will not in any way jeopardizes the relationship between the researcher and yourself.

If at any point you decide not to go on with your participation, you will be free to do so without any consequence. If you have any question, observation or comment, please contact Aladeniyi Isaac on 08033582472 or send through E-mil allanolaisaac1@Yahoo.co.uk.

The investigator has fully explained this study to me and answered all the questions raised.

Signature of respondent: _____ Date _____