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Psychological Impact of Ebola Disease on Survivors: A West Africa study

Babatunde Moses Irinoye
Walden University

Walden University

College of Health Sciences and Public Policy

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Babatunde Irinoye
has been found to be complete and satisfactory in all respects,
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Review Committee
Dr. Chinaro Kennedy, Committee Chairperson, Public Health Faculty
Dr. Jagdish Khubchandani, Committee Member, Public Health Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
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Abstract

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Babatunde Irinoye

MSc, Long Island University, 2010

BSc, University of Lagos, 1990

Dissertation Submitted in Partial Fulfillment

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Abstract

Survivors of Ebola virus disease often experience social isolation. Understanding the psychological impact of Ebola virus disease on these survivors was the focus of this study. The study encompasses assessment of experiences in re-integration back into communities, and psychological implications (post-recovery), among Ebola infection survivors (EIS) in Republic of Liberia. The purpose of the study was to explore the psychological impact of Ebola as the EIS continue their re-integration journey in their communities in Liberia. The conceptual framework for this study was based on principles of system theory, based on interrelatedness of the biopsychological experience of the EIS, and the social system that directly and/or indirectly affects the individual. An exploratory, sequential mixed method design was adapted, and primary data was obtained from 752 study participants. Participants included EIS not integrated into Ebola survivor re-integration service, EIS integrated in re-integration service, EIS who were also caregivers (family/friends), and ten professional healthcare personnel, who are also EIS. The primary data was collected between Jul-Oct 2022 using Patient Health Questionnaire (PHQ-9), Generalized Anxiety Disorder (GAD-7), and Impact of Event Scale-Revised (IES-R), and recorded audio interviews. The qualitative data was analyzed using NVivo version 11, with results indicating challenges relating to stigma, and psychological mental health, while quantitative data was analyzed using SPSS, and Z-test scores which shows a higher prevalence of anxiety (32.3%), depression (22.6%), and stigma (54.3%) among the 752 EIS sampled, compared to the prevalence of anxiety (9.9%), depression (20.2%), stigma (34%) in the general population.

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Dedication

This capstone study is dedicated to my loving parents (Late Mr. Micheal Adetunji Irinoye and Late Mrs. Comfort EbunOluwa Irinoye), my uncle (Late Hon. Justice Timothy A. Irinoye), and my brothers; Late Dr. Adedayo Ishola Irinoye, and Late Prince Johnson Adeniran Irinoye. May their souls rest in peace.

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Immense thanks go to my brother; Late Dr. Adedayo Ishola Irinoye, who inspired, and mentored on this project from the onset to the time of his demise. Lot of thanks to my beloved wife Mrs. Oluwashola A. Irinoye, and my sisters; Mrs. Iyabode Ariwoola & Mrs. Modupe Ajala, and brother, Mr. Adeyemi Irinoye who provided moral support. I also like to appreciate the relentless efforts, mentoring, and guidance provided by my chair, Dr. Chinaro Kennedy, and committee member, Dr. Jagdish Khubchandani, as well as Dr. Oluseye Okunola, Dr. Richard Ogunlusi, Dr. Asimiyu Olatunji in bringing this project to a fulfilment. Similarly, I would like to acknowledge the contributing efforts of Mr. Hamilton Hamma Sano, Miss. Oluwatosin Oyedele, Mr. Abdulrahman Azeez Aroke on various tasks. Appreciation also goes to all Ebola virus disease infection survivors in Liberia who participated in this project.

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Chapter 1: Introduction to the Study

There have been thirty-four reported outbreaks of Ebola, since about 47 years ago when the disease was first reported (Centers for Disease Control and Prevention [CDC], 2019; World Health Organization [WHO], 2023). Out of all the outbreaks, the 2013 and 2016 Ebola outbreak was considered far worse than any of the previous outbreaks. It has the highest recorded number of deaths, spatial dimension, as well as survivors of the disease in history (Shultz et al., 2016). WHO, 2016 put the number of cases at 28,600, resulting in 11,325 deaths and 17,300 survivors. This represents the total occurrence of Ebola reported cases in 10 countries spanning from Africa to Europe and North America. Over 99% of the cases recorded were in Guinea, Sierra Leone, and Liberia. The WHO declared the Ebola outbreak a public health emergency of international concern (PHEIC) in 2014 to 2016.

Ebola virus disease (EVD) is an infectious zoonotic disease, and its primary reservoirs are bats, monkeys, and other small game animals (WHO, 2023). EVD is a severe, communicable, viral illness in humans with a fatality rate of about 50% of cases. The incubation period ranges between 2 to 21 days with symptoms appearing at about 8 to 10 days after infection. Symptoms vary from intense weakness, fever, diarrhea, vomiting, and abdominal pain to severe hemorrhage. Ebola virus can transfer from human to human through bodily fluid of an infected person, and from animal to human through direct contact with an infected animal, or animal waste, carcass, and game meat. There are five strains of Ebola virus, namely the Zaire ebolavirus (EBOV), Sudan ebolavirus (SUDV), Tai Forest ebolavirus (TAFV), Bundibugyo ebolavirus (BDBV),

Reston ebolavirus (RESTV; The 2014 outbreak of Ebola virus disease (EVD) in West-Africa was caused by the Zaire Ebola virus species.

The WHO (2016) defined the Ebola survivor using these two basic criteria: (a) an individual who earlier had a positive result on RT-PCR testing for Ebola virus from body fluid, treated, and subsequently recovered testing negative afterwards, (b) an individual with IgM and/or IgG positive on serological testing for EVD and has not been vaccinated against Ebola virus. The term "survivor" is a term not often used for patients of other disease outbreaks, but is mostly applied to former patients of serious health issues like cancer. The socially constructed term of "former Ebola victims" as survivors reflects the psychological, social, and scientific perception of the victims as well as the severity of the disease itself. Meanwhile, Zwiers et al. (2015) attempted to examine the context of the term survivor as applied to former pediatric brain tumor patients, where they concluded that the experience of the patient can determine what meaning they make of the term survivor. Additionally, Zwiers et al. perceived the term as a social label, rather than just a mere clinical descriptive term.

Background of the Study

The lack of specific treatment for EVD makes prevention the cornerstone in the fight against Ebola. Meanwhile, few studies have taken a deeper interest in ways to manage Ebola infection survivors (EIS). Delamou et al. (2017) identified the need for economy, social, and professional reintegration, and a long-term follow-up of the Ebola infection survivors. Although, the global approach to Ebola disease includes the reintegration of survivors; however, long-term care- and management of Ebola infection survivors has

been a problem. They also noted that many of the Ebola infection survivors live in cluster mappings to facilitate group support, and eight of such clusters exist in Guinea (Delamou et al., 2017). In Liberia, Guinea, and Sierra-Leone, the Ebola infection survivors' care network has 11,000 survivors, with about 5,000 survivors in Liberia alone (New Dawn Monrovia Newspaper, 2018).

The public health progress made during the 2014-2017 Ebola outbreak in Sierra Leone, Guinea, and Liberia, the three most affected countries, was focused on the following four major areas; emergency response: laboratory capacity, surveillance, and workforce development (Marston et al., 2017). The above observation according to Marston et al. (2017) revealed that limited attention is devoted to the post-EVD psychological needs of Ebola infection survivors during and after the outbreak. Although many EIS received a lot of media attention during and immediately after the outbreak, Jalloh et al. (2018) highlighted the importance of building capacity in the management of mental-related challenges associated with Ebola.

