INFLUENCE OF INSECURITY AND DISEASE OUTBREAK ON TEACHING AND LEARNING OF MATHEMATICS IN SECONDARY SCHOOOLS OF IBARAPA REGION OF OYO STATE

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This study investigated the effects of insecurity and disease outbreak in teaching and learning of Mathematics in secondary school. The population consisted of one thousand and five hundred (1,500) respondents, selected from secondary schools that were purposively selected from three local government areas in the region. A sample of three hundred (300) students was selected by a simple random technique for the study. A self-made and well-structured questionnaire was used to answer two research questions formulated for the research. Mean rating was used to analyze the data collected from the respondents. It was revealed through the result of analysis that insecurity and disease outbreak had adverse effects on teaching and learning of Mathematics in secondary school. The study recommend that instructional facilities that will support online teaching of Mathematics should be provided in secondary schools to enhance teaching-learning process in such situations when physical classes are prohibited.

Keywords: Academic Achievement, Disease Outbreak, Insecurity, Teaching-learning process

Introduction

Globally, security has remained a subject of great concern. There is no gain saying the fact that Nigeria is currently facing a serious security challenges that have put every citizen on the edge including those at the helm of affairs and even security operative saddled with the responsibility of securing lives and properties (Aasa, 2019). No nation or society can boast of being completely free from the problems ensued by insecurity. Insecurity that used to be one of the lowest concerns in the hierarchy of Nigeria's social problem has now assumed an alarming rate. A time we thought that corruption and power failure have the crown of our problem; insecurity in the country has now taken the centre stage (Fin Intel, 2013). Fear, apprehension and jitteriness have become the lot of Nigerians. A cursory glance at the Nigeria daily newspaper will convince one on the state of insecurity in the country. The deteriorating security situation in Nigeria is

worrisome. Recently, Nigeria has witnessed unprecedented level of insecurity ranging from intra-communal, inter-communal and inter-ethnic dashes; religions violence; armed robbery; incessant banditry; assassination; kidnapping and Boko Haram" insurgency (Mutiullah cited in Abubakar, 2011). Insecurity in Nigeria is causing developmental challenges such as endemic penury, high rate of unemployment, inured corruption, low industrial output, unstable and deteriorating exchange rate, high inflation rate, inadequate physical and social infrastructure, large domestic debt, and rising external debt profile factors in which ineffective education is the most prominent and root to other factors.

Generally, conflict and war have long been accepted as significant constraints to development, while violence in "non-conflict" situations has been increasingly recognized as core security and development priority. Moser and Rodgers (2005) are of the view that violence issue is particularly critical in context of rapid social change, and often most evident in "Failing" or 'crisis' states. Zubairu (2017) observes that, Nigeria since the end of the civil war has been wallowing in various serious violence, socio-economic threats incidents and other social vices that include the Boko Haram insurgency, the armed Fulani herdsmen menace, kidnapping gangs, Niger Delta militancy and various others. These vices no doubt hinder the socio-economic development of Nigeria. In addition, Nigeria, according to Oguntunde, Ojo, Okagbue and Oguntade (2018), is known for major crimes which include rape, kidnapping, murder, burglary, fraud, terrorism, robbery, cyber-crimes, bribery and corruption, money laundering, etc.

The entire globe is battling with outbreak of disease, which has caused a downward spiral in many nations' economies, particularly in the education sector. A growing number of schools have either postponed or cancelled academic activities. A few Universities, Polytechnics and Colleges of Education have intensified measures to prevent face-to-face interactions, interviewing to protect staff members and students from contagious diseases. Disaverio, Pata, Gallo, Carrano, Scorza, Sileri, Smart, Spinelli and Pellino (2020) noted that the outbreak of disease has not only over stressed health care system globally but has also transformed medical care system as patient having diseases and needing emergency treatment has been increasing astronomically. The aftermath of the failure of various measures to containing the adverse impact of infectious diseases and pandemic is now contributory to the worsening pace of insecurity in Nigeria. Over the years, some of these outbreaks have killed many people and led to countries closing their borders, employing strict immigration policies and advising people against travelling across borders. These outbreaks had grave consequences on global education. For instance, in West Africa during the Ebola Outbreak of 2013, over 10,000 schools in Liberia, Sierra Leone and Guinea were closed for a full academic year. This was necessitated as a result of the ban on public gathering, which invariably affected schooling (Global Partnership for Education, 2022).