Tiffany et al. (2018) reported that there are several similar historical descriptions of post-EVD complications among survivors and the common complications are arthralgia, fatigue, auditory symptoms, and ocular complications, with extremely limited understanding of the ethology of such complications. The limited knowledge of the etiologies of the post-EVD complication also poses some level of challenges regarding the best practices to follow in post-EVD management in future outbreaks. The appearance of Ebola clusters in some specimens from EIS is evidence that the virus may

have persisted in a survivor and may still be transmitted sexually to others (Hossain et al., 2016; Jalloh et al., 2018; Tiffany et al., 2018; WHO, 2016).

The above observations have also heightened public fear and stigmatization of EEIS. There are other unsubstantial insinuations and misinformation that portray the survivors as still being contagious even after treatment and cured of all EVD symptoms. Prominent among such insinuations is the assumption that Ebola disease, or related illnesses was caused by black magic, voodoo, or disobedience to the local gods (Manguvo & Mafuvadze, 2015). These assumptions amplified the stigma, fear, confusion, and discrimination against EIS in Liberia. Such beliefs in the community have created unnecessary stress and psychological outcomes among Ebola survivors in this low-resource setting.

Problem Statement

In 2016, WHO estimated that one in five Liberians suffer a mild to moderate mental disorder. The EIS suffered loss of possessions in the wake of the outbreak. The various forms of loss range from homes, jobs, relationships, and personal belongings of Ebola infection survivors were burnt for the fear of contamination. Survivors of Ebola infection also suffered some other socio-stigmatization, such as being evicted from their rented apartment at the onset of the last Ebola outbreak in Liberia (Rabelo, I., Lee, V., Fallah, M., Massaquoi, M., Evlampidou, I., Crestani, R., Decroo,T., Van den Bergh, R., Severy, N., 2016). There was no provision of palliative measures in place from any quarters either private or governmental organization to address those lost or to cushion the effect of the disenfranchisement experienced because of an being an Ebola infection

survivor. The lack of the much-needed socio-economy support programs inadvertently would have several psychological effects on many of the survivors (Bortel et al., 2016).

The Ebola virus disease containment protocol later involved blocking EIS from attending religious gatherings, and social functions. Similarly, issues like divorce, unemployment, and inability to organize or own businesses, were some of the issues that were also reported (Rabelo et al., 2016). All the identified post-EVD psychosocial issues rested heavily on the stigma associated with the Ebola virus. It was also observed that trade transactions were avoided with known survivors long after being discharged from Ebola treatment units. Cases of neglect and abandonment by family members were reported, and in situations where the survivor was the only surviving member of the immediate family, social support was extremely limited or not forthcoming from the community (Rabelo et al., 2016).

Majority of the affected communities still lack needed legislation, and health policies to protect Ebola infection survivors. In Liberia, irregularities in media reporting also contributed to the mixed feelings survivors get within their local communities (Kilgo et al., 2018). Effects of fear and stigmatization of Ebola on infected survivors is compounded by unknown long-term medical implications in terms of reproductive health. Families will not support the idea of a family member marrying an Ebola infection survivor based on perceptions, while in other situations, Ebola infection survivors were forced to divorce their spouse (Rabelo et al., 2016). This have affected Ebola infected survivors in re-integrating back into their respective localities in Liberia.

Whiteside and Zebryk, (2017) described the social context of Ebola and AIDS as 'in many ways Ebola can be described as AIDS on steroid' (p. 413). They highlighted similarities and differences between Ebola and AIDS, but essential to this study is the similarity outlined in the study which includes the fear and stigma of being either a person living with HIV/AIDS or an Ebola infection survivor. A closer look at both diseases, in the future can contribute to knowledge in terms of identification of cases and synergize provision of care for those affected. Undoubtedly, Ebola and HIV/AIDS both have more debilitating outcomes in similar low-resource settings like Liberia when compared to the effects on the public, the survivors, and the healthcare system of a country with an advance economy.

The identified similarities necessitate further investigation in terms of what will be best practice in providing support for Ebola infection survivors, improvement in healthcare policies, and more sustainable programs dedicated to improving health literacy in vulnerable developing populations like Liberia.

Purpose of the Study

The purpose of the study was to explore the psychological impact of EVD on infected survivors in Liberia. The study is important because it increases an understanding of the psychological impact faced by EIS. An array of post-infection illnesses, stigmatization, and trauma has been linked to the survivors. These range from deprivation of/from the loss of loved ones to Ebola virus infection, loss of personal belongings and lack of substantive re-integration policy for survivors of EVD.

Research Aims and Objective

My general objective of this research study was to investigate the psychological impact of EVD on the day-to-day lives of the survivors of Ebola infection. To achieve these aims/objectives, the following specific objectives are outlined:

- To investigate the prevalence of anxiety among Ebola infection survivors.
- To examine the prevalence of depression among Ebola infection survivors.
- To examine the influence of Ebola-related stigma on Ebola infection survivors' quality of life.

Research Questions and Hypothesis

In this research study, I aimed at investigating the psychological impact of EVD on survivors of the infection, based on the premise that EVD had overreaching direct and indirect psychological impacts on the survivors, their families, and their communities at-large. This necessitates a scientific evaluation and examination of the possible impact common among EIS in Liberia. The central research question focused on identifying the psychological impact of Ebola on survivors.

2014-2016 Ebola pandemic ravaged Liberia after the country was recovering from a 14-year civil war which resulted in loss of lives, weakening of the country's health system, and political stability (Fall, 2019). During the war, a considerable number of Liberians experienced significant trauma through ethnic killings, forced servitude of child combatants, and sexual violence during the war. Life-threatening events such as war, or pandemic/ epidemic outbreaks can lead to higher prevalence of mental disorders and psychosocial distress (Adom, Mensah, Osei (2021). While the civil war is not

stigmatized, in the African cultural context, diseases, certain sickness, or life-threatening events such as cancer, mental issues, misfortunes are sometimes believed to be imparted spiritually on the victims through witchcraft, angered ancestors, evil spirit, or other spiritual means as retributions from wrongdoings, offending the gods by conducting acts against the norms, or disobedience against the culture on the part of the individual or individuals in a family (Rabelo et al., 2016). Stigmatizing attitudes and behaviors directed towards EVD survivors were significant in terms of social rejection, violence, and diminished quality of life (Davtyan et al., 2017). Exploring the prevalence of EVD-related stigma in day-to-day lives of the sampled population living in Montserrado county (the highest number of Ebola survivors in Liberia reside in this county), in comparison to the prevalence of stigma in the general population added value to the objective of this study The independent variable in the study was whether the participant is an Ebola survivor or not. The dependent variables were anxiety, depression, and stigma.

RQ1: Does the prevalence of anxiety significantly differ between Liberia general population and a representative sample of Ebola infection survivors?

$H_0$1: There is no statistically significant difference in the prevalence of anxiety between Liberia general population and a representative sample of Ebola infection survivors.

H_a1: There is statistically significant difference in the prevalence of anxiety between Liberia.

RQ2. Does the prevalence of depression significantly differ between Liberia general population and a representative sample of Ebola infection survivors?

$H_0$2: There is no statistically significant difference in the prevalence of depression between Liberia general population and a representative sample of Ebola infection survivors.

H_a2: There is a statistically significant difference in the prevalence of depression between Liberia general population and a representative sample of Ebola infection survivors.

RQ3. Does the prevalence of stigma significantly differ between Liberia general population and a representative sample of Ebola infection survivors?

$H_0$3: There is no statistically significant difference in the prevalence of stigma between Liberia general population and a representative sample of Ebola infection survivors.

H_a3: There is a statistically significant difference in the prevalence of stigma between Liberia general population and a representative sample of Ebola infection survivors.

Conceptual Framework

The system theory is based on the premise that every individual is a product of the social system they find themselves in, as well as an indispensable part of the same system (Bertalanffy,2013). The system theory indicates the biopsychosocial analysis of an individual as the only all-encompassing method, in which the individual can be understood in the social context, presenting the person-in-environment as an inseparable duo. The conceptual framework for this study is based on these principles of system

theory. According to system theory, social systems consist of micro (individuals), mezzo (organization, family, tribe community), or macro (the society, state, etc.).

This conceptual framework depicts the interrelatedness of the biopsychosocial experience of the individual and the social system as a continuous circle that directly and indirectly produces the outcome in every unit of the system. The pre-Ebola and post-Ebola outbreak prevailing situation of each of the individual interrelating units of the systems (individual, family, and the society) will directly and indirectly affect the outcome of the aftermath of disease outbreak, an individual as a survivor, or the smallest unit of the system (the family and family member of the survivors) which are the mezzo unit of the system. Finally, the prevailing situation of the pre-Ebola and post-Ebola outbreak in a society (macro units of the system) in terms of level of infrastructure, human capital, and capacity, economy, directly and indirectly determine the outcome, and aftermath of the disease for the individual (micro-unit) as a survivor, families of survivors. and nonfamily members (mezzo unit of the system). The sociodemographic status of an Ebola survivor in post- and pre-Ebola outbreak will determine the individual experience of the disease, based on the social context in which the individual finds him or herself. Social and moral support of family and friends will also contribute to the larger systemic outcome. All these aspects of the system end up determining the psychosocial outcome, and whether the survivor will develop PTSD or respond to management afterward.

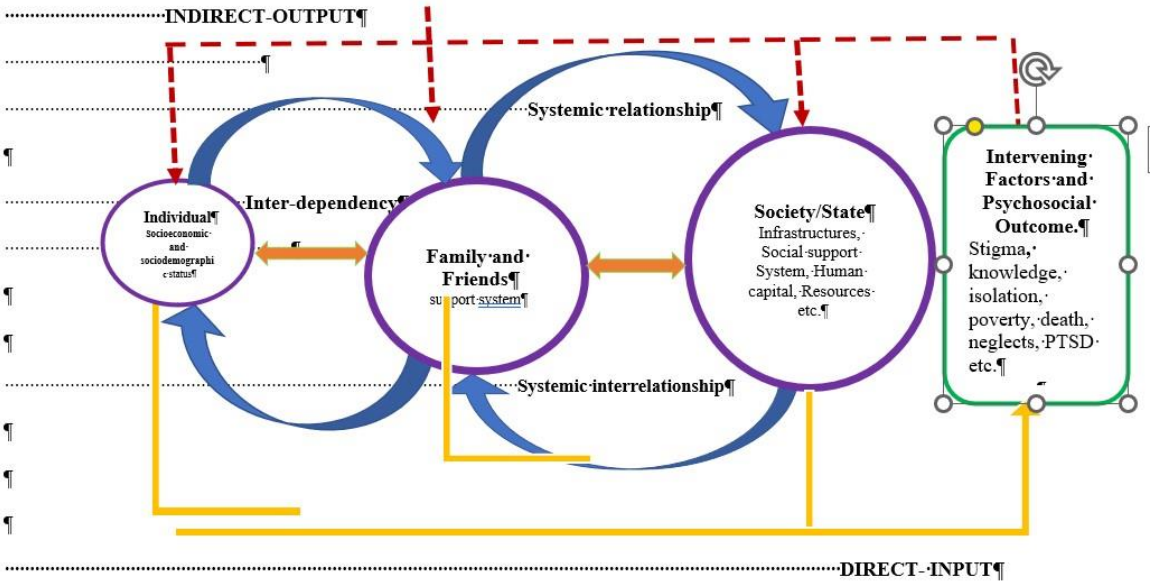
The conceptual framework (Figure 1) was based on the theoretical orientation adopted to best capture the heterogeneous nature of the phenomenon under consideration

as well as the reviewed literature of related studies. The person-environment paradigmatic approach elaborates on the social nature of the spread of Ebola, and the possible psychological impact on the individual.

Borrowing from the systemic paradigm, the system in which an individual exists are interrelated and interdependent. Whatever an Ebola infection survivor experiences is directly determined by the individual sociodemographic characteristics and socioeconomic status. In other words, the individual experience is also influenced indirectly by the family and the social system around him or her. The outcome of the systemic interaction between each component of the system makes the whole system either negative or positive depending on the capacity of the system, the rate of energy import/export, and the level of equilibrium.

Figure 1

Conceptual Framework



Note. Adapted from Von Bertalanffy General Systems Theory

The study is grounded on the social economy account system. The socioeconomic situation and experience of Ebola infection survivors is best situated under the social economy account system as reviewed by Finsterbusch (1982) in which social impact assessment indicators help identify ways in which individuals are affected. One way is economic impact, such as when an employee who loses or gains income or job. According to the social impact assessments, when an individual loses a source of income, it mostly results in having some social impact with capacities of further causing some psychological impact (Frankham, Richardson, Maguire, 2020). Ebola infection survivors lost their source of livelihood because of the disease, trade goods were burnt to prevent contamination, or stolen, or simply due to lack of business patronage, or trade after being discharged from treatment facilities because of stigmatization which consequently resulted in some psychological impact on the survivors.

Another indicator is the environmental impact such as how household items were destroyed to prevent contamination (CDC, 2014). Some EIS lost homes and properties due to stigma (Davtyan, M., Brown, B, & Folayan, M., O. (2014)

Others lost farmlands, crops, and other domestic items were stolen, and in some, people stopped patronizing survivors of Ebola operating businesses or trades because of stigma. Others lost their domestic animals, and survivors also experienced restricted movements within their communities. Rabelo et al, (2016), noted that “Some Ebola survivors were forced to divorce, were driven out of their houses, or lost their jobs as nobody wanted to buy their products at the market, or touch their money” (p. 4). Although some of the survivors willingly relocated, other

were forced to do so due to some other factors that was not directly linked to being an Ebola survivor, but which may have stemmed from losses incurred, such as the death of a loved one from Ebola.

Commercial impact includes how changing prices of goods and services affect consumers. The economy of developing countries where the Ebola outbreak occurred in 2014-16 were devastated greatly. This resulted in a general increase in the price of goods and services, during and the outbreak and aftermath. Transportation impact occurs as EIS who were commercial drivers, dispatchers, auto-repair mechanics, and auto part traders were prevented from using public open spaces like public bathrooms, public transport buses, trains, and ride sharing (James, Wardle, Steel, Adams, 2020). A social impact occurred as social and leisure were altered for Ebola infection survivors as some survivors were heavily stigmatized even by family members. Divorce rates increased after it became evident that a family member is an Ebola infection survivor (James, Wardle, Steel, Adams, 2019). Hostility to EIS also became higher among family members. The feelings of being immune to the Ebola disease for at least another 10 years as reported by WHO (2023), provided a positive social assessment impact.