The most recent outbreak is the novel Coronavirus (COVID-19), which was detected in Wuhan, China, and reported to the World Health Organization in China on December 31st, 2019. The Coronavirus pandemic has impacted the world in a lot of different ways and magnitude. Of interest is the devastating impact the new virus has had on the educational system the world over (Ebiner, Schon, Braun, Ebner, Grigoriadis, Haas, Leitner & Taraghi, 2020). Part of the grim consequences includes the spontaneous shutting of schools and sudden switch to remote learning in some jurisdictions as an alternative strategy to sustain the educational process. Also, critical

players in the educational milieu such as educators, lecturers and researchers are faced with the challenges of coping within the debilitating impact of the Corona Virus disease.

The rate of spread became so alarming that most countries took unprecedented steps and precautions to ensure the safety of their citizens and curb the rate of new infections. Recent challenges of insecurity in Nigeria and the emergence of the coronavirus disease (COVID-19) globally have in no small measures affected elaborate planning and actualization of Mathematics teaching and learning in particular and education in general.

Mathematics is a tool, its knowledge and skills are the bedrock of all societal transformation and transfer of ideals into reality (Abubakar & Afe Buame, 2011). It has always been acknowledged, that no nation can rise above the quality of the education, its citizens get. Similarly, the quality of life in any society depends significantly on its standard of education (Onwuka & Moseri, 2011) and the educational standard of any nation also has something to do with the quality of Mathematics education (Moseri & Onwukasmart, 2010).

Insecurity and Disease Outbreak

Security is the state of feeling safe and protected. Security is freedom from worries and a state of being safe from harm by people or things. There is no meaningful development without security and there is no security without development. Security is seen as the freedom for nations to reach their full potential without man-made and natural activities preventing them from achieving the goal of freedom for all. The issue of safety and protection of life and property has always been at the forefront of the activities of academic, government and organizations in recent times. Anything that negates all these aforementioned is referred to as insecurity (Ganor, 2011). In Nigeria security can be categorized into environmental security that protects people from the devastation of natural disasters, economic security that ensures employability and equal wages for all citizens, personal security to protect people from external and internal factors that endanger life and property, political security to protect basic human rights and social justice of everyone life in society, health security includes maximum protection against pandemics and diseases. In the current situation of Nigeria, all these types of security are constantly being breached (Nwolise, 2015).

National security can be seen as the protection of a country's borders and territories from invasion or control by foreign powers. The security of a nation implies its ability to promote its interests and goals, control instability, crime, eliminate corruption, and improve the happiness and quality of life of its citizens. National security is about protecting the interests of its citizens and creating the kind of atmosphere that can hinder the pursuit of everyone's interests. It is about the processes and actions taken to maintain law and order. The United Nation development program report (UNDP, 1994) expands the scope of security to include: Economic security, Food Safety, Health security, environmental safety, personal confidentiality, community security and political security.

National security can be effectively achieved if there is a concerted effort of a country to plan and implement quality Mathematics education and Nigeria is no exception. According to Katsina (2012) the security issues currently affecting Nigeria are but not limited to: Political violence (especially in elections) severe extremism, community violence (Niger Delta), safety of time, lack of employment, poverty, environmental degradation, population explosion and corruption.

Large recent outbreaks of highly pathogenic or highly transmissible infectious diseases include plague (Madagascar), diphtheria (Bangladash), Ebola (West Africa) and Democratic Republic of Congo (DRC), monkey pox (Nigeria), Zikaflu (South and Central America), Middle East Respiratory Syndrome Coronavirus (MERS-Cov; Saudi Arabia and Korea) and Lassa fever (Nigeria). Outbreak of more familiar diseases such as Chikungunya, Cholera, Polio, Measles and seasonal influenza have also occurred. The number of reported outbreaks has increased over the past three decades, this trend is expected to continue with further zoonotic spill-over events occurring due to population expansion and movement into previously uninhabited regions and the influence of climate change on vector distribution (World Health Organization, 2015)

In *epidemiology,* an outbreak is a sudden increase in occurrences of a *disease* when cases are in excess of normal expectancy for the location or season. It may affect a small and localized group or impact upon thousands of people across an entire continent. The number of cases varies according to the disease-causing agent, and the size and type of previous and existing exposure to the agent. Outbreaks include many epidemics, which term is normally only for *infectious disease*, as well as diseases with an environmental origin, such as a *water* or *airborne disease.* They may affect a region in a country or a group of countries. *Pandemic* are near-global disease outbreaks when multiple and various countries around the *Earth* are soon infected (Centers for Disease Control and Prevention, 2015). Similarly, an outbreak is defined as more cases of a disease than expected in a specific location over a specific time or period. Suspicion often arises when health care workers report an unusual Cluster or a single, unexpected presentation. This passive surveillance leads to a delay in the detention of an outbreak. Various efforts have been made to improve this: monitoring social media and internet searches of symptoms have been used to detect and report influenza epidemics (Al-garadi, Khan, Varathan, Mujtaba & Al-Kabsi, 2016). Online platforms have been used to rapidly share or access information about potential outbreaks for two decades (ProMED-mail and Global Public Health Intelligence Network), and never tools have emerged, for example Health Map, an application which generates formal notifications, online news and eye witness reports (Brownstein & Freifeld, 2012). The World Health Organizations Early Warning and Response System (EWARS) provide a box of electronic equipment, allowing a surveillance system to be deployed rapidly during a humanitarian crisis or outbreak.