A biological impact stem through clinical reports that Ebola virus is seen in some EIS bodily fluids relating to issues like ocular problems and chronic joint pains (Wilson, Amo-Addae, Kenu, Ilesanmi, Ameme, Sackey, 2018). Hossain et al, (2016), Marston et al (2017), and WHO (2016) also reported the idea of EIS being susceptible and vulnerable, which also accounts for possible negative social and psychological impact.

Finsterbusch (1982) indicated that individuals who experienced prolonged stress, low self-esteem, deprivation, love, fear, or self-realization are commonly impacted socially, and this could have a positive or negative psychological impact on their lives. Psychological impact mentioned in the social economy account system (SEAS) developed by Fitzsimmons and Levy (1976), and Finsterbusch contains 477 community-level indicators. How social impact was perceived and experienced is what in turn determines the psychological impact, and for the Ebola infection survivors, it has been on the negative side as reported by Hanson et al. (2017).

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Definition of Key Terms

Ebola infection survivor: An Ebola infection survivor is considered as an individual, confirmed negative after Ebola virus disease treatment in a facility, following prior confirmed positive result on RT-PCR testing for Ebola virus on body fluid and/or an individual who is IgM and/or IgG positive on serological testing for Ebola virus disease and was not treated against Ebola virus (WHO, 2016).

Life expectation: The hopes, expectations, and aspirations of Ebola infection survivors about their life.

Psychological impact: The effect of certain social impacts or circumstance surrounding the Ebola infection survivor's capacity negatively, either physically or mentally, giving that the individual would have acted or have different experiences in the absent of those social circumstance surrounding surviving the illness.

Posttraumatic experience: This is a mental disorder or experience that can have mental effect on an individual after been expose to a life-threatening event or circumstances.

Public perception: The social construction of the Ebola infection survivors by the public based on facts and unfounded assumption about the survivors.

Reintegration: The process of getting back to normal productive life in the aftermath of a debilitating illness.

Self-perception: The concept of self by the survivor or the way the individual sees him or herself being an Ebola infection survivor.

Stigma: Goffman (1963) theoretically defined stigma as anything that disqualifies an individual from full social acceptance, the acceptance which is determine by social identity and label. incarcerations, deformity, illness or diseases can lead to stigmatization (Stuenkel & Wong, 2009).

Assumptions

I assumed that a mixed method approach was suit for this study, because a qualitative approach would provide detailed information on the lived experience of the EIS as expressed by the survivors, Ebola infection individuals, Ebola infection caregivers, and experiences of healthcare providers who are also Ebola infection survivors. The quantitative data captures the needed sociodemographic data and other quantifiable, generalizable data. I also assumed that memory recall from the subjects under study would be replayed with a certain level of accuracy.

Scope and Delimitation

The study is focused on EIS in Liberia with intention to understand the psychological impact of Ebola disease on the survivors. This included individual EIS, EIS who are caregivers (immediate family/friends), and also perspectives from healthcare providers who also survived Ebola infection and providing services.

Limitations

The study was limited to traumatic experiences from memory recall by all the survivors. The study did not have any psychiatrist evaluation reports about participants, and the possibility exists that all study participants may not have been able to recall all events, and reactions with accuracy. Liberia was still recovering after 14 years (1989-2003) of civil war ended when country was hit with Ebola epidemic in 2014-2016 (Ako-Egbe, Seifeldin, Saikat, Wesseh, Bolongei, Ngormbu, George, Ocan, C., Peter Lasuba; 2023). Like in many sub-Sahara African countries, epidemiological data on depression, anxiety and stigma is poor as country-specific data are absent, and rather replaced by point prevalence in many cases, which in turn can be a limitation to generalization of this study. Statistical data available may also not capture the real extent of depression, anxiety, and stigma due to other factors such as misdiagnosis, undiagnosed, and unpublished data. However, such available data serves as a starting point to assess the gravity of depression, anxiety, and stigma but could further reduce the generalizability in other social settings.

Significance of the Study

The study can contribute to the body of knowledge on the psychological impact of Ebola disease on the survivors by evaluating survivor's methods of coping with stigmatization and other post traumatic effects associated with the diseases. The self and public perception of survivors, as well as the ways in which the survivor can rehabilitate to make re-integration easier will also be significantly evaluated in the outcome of the research.

Implication for Social Change

The study provided details of the psychological impact resulting from the social environment faced by study participants and ways in which these psychological impacts can reduce or addressed. The identified key causes of negative psychological impact on the Ebola infection survivors may be useful to policy makers in Liberia and other affected countries, nongovernmental organizations, and international organizations in terms of help in identifying areas where attention is needed the most. The research outcome is also expected to aid in the formation of the type of support system that is really required to ameliorate the psychological impacts, and which will in turn foster the re-integration of EIS within reasonable time limit. Furthermore, the outcome of the study is intended to contribute to interventions need-assessment of existing post EVD survivors care programs to foster re-integration journey of survivors.

Summary

I started the chapter by giving the background of the study and the central purpose of the study, which was to explore the psychological impact of Ebola disease on

survivors in Liberia. I also highlighted the theoretical framework for the study, the research aims, objectives, and the research questions. The nature of the study and possible types and sources of information or data were identified. The significance and possible implications for the study was also identified. The central terms in the study were clarified and operationalized to enhance clarity.

Chapter 2: Literature Review

This chapter is focused on the literature review, and the strategy I used in the literature review. These include the application of system theory to psychological impact of Ebola disease on infected survivors as related to other studies focused on the psychological impact of life-threatening diseases. This chapter also contain the conceptual framework which delignated the relationship between identified concepts. The literature was further review on key variables, and concepts. The chapter ends with summaries of all the major themes in the literature, outlined identify gap, and how I attempted to fill the identified gap.

Literature Search Strategy

The research objectives were defined, and a literature search strategy was systematically developed with specific objective to limit bias in selecting the literature for review. The following database were search for literature relevant to psychological impact of Ebola disease on survivors in West-Africa: PubMed, ELSEVIER, GOOGLE SCHOLAR, TAYLOR AND FRANCES (Tandonline), SCIENCE DIRECT, MEDLINE, and ProQuest. The search terms developed using the themes, and major concept of the research objective was helpful in locating the relevant literature. Boolean term such as AND, OR, and NOT, were all used to refines searches. The articles that was reviewed span from materials published between the year 2000 to 2018. The inclusion criteria include articles published in English language only, and those articles which did not focus on the clinical aspect of the Ebola disease alone. The key terms were also typed

directly into Google search engine for themes and concept materials that were limited in the listed databases.

The key search terms, themes, and concepts included *infectious diseases and psychological impact, Ebola disease and psychological impact, Ebola survivors, Ebola in West-Africa, Psychological impact of life-threatening diseases, Psychological impact of Ebola, Post-traumatic experience of Ebola survivors, Pattern of stigma associated with Ebola, Pattern of stigma, Coping strategies as Ebola survivor, Public Perception of Ebola survivors,* and *Living with HIV/AIDS in Liberia*. The literature was further refined using some other exclusion criteria such as eliminated white papers, magazine papers, textbooks, non-English language, and literature that was out of the scope of the cover period, and the degree of relevant of each article.

Williams et al. (2011) significantly established the relationship between infectious disease, and social stigma, and defined stigma as a social reaction based on four major characteristics including:

- An existent of a condition necessitating a stigmatizing response,
- Stigmatized individuals are differentiated from others based on a certain characteristic,
- Stigmatized individuals are identified with a condition,
- A separation exists between the stigmatized and everyone else.