Mathematics Education

Mathematics is a powerful tool for global understanding and communication that helps organize our lives and prevent chaos (Fadara & Adedapo, 2020). Mathematics is the subject of measurement, numbers and space, is one of the first sciences developed by man due to its great importance and benefits. Mathematics is such a divine subject that some people love it, some fear it, some study it, while others revere it. Goober (2011) stated that, Mathematics is a school subject whose foundation really begins at home as children grow up. It covers many concepts and it is a good communication medium that allows people who speak different languages to communicate easily. Mathematics helps us to understand the world and provides an effective way to develop mental discipline. It is a way of life and a body of knowledge that opens the mind to logical reasoning analytical thinking, and the ability to make abstract objects real or concrete. Abakpa and Iji (2011) recognized that Mathematics is an intellectually stimulating subject that affects all aspects of human activity such as economics, politics, science and technology. Mathematics is central to our understanding of the world in which we live, our ability to master

our environment and to organize society. Education aims to induce changes in human behavior in sync with social norms for the sake of progress and survival. Mathematics education is the process of imparting the mathematical knowledge and skills that are incorporated into it.

Garri (2012) stated the objectives of Mathematics education in school:

a. Raise a generation of people who can think for themselves, respect the view and feelings of others, respect the dignity of labor and appreciate these values specified under our broad national aims and live as good citizen.

b. Inspire its students with a desire for achievement and self-improvement both at school and in later life.

c. Develop habits of effectives critical thinking this means developing logical reasoning both inductively and deductively

d. Develop the ability to differentiate between relevant judgments through discrimination of values.

e. Develop intellectual independence and aesthetic appreciation and expression.

f. Develop the ability to communicate thought through symbolic expression.

g. To develop in the child desirable habits and attitudes like habits of hardworking, self-reliance, concentration and discovery.

According to the National Council of Teachers of Mathematics (NCTM, 2011), basic skills of Mathematics must not be limited to routine computation at the expense of understanding, application and problem solving. The Council reiterated that the identification of basic skills in Mathematics is a dynamic process and should be continually updated to reflect new and changing needs. National Council of Teachers of Mathematics (2011) through the National Council of Mathematics Supervisors (NCMS) developed ten basic skill areas:

a. *Problem Solving*: The principal reason for studying Mathematics are posing questions, analyzing, translating and illustrating results, drawing diagrams, using trails and error, applying rules of logic, recognizing relevant facts and subjecting conclusion to scrutiny.

b. *Apply Mathematics to everyday situation:* Inter-related with all computational activities. Use everyday situations translate them into Mathematics expression, solve and interpret results in the light of initial situation.

c. Alertness to reasonableness of result-calculating devices in society makes this skill essential.

d. *Estimation and Approximation:* Technique for estimating quantity, length, distance, weight, etc.; know when result is précised enough for purpose at hand.

e. *Appreciate Computational Skills:* Addition, Subtraction, Multiplication and Division with the whole numbers, decimals and simple fractions: complicated computations will

usually be done with a calculator. Knowledge of simple digit number facts and mental arithmetic; use of percentage should be developed and maintained.

f. *Geometry:* Concepts of points, line plane, parallel, perpendicular, basic properties of simple geometric figure with emphasis on problem solving; recognize similarities and differences among objects.

g. *Measurement:* Minimally; measure distance, weight, time capacity, temperature and angles; calculate simple areas, volumes; use both metric and customary system with appropriate tools.

h. *Reading, interpreting and constructing tables, charts and graphs:* Considering information into manageable/meaningful terms and use conclusion with simple tables, maps, charts and graphs.

i. *Using Mathematics to Predict:* Elementary notions of probability to determine likelihood of future events and identify immediate past experience that does not affect the likelihood of future events; use of Mathematics to help make prediction.

j. *Computer Literacy:* Understanding what computer can/cannot do.

Statement of the Problem

The problem of insecurity facing Nigeria today is enormous. This astronomically spike in rate to be relatively higher than usual as disease outbreak occur which may result in the closure of school causing challenges to the teaching and learning of traditional subjects (e.g. Mathematics). This problem and others trigger the researchers to embark on investigating the effects of insecurity and disease outbreak to the teaching-learning process of Mathematics in secondary schools of Ibarapa region of Oyo State. Ibarapa region has witnessed a significant increase in security breaches in recent times, including kidnapping, armed robbery, and communal clashes. This has created a volatile environment that can potentially disrupt the teaching-learning process in secondary schools. The region has also experienced outbreaks of infectious diseases such as Lassa fever, cholera, and malaria. These outbreaks can lead to school closures, absenteeism, and decreased productivity among teachers and students.

Research Design

The research design adopted for this study is a descriptive survey. This design is the systematic and structured approach to collecting data from a sample of individuals within a larger population, with the primary aim of providing a detailed and accurate description of the characteristics, behaviors, opinions, or attitudes that exist with the target group.

Research Questions

The following research questions are formulated to guide the study.

1. What is the influence of insecurity and disease outbreak on the teaching and learning of Mathematics?

2. What is the influence of insecurity and disease outbreak on academic performance of students in Mathematics?

Significance of the Study

The result of this study will be of great importance in the following areas:

a. Source of educational data to provide individual and government in case of planning and execution of educational policies.

b. Source of information about the need to promote and encourage teaching and learning of Mathematics as an academic discipline.

c. Source of information about the effect of disease outbreak and insecurity on teaching and learning of Mathematics.

Sample and Sampling Technique

The sample size for this research involved one thousand and five hundred (1,500) secondary school students in Ibarapa region of Oyo State out of which three hundred individual were selected using disproportionate stratified random sampling technique. Disproportionate stratified random sampling technique was used because it allowed the researchers to have representation from all the secondary schools in the study area. There are three Local Government areas in Ibarapa region, namely Ibarapa North, Ibarapa East and Ibarapa Central Local Governments. Five schools were randomly selected from each Local Government to make a total of fifteen schools for the study. From each school twenty students were randomly selected to form the sample population of three hundred for the study.

Data Collection and Validity

Research Instrument

A self-designed questionnaire were administered to the randomly selected respondents from the study area. It consists of two sections. Section A is about the demographic data of the respondent while Section B consists of twenty structured items that elicit information from the respondents.

Validity and Reliability of the Instrument

The instrument was validated by experts who have more than two decades of teaching and research in Mathematics. The reliability of the instrument was determined using test-retest method of reliability. The instrument was first used on fifty members of the population who are not part of the sample and after one week the same instrument was administered to the same people. The two data sets were correlated using Pcarson Product Moment Correlation Coefficient and the result was 0.7, this indicates that the instrument is very reliable since it measured what it was meant to measure at different times.

Data Collection

The questionnaires were administered to the randomly selected respondents from the study area by the researcher and two research assistants.

Method of Data Analysis

The statistical method used for analysis of the data obtained was mean score. The mean score was used to interpret the responses of the students in the questionnaire. The four points Likert rating scale will be as follows:

Strongly Agreed (SA) 4 *Agreed (A) 3* *Disagreed (D) 2*

Strongly Disagreed (SD) 1

The direction rules is $\frac{4+3+2+1}{4} = \frac{10}{4} = 2.5$

Scores of 2.5 and above will be accepted, it will be rejected if otherwise.

Data Presentation and Analysis

Table 1: Influence of insecurity and diseases outbreak on the teaching and learning of Mathematics

S/N	ITEMS	SA	A	D	SD	x	Decision
1	Mathematics is important and necessary for solution of life problems	146	112	36	6	3.33	Accept
2.	Time spent on solving disease outbreak cannot be compared to time spent on Mathematics	144	114	32	10	3.31	Accept
3.	Mathematics reformulate the problem you want to solve, until it becomes comprehensive	140	114	34	12	3.27	Accept
4.	Teaching and learning of Mathematics is highly affected by any disease outbreak that occur	138	110	40	12	3.25	Accept
5.	Outbreak of diseases cause much difficult in understanding and solving practical and theoretical issues; as Mathematics serves as important tools in understanding and solving practical and theoretical issues.	128	108	42	22	3.14	Accept
6.	The impact of Mathematics at maintaining stable, economically viable, peaceful and conducive environment in a nation cannot be over emphasized	120	106	50	24	3.07	Accept
7.	Outbreak of disease can lead to low standard of Mathematics studies	131	116	43	10	3.23	Accept
8.	Insecurity negatively affect student study timings in routine life	108	99	63	30	2.95	Accept
9.	Insecurity brings about some too difficult and wrongly posed Mathematics questions in some Mathematics test and examination	135	132	21	12	3.30	Accept
10.	Student performance is always affected by any disease outbreak	176	105	34	12	3.19	Accept
		1,366	**1,116**	**395**	**150**	**3.20**	**Accept**

Table 1 shows that insecurity and disease outbreak influence the teaching and learning of Mathematics negatively which resulted in low assimilation of the content that should propel the students in using the skills and knowledge in solving the nation's economic as well as political problems.