The fear of the unknown created the justification for the exclusion and disenfranchisement of those with medical conditions without apparent cure. The local society in its efforts to curb the spread of an infectious disease, usually ostracize, or

quarantine the individual or extricate any material infected that may put others at the risk of infection. Although conducted for prevention purposes, the social stigma that induced in the process last exceedingly long thereafter, as stigma is reinforced by media reports during and after an outbreak. Although, this view is slightly contrasted by the conclusion of a literature review that was carried out by Gammon et al. (2019), which was done to evaluate the evidence supporting the assertion that stigma is a significant characteristic of isolation experienced in a healthcare setting. Gammon et al., concluded that a clear association exists between stigmatization and isolation because a negative effect develops when patients are placed in isolation. However, this could only be said for isolation setting.

Infectious diseases related social stigma are among the most damaging form of social stigma, as it usually has a harmful effect on the victim's psycho-emotional capacity (Saeed, Mihan, Mousavi, Reniers, Bateni, Alikhani, Mousavi; 2020). Infectious disease stigmatization often sabotages efforts to mitigate the spread of the disease itself, especially when infected individuals no longer make themselves available for treatment options due to the social stigma such individuals observed others suffered. Meanwhile, infectious diseases are said to be the most common diseases associated with stigma (Williams et al., 2011).

In a cross-sectional study by Secor et al. (2020) on mental health among Ebola survivors in West-Africa, using the Personal Health Questionnaire (PHQ-9), prevalence of depression was 22.0% in Sierra-Leone, 20.2% in Liberia, and 13.0% in Guinea. Similarly, using the General Anxiety Disorder (GAD-7), prevalence of anxiety in Sierra-

Leone was 10.7%, in Liberia 9.9%, and 4.2% in Guinea. In all the three countries, the findings showed that higher depression and anxiety scores were significantly associated with experiences of stigma. Many EVD survivors suffer symptoms associated with mental health in Sierra-Leone, Liberia, and Guinea. In a study among EVD survivors in Sierra-Leone, 48% showed symptoms of anxiety or depression (Jalloh et al., 2015). In a similar study, 13% of EVD survivors in Liberia showed symptoms of depression and /or anxiety (de St Maurice et al., 2018), and in another study, 15% of EVD survivors in Guinea had symptoms of psychological suffering (Etard, et al., 2017).

In the last decade, there have been series of serious infectious disease outbreaks such as the influenza A (H1N1), Ebola virus disease, Zika virus, and SARS. At the time, victims of these outbreaks faced stigma as common social issue, and the possibility of mental health issues. Historically, the excuse for the stigmatization of those with infection diseases has been the avoidance of the diseases, hygiene, but the lesson from decades of the spread of human immunodeficiency virus (HIV) acquired immunodeficiency syndrome, serve as lesson that stigma continued long after scientific advancements, making it obvious that stigma only complicates disease control (Fischer et al., 2019).

Infectious diseases are known to have psychological implication for the public and health workers alike, due to invisibility and transmutability when compared to other diseases, which may be more fatal but that are not contagious (Cheung, Cheng, Fong, Sharew, Anders, Xiang, Lam, SR Nursing Working Group; 2022). Infectious diseases outbreak is always accompanied by many psychological outcomes on the general

population, but more on the survivors who may still be perceived as both victim and potential vectors. According to Pappas, et al. (2009), there exists the potential for infringement of personal rights in order to control an outbreak. In event of infectious diseases outbreak, an infected individual usually suffer not just clinical issues, but also psychosocial issues, as they are very likely to experience fear, denial, stigmatization, loss, and discrimination which may take several forms (Pappas et al., 2009).

Historically, the attitude toward any infectious disease has always been that of fear, isolation (quarantine), social separation, and unfavorable policy which mostly strip the patients or survivors of their personal human dignity, are intended for the general good of the populace. (Saeed, Mihan , Mousavi, Reniers, Bateni, Alikhani, Mousavi (2020). However good the containment protocol, the measures do have varying psychological effect on the individual patients who would not have been subjected to such measures if not directed or indirectly affected by the outbreak (Taylor et al., 2008).

Australia experienced its first outbreak of highly infectious equine influenza in the year 2007 with a similar but lesser containment measure to those of the later Ebola outbreak (Taylor, et al., 2008). There was movement restriction of quarantine persons and property, but in the case of Ebola, the personal effects of Ebola infected victims were set ablaze in the onset of the outbreak. The equine influenza psychological impact during the Australia outbreak, was measured using Kessler 10 psychological distress scale. It showed that the areas where the influenza occurred have higher prevalence of psychological distress and the statistic further shows that the psychological distress also varies within participant level of education, age and income as well the source of the

income (Taylor et al., 2008). This observation further strengthens the system paradigm of this study.

Ebola Survivors and Post Traumatic Syndrome Disorder

Knauss and Schofield (2009) defined PTSD as diagnostic psychological mental disorder developed as a result of an overwhelming or traumatic experience and events that include an element of serious physical threat. The list includes potentially traumatic events such as combat, sexual and physical assault, childhood sexual abuse, robbery, kidnapping, terrorist attacks, torture, disasters, severe accidents, life threatening illnesses, witnessing death or severe injury by violent assault, and acts of war. PTSD occurs in about 5-10% of the population and found to be twice common among women than it is with men. Biological and psychosocial risk factors are predictors of onset symptoms, severity and chronicity of PTSD (Breslau, 2002; Yehuda et al., 2015). Paladino et al., (2017) highlighted the prerequisite of PTSD diagnosis an individual or group must have met. These conditions include (a) direct exposure to trauma; (b) witnessing the traumatic act or event in person; (c) indirect involvement, by learning that a close relative or close friend was exposed to trauma; (d) if the event involved actual or threatened death, it must have been violent or accidental; and (e) repeated or extreme indirect exposure with aversive details of the event(s) occurred, usually in the course of professional duties.

In a study conducted to evaluate the quality of life and PTSD among survivors of legionnaire disease outbreak in the Netherlands, 122 survivors were evaluated, and 15% of the sample population presented symptoms of PTSD, thereby reinforced the fact that PTSD are synonymous with disease outbreaks. Majority of the sample population

presented other varying health-related quality of life challenges (Lettinga et al., 2002). Similarly, McAlonan et al. (2007) examined the stress level and psychological distress of severe acute respiratory syndrome (SARS) on survivors one year after the disease outbreak, and discovered that survivors of infectious diseases outbreak usually suffers long-term psychological implications of the diseases. This shows that mental health services could play a significant role in rehabilitation of survivors of infectious diseases.

Another disease in the like of Ebola with long-term psychological impact was the Middle East Respiratory Syndrome (MERS) outbreak in the Middle East, with a record number of survivors in Korea. Selected survivors were examined by Shin et al. (2019) in a study to evaluate the long term impact of the outbreak on the Korean survivors. The study evaluated a cohort of sixty-three samples of MERS survivors, and they were administered the Korean-Symptom Check List 95. The survivors were evaluated for psychiatric problems which may have resulted from their experience of the disease, personal characteristics, and exposure that occurred during the outbreak of the disease. The authors concluded that patient exposure to traumatic events during the outbreak would affect the long-term mental health of the survivors. PTSD, among other psychiatric problems, accounted for 36.5% of the 63.5% population sample of survivors examined, although the patient also presented one or the other psychiatric problem other than PTSD.