Table 2: Influence of insecurity and disease outbreak on the academic performance of students in Mathematics

S/N	ITEMS	SA	A	D	SD	x	Decision
1.	Disease outbreak change the behavior of student towards Mathematics learning	129	123	30	18	3.21	Accept
2.	Disease outbreak and insecurity affects the academic performance of student	144	102	39	15	3.25	Accept
3.	Insecurity has negative influence on academic performance of student in Mathematics	156	114	24	6	3.40	Accept
4.	Disease outbreak can bring about negative change in the student academic performance in Mathematics	144	102	39	15	3.25	Accept
5.	Insecurity are affecting the way of reasoning in Mathematics students' life	123	90	54	33	3.01	Accept
6.	Outbreak of disease distract student from their studies	120	102	60	18	3.08	Accept
7.	Outbreak of disease and insecurity makes Mathematics difficult to comprehend as its involves teaching from simple to complex	156	114	24	6	3.40	Accept
8.	Student academic performance in Mathematics are very low while there is outbreak of disease compare to while there is none	99	120	69	12	3.02	Accept
9.	There will be improvement in student academic performance in the absence of insecurity	126	105	51	18	3.13	Accept
10.	Insecurity brings about some too difficult and wrongly posed Mathematics solution in a Mathematics test and examination.	156	105	15	24	3.31	Accept
		1,353	**1,077**	**405**	**165**	**3.21**	**Accept**

Table 2 shows that insecurity and disease outbreak influence the behavior of students negatively towards the study of Mathematics and thereby affect their academic performance in the subject.

Discussion of Result

The findings of this study indicate that insecurity and disease outbreaks have a significant impact on the teaching-learning process in Mathematics, particularly in the Ibarapa region of Oyo State, Nigeria. The overall mean score of 3.20 (Table 1) for all the statements relating to teaching and

learning of Mathematics suggests that respondents strongly agree that insecurity and disease outbreaks affect the teaching-learning process in Mathematics.

The findings are consistent with previous studies that have reported a negative impact of insecurity and disease outbreaks on education. For instance, Moliner & Alegre (2022) found that restrictions due to COVID-19 produced an important decrease in students' Mathematics achievement. Similarly, Khan et al. (2022) found that the COVID-19 pandemic had a significant impact on students' academic performance in Mathematics, particularly in low-income countries.

However, the findings of this study contradict those of Huang et al. (2020), who found that online learning during the COVID-19 pandemic can be effective in improving students' Mathematics achievement, particularly in high-income countries. The discrepancy in findings may be due to differences in context, methodology, and sample population. The findings of this study also highlight the need for strategies to mitigate the impact of insecurity and disease outbreaks on education. This can include providing training for teachers on online learning platforms, providing resources for students to access online learning materials, and developing contingency plans for school closures. Furthermore, the study's findings suggest that insecurity and disease outbreaks can have a disproportionate impact on vulnerable populations, such as students in low-income countries. This highlights the need for targeted interventions to support these students and mitigate the impact of insecurity and disease outbreaks on their education.

In conclusion, the findings of this study provide evidence that insecurity and disease outbreaks have a significant impact on the teaching-learning process in Mathematics, particularly in the Ibarapa region of Oyo State, Nigeria. The findings highlight the need for strategies to mitigate the impact of insecurity and disease outbreaks on education, as well as the need for targeted interventions to support vulnerable populations.

Conclusion

On the basis of the findings of this study, we conclude that insecurity and disease outbreak greatly influence the teaching and learning of Mathematics and thereby affects the academic performance of student in Mathematics. Thus a secured society and disease free community will produce a smooth teaching and learning process in Mathematics which will ensure good academic performance of students in Mathematics.

Recommendations

The following recommendations were made from the findings:

i. Government should provide instructional facilities that will support online education in schools to facilitate online teaching-learning process in the case of forbidden physical gathering.

ii. Government should tackle and arrest youth restiveness by investing on job creation in other to reduce insecurity in the state.

iii. Teachers of Mathematics should be encouraged and empowered to be using online facilities in teaching their students in such a situation that forbids gathering.

iv. Teaching of Mathematics should be made practical and creative to stimulate the creativity of the students towards developing the growth and secure of the country while there is any disease outbreak.

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