In West-Africa, the Ebola outbreak occurred in Nigeria, Liberia, Sierra-Leone, and Guinea in 2014-2016 (CDC, 2016). However, Liberia and Sierra-Leone were the worst hit countries during the outbreak, since both nations had earlier experienced a series of traumatic events, including a civil war, continuous civil unrest, and political

instability. The Ebola survivors faced traumatic experience during treatment, as well as posttreatment stigma in the community. In a cross-sectional study conducted in 2022 with 595 EVD survivors, and 403 close contacts in Sierra-Leone between 2021 and 2022, a high proportion (50.6%), of EVD survivors experienced stigma due to the disease (Schnidell et al., 2024). The impoverish state socioeconomic factors, cultural factors, fear of unknown post-infection symptoms, fear of long-term effects, mistrust between the people, the government and foreign aid workers, fragile health care system, and prevailing poor mental health care all contributed to potential PTSD for Ebola survivors and healthcare workers (Paladino et al., 2017).

Similarity in the Experience of Ebola Survivor and PLWHIV/AIDS

Diseases do not exist in a vacuum but are products of broader structural processes such as poverty, racism, and gender inequality to mention but a few. HIV/AIDS and EVD are contemporary epidemics associated with significant social stigma in which communities affected suffer from social rejection, violence, and diminished quality of life (Davtyan et al., 2017). Furthermore, stigma certainly affect the psychosocial wellbeing of any individual stigmatized, be it as a reason of a disease, or for other reasons. However, when supporting care is available from family, friends, and devotional faith or religious hope, survivors can cope better with their mental distress (Rabelo et al., 2016). According to Davtyan et al., (2017), many stigmatizing attitude and behavior directed towards those with EVD are strikingly similar to those with HIV/AIDS. Both diseases are life threatening, and there is no existing medical cure. Additionally, misinformation about affected groups and modes of transmission still exist. However, a difference is that unlike

Ebola disease survivors, drug users who share needles and people with risky sexual lives are at a higher risk for HIV infection. Mortality due to EVD occurs within a shorter time span as compared to HIV/AIDS, the authors stipulated the essentials of addressing an immediate and remote cause of stigmatization before it becomes a pattern.

Public Perceptions of Ebola Virus Disease

The African setting had from inception always postulated the religion/spiritual theory of diseases in addition to the more generally accepted social, psychological, and the germ theory of diseases. This notion inform how diseases are perceived, socially constructed, treated, and how survivors are regarded in the African society (Anizoba, 2021). The spiritual theory of diseases in the African tradition holds it that diseases and sicknesses such as cancer, skin problems, madness, severe migraine, and HIV/AIDS can inflict an individual spiritually as an act of disobedience. In African settings, believes exist that such could be from witchcraft, angered ancestors, evil spirit, God, or by other spiritual means. The belief exists that spiritual undertones must be involved and a cure must come from spiritual remedies, not by western or orthodox medicine even if symptoms indicate a well-known medical illness (Kahissayet al., 2017; White, 2013).

This spiritual theory of disease is widespread across all forms of belief system that exist in the African society, and this include African Pentecostals, Islamic religion, and traditional African religions who attend to the general health needs of the people (Kahissay et al., 2017; White, 2013). The result of a study by WHO, Center for Public Policy Alternatives, in 2014 on the EVD Knowledge, Attitudes and Practices of Nigerians in Lagos State, also showed that religion to a very large extent determine how

people in the African society construct diseases including Ebola, and even some health workers in the African setting shared such believe about the causation of the disease.

The Ebola disease outbreak situation has several perceived etiologies which are in tangent with the pre-existing Africa theory of disease, one of which is that the Ebola outbreak was a result of failed laboratory experimentation of a biological weapon by the Western world, and/or is a weaponized disease aimed at reducing the African population by a foreign power (Loukatou, Fakourelis, Papageorgiou, Megalooikonomou, V., Kossida, S., Vlachakis, D. (2014). This belief led families and friends of the first set of infected Ebola patients in 2014 to remove their loved ones from the treatment centers, and attack and murder of some of the aid workers in the onset of the outbreak of the disease in Guinea, Liberia, Sierra Leone and in some other affected countries (WHO Emergency Preparedness Response, 2015).

Turay (2017) found out that there were rumors and theories that were common in the wake of the outbreak, which implicated political leaders of the affected countries, international agencies, and foreign governments for initiating the outbreak, and that healthcare workers, top drug companies, and foreign businesses were presumed to always benefit immensely from such outbreaks. The high number of recorded cases, deaths, denials, and hostilities towards healthcare workers at the time was considered by many locals to support the believe that Ebola outbreak had some spiritual underlining.

Theoretical Foundation

System Theory

The non-biological interrelated and interdependent systemic view of society and individuals, earlier referred to as social Darwinism, historical draw a lot from the work of Emile Durkheim and Max Webber (pioneers of system theory social system), (as well as others such as Ludwig von Bertalanffy (1901–1972), Uri Bronfenbrenner's socio-ecological system (1917–2005), and Friedman & Allen (2017)) who examine human biological systems within the context of an ecological environment. Talcott Parsons (1902–1979) also contribute to the systemic approaches in explaining the social occurrence from the structural functionalism perspective noting that all organs of the society have functions to perform, and each organ must function for the social system to reach equilibrium. The system theory today has seen modifications, and contribution from vast field of study varying from disciplines such as sociology, mathematics, social psychology, administration, public health etc. which have applied the theory in solving and analyzing complex concepts.

Basic Assumptions of the System Theory

The fundamental basic tenet of the system theory emerges on the general assumption that encompasses the person-in-environment as an inseparable duo. A system is defined as "an organized whole made up of components that interact in a way distinct from their interaction with other entities and which endures over some period of time" (Anderson et al., 1999, p. 4) in Friedman & Allen, 2017). Additionally, the tenets of the system theory are that each system is a unit of wholeness with a distinct property or

structural limitation that differentiated it from other systems. A familiar demarcation of the systems is the designation of particular social systems as being micro-(individuals), mezzo- (organization, family, tribe community), or macro (the society, state, etc.). The level depends on the system size and complexity. The invisible boundaries of each level also regulate how a particular system import and export through the boundaries. The demarcation is usually in form of sociological, legal definitions and sometimes group membership such as family, ethnic group affiliation etc. These system boundaries are relatively permeable.

A system growth depends on the exchange of energy between the system and its environment, a process that is possible through the boundary permeability. This energy that is exchange can be tangible or intangible material such as food, money, shelter, and other things that contribute to the physical maintenance of the system, education, information, culture, knowledge etc. However, when not balanced, such can cause a negative entropy or *negetropy*, a situation where a system might be importing more than they are exporting.

Major Theoretical Preposition of System Theory

A departure from the linear causality perspective view gave rise to the need for a broader and more inclusive system of approach in enquiry and explanation. The assessment of biopsychosocial and the development of appropriate intervention strategies to a particular problem, investigation approach or explanation requires consideration for the individual, phenomenon, or group in relation to the larger social context (Friedman & Allen, 2017). In other words, a scientific explanation paradigm of any individual bio-

psychosocial makeup should never be done of the individual in isolation, without a close view of the social milieu in which the individual exists. Heterogeneous consideration of all the external, internal, environment, and environmental factors, the tangibles and non-tangible material cultures must all be viewed as inter-connected, interdependent, and inter-relating systems which then determine the bio-psychosocial of the individual. (Friedman & Allen, 2017; Ludwig Von Bertalanffy, 2013).

A discussion paper by Adetola, Adedeji, & Popoola, (2018) employed a systems theory analysis of Ebola virus disease, and nursing needs in the west African sub-region. By extracting data from the archival and academic literature, the researchers were able to theoretically establish that, through biological and social exchange, Ebola disease could cause social systems breakdown too. The paper concluded that the lower degree of permeability present in the Nigerian social system, which is a function of multiple factors, related to space, time, and technology accounted for the outcome of management, control, and containment of EVD in Nigeria, West Africa (Adetola et al., 2018).

In another systemic view of Ebola outbreak in West Africa where the health systems are weak, and severely under resourced, Adetola et al., (2018) concluded that poor disease surveillance, infection prevention and control, and lack of clinical care were favorable to the outbreaks. The researchers opined that EVD emerged and spread more quickly in some of the weakest healthcare systems in the sub-region, especially fragile and post conflict states with a long history of economic woes like Liberia, Congo and other states with very high human under-development.

Additionally, a system theory oriented research was used to analyzed and capture evolution, and transition of the network systems supporting Ebola survivors and their affected communities, during the 2014-15 Ebola outbreak and recovery phases (Hanson, Faley, & Quinn, 2017). The research tracks the evolution of the Liberian Ebola Survival Support System by capturing its transition during different phases of the response, identifies the key issues, and the system structural changes.

Rationale for Choosing System Theory

"*Disease outbreaks are social as well as biological phenomenon. Prevention and control requires understanding and management of causative agents and pathology; but also of contexts, systems and people; and the mechanisms generated by their interactions"* (Agyepong, 2014, page 168). Ebola disease and its spread, as well as the psychological impact on the survivors is an interrelated, inter-dependent and interconnected phenomenon, with each of the element being very difficult to analyze in isolation. If any of the elements of Ebola analysis is done in isolation and not as a system, the explanation will lack the needed content and depth.

The systemic theoretical approach adopted is effective to capture the entire phenomenon under study. Unlike other theoretical approaches that would have been applicable, such as the social psychological impact theory of Finsterbusch (1982), the system theory is a macro theory sufficient in capturing the deficiencies in the existing health system of the most severely affected countries. These deficiencies contributed to the high mortality rate, easy patient to medical workers' transmission, and poor public

health education of the public, thereby contributing to wide, quick and continuous spread of the disease.

The systemic theoretical approach also gave room to capture the lack of the needed social support system in the affected countries. This was particularly useful in explaining how already prevailing poverty in the aftermath of the long history of civil war contributed and complicated the psychological impact of the post EVD outbreak on not just the survivors but also on other citizens. Other individuals not infected with Ebola virus who would have been able to provide the needed social support to Ebola infection survivors where the government social support is not in existent or sufficient for the survivors.

Resettlement, reintegration, and structured intervention programs for Ebola infection survivors seems to be poorly managed, when and where such exists in some of the worst affected countries. Few international support systems are in existence in Liberia, and other low-resource nations affected.

In Appendix E (adapted from WHO), the spread of Ebola virus disease (EVD), and the psychological impact can be best explained by interpretating patterns such as poverty, lack of infrastructure, lack of the needed professionals, and a whole lot of systemic anomalies as connecting dots towards the number of cases, fatality, and disease containment failure.

Ebola infection is higher among the poor and low-income countries when compared to the mortality rate in high-income countries. The infection spread more quickly in the low-income country and outbreak is most likely to re-occur in the low-

income countries when compared to countries with more resources, where real-time disease surveillance is in operation, infrastructures are well maintained, and there is higher health literacy among the population. The spread of the Ebola infection, surviving the infection, as well the survivors' life expectation in the aftermath of the Ebola outbreak is more of a whole systemic dependent. It is not an isolated individual phenomenon, but a call for a systemic view and explanation.

Methodological Review

While several studies have been conducted to examine the experience of Ebola infection survivors, none have qualitatively examined the psychological experience of both the survivor and the primary caregivers. Leary et al., (2018) conducted a qualitative study aimed at capturing impact of Ebola experiences and risk perceptions on mental health in Sierra Leone in which they highlighted that few studies have attempted to assess the mental health impact of Ebola on directly affected populations such as the Ebola infection survivors, healthcare workers, and other response staff. While Rabelo, et al., (2016) used qualitative study to examine psychological distress experienced by Ebola infection survivors in Liberia during hospitalization and reintegration, data was collected through focus group discussions only. In examining mental health symptoms among Ebola infection survivors in Sierra Leone, Jalloh, et al., (2018) used qualitative approach to collect data from non-Ebola survivors who knew Ebola survivors. However, in the project examining psychological impact of Ebola disease on survivors: A West Africa study, the use of mixed method will not only examine the existing issues contributing to the mental health of the Ebola infection survivors in its complexity (qualitative), but also

allow the researcher to examine the relationships existing, assumptions/perceptions held by the Ebola infection survivors, healthcare workers, and the family caregivers (quantitative). Delamou et al, (2017) conducted a cross-sectional study to describe the experience of Ebola virus disease (EVD) survivors in Guinea ten months after discharge from the Ebola treatment unit, using a standardized semi-structured questionnaire to capture data. The questionnaire was distributed among Ebola infection survivors from Conakry and Coyah districts, Guinea in 2015. The questionnaire captured the survivors' socio-demographic characteristics (age, sex, level of education, marital status, profession, residence, people they lived with), their general well-being (economic status, work situation, psychological status, physical health), their socio-professional reintegration (at workplace, with friends, with family, acceptance by others) and involvement in the EVD response. The study concluded that there is a need for a long-term follow-up of EVD survivors in Guinea and more efforts to support their social, professional and economic reintegration, especially in rural areas (Delamou et al., 2017).

Mayrhuber, Niederkrotenthaler, & Kutalek (2017), carried out a content analysis of media reporting on Ebola infection survivors in Liberia, where they analyze media reports from the Daily Observer Liberia (DOL), and several articles published in journals. Mayrhuber, et al., found out that the media defined Ebola infection survivors beyond biological terms, reflecting on a broader social definition of survivorship. Survivorship was associated with challenges such as post-Ebola sufferings, social consequences such as stigma, and discrimination, economic consequences and psychological distress.

A cross-sectional survey design was employed in a 2015 study that assessed the Impact of Ebola experiences and perceptions on mental health in Sierra Leone. A national sample of 3,564 consenting participants were selected for the study through a multistage cluster sampling. Patient Health Questionnaire was used for capturing the sociodemographic characteristics, Ebola experience, perceived Ebola threat, and anxiety-depression symptoms. PTSD symptoms were used to assess the symptoms of anxiety in the general population in Sierra Leone after over a year of outbreak response. The study concluded that psychosocial support may be needed for people with Ebola-related experiences and recommended that preventing, detecting, and responding to mental health conditions should be an important component of global health security efforts (Jalloh et al., 2018).

In a study conducted by Centre for Public Policy Alternatives of the World Health Organization aimed at evaluating the knowledge and perceptions of Nigerians, and Nigeria health workers concerning the Ebola virus disease, their attitudes towards it, and the prevention practices that was adopted to curb its spread in the wake of the Ebola crisis in 2014, quantitative cross-sectional design was used. The quantitative data was collected using structured questionnaires. The sampled constituted 331 people, consisting of 214 from the general population and 117 healthcare workers, selected randomly from 10 local governments in Lagos (W.H.O Centre for Public Policy Alternatives, 2014).

In another qualitative study conducted in Monrovia to better understand the mental distress experienced by survivors during hospitalization and reintegration into their community, the researcher claimed that the rationale for adopting this methodology

was that it will allow the researchers to explore the multiple perspectives of reported experiences and views of the respondents. Purposively selected Ebola survivors from the Médecins Sans Frontières Managed Ebola Treatment Unit, the largest Ebola Treatment Units (ETU) in Liberia, were engaged in a focus group discussion in the study. Three focus groups with a total of 17 participants were conducted between February and April 2015 (Rabelo et al., 2016).

Gaps in Literature

Majority of the studies reviewed did not evaluate the perspective of the Ebola infection survivor care giver/ healthcare provider being first responders. The focus on the healthcare provider availed the researcher the opportunity to examine, and analyze common medical complain, psychological issues, and potential needs of the survivors.

Despite the rigor of the review, there was no literature that sufficiently focused on description, explanation and understanding of the actual psychological impact of Ebola on survivors. Literatures that touched on the psychological impact of Ebola in the Liberia context, and employed the method of this study in capturing the phenomenon are not currently available.

Conclusion and Summary

This chapter highlighted the strategy that was employed in searching different electronic databases, and library for the literature reviewed. The literature review wqs thematically done based on theoretical orientation, objective of the study and methodology applied in similar studies. The conceptual framework was adopted based on

the literature reviewed, theoretical paradigm of the study, as it relates to the study in the chapter.

Chapter 3: Research Method

The purpose of the study was to explore the psychological impact of EVD on survivors in Liberia. Recent clinical studies on Ebola survivors have reported about post infection illness, stigmatization experienced by Ebola infection survivors, deprivation from the loss of loved ones to Ebola, effect of loss of personal belongings and lack of substantive re-integration policy for survivors (Tiffany et al., 2018). The cumulative effect of these issues is bound to have a psychological toll on the survivor of Ebola infection.

According to WHO (2015), one in five Liberians suffer a mild to moderate mental disorder. Among the general population in Liberia, prevalence of depression is 20.2%. Likewise, the prevalence of anxiety is 9.9%, and prevalence of stigma is 34% (Secor et al., 2020; Yuan, 2022). Although different studies have addressed the mental health issue for EVD survivors and those affected by the virus, however, empirical data on the general population is non-existing.

The research methodological orientation that best capture the concept of system theory was adapted based on literature reviewed. I employed a mixed method of data collection and analysis, as the research as the research study focused on understanding the psychological impact of Ebola infection on the survivor. This research design is favored as it most suitable in achieving the aim and objective of the study. It provided for collection of data that was suitable in the description of the phenomenon under study, as well as qualitative data for its explanation. The mixed method research design is more

advantageous in that it usually provides both depth and breadth view of the phenomenon under study.

The method of data collection, the population sample, and the instrument used is described in detail in this chapter, likewise data analysis used.

Setting

The declaration of the 2014/2016 Ebola outbreak as Public Health Emergency of International Concern (PHEIC) on the 8th of August 2014 ended on the 29th of March 2016 after The International Health Regulations (2005) Emergency Committee regarding EVD in West Africa met for the ninth time (WHO, 2016). The report of the committee summarized the outbreak of the virus in the three nations affected namely, Liberia, Sierra Leone, and Guinea. In a similar report, the CDC (2019) reported that Liberia recorded the highest number of deaths despite not been the state with highest number of infections. Out of the 10,678 cases, Liberia recorded 4,809 deaths. Sierra Leone had 14,124 recorded cases, but had 3,956 deaths, and the cases in Guinea were less than that of the other two nations with a total of 3,814 cases, and 2,544 deaths (WHO, 2019). The number of infection cases, and death peaked between August and December 2014 and began declining gradually afterward.

The extent of the Ebola outbreak within the Liberia's 15 counties can be broken down as follows:

- Gbarpolu, Grand Gedeh, Grand Kru and Maryland counties each had about five or fewer cases.
- Sinoe and River Gee counties had six to 20 reported cases.

- Grand Bassa, Rivercess, and Grand Cape Mount each had about 21 to 100 reported cases,
- Bomi, Magidi, Bong, Nimba, and Lofa counties all had about 101 to 500 cases each.
- Montserrado county had about 4,000 cases (WHO, 2019).

Liberia has an estimated 1,550 registered Ebola infection survivors, and of the registered survivors, only 419 accessed the care that is currently available. The number of Liberian Ebola survivors who are accessing the care provided is low compared to the number of registered survivors who accessed provided care in Sierra Leone and Guinea which had about 68% to 80% survivors accessing care. Nigeria had fewer Ebola cases, deaths, and infected survivors compared to Liberia, Sierra-Leone, and Guinea. The care in Liberia currently includes semen screening and counselling for male infected survivors, of which about 355 have been tested, and 37 were positive (WHO, 2016).

The Government of Liberia (GoL) mandated The Ministry of Health and Social Welfare (MoH) to act as the internal governing unit (IGU) overseeing compliance of all the partner agencies such as (WHO, the Red Cross, CDC, Doctors without Borders, and Médecins sans Frontière operating in the country on tracking, prevention, treatment, and reintegration of affected persons (Hanson, Faley, Quinn, 2017). The MoH also enacted policies that promote the Ebola Infection Survivors' Support System to become the strategic action field under which all coordinated efforts occur to aid infected survivors of Ebola disease. The National Ebola Survivors' Network-Liberia (NESNL) is responsible

for the communication of government policy on Ebola infection survivors in every part of the country (Hanson et al., 2017).

Research Design and Rationale

I adopted an exploratory sequential mixed method research design which took the order of qualitative and quantitative. The data for the study was collected using a mixed method of data collection that ran sequentially. The qualitative data was collected and analyzed first. The identified themes, pattern, and other specify variables that needed to go into a follow-up was used in the formation of quantitative instrument that was employed in the collection of quantitative data. Additionally, this gave room for me to understand the most salient psychological issues surrounding the problems of research, and their impact on the Ebola infection survivors. It also supported me in acclimatizing with the problems and with the people in their environment to have the best research outcome.

Qualitative research is most desirable in understanding the meaning individual or group ascribe to a social problem, because qualitative method make it easier for the researcher to render the problem in its complexity (Sutton, & Austin, 2015; Williams, 2007). The quantitative on the other hand examine relationships, and sometimes is useful in testing commonly held assumptions, belief, or perception of a group, or individual on a social issue. (Williams, 2007). This method of research allows for quantifying, which also gave room for generalizability of the research findings. Looking at the research questions, the major strength of the two methods of inquiry helped in answering the research questions. Furthermore, a research methodological design that accommodated

the combination of both the qualitative and quantitative method of enquiry always provide a complete understanding of the research problem than either approach alone (Creswell, 2014).

The choice of mixed methods used in this study enhanced the validity of the study, strengthened the conclusion of the study, and made a significant contribution to existing related studies that applied either qualitative or quantitative research design alone (see Schoonenboom & Johnson, 2017). I adopted a mixed method research design to collect both qualitative and quantitative data to give the study the benefit of having both in-depth, and broader understanding of the psychological impact of Ebola on infected survivors, from which inference, explanation, and the description of the situation was drawn (see Omair, 2015).

The research study is aimed at understanding the psychological impact of Ebola disease on survivors of Ebola infection, based on the premise that Ebola disease had several overreaching direct and indirect psychological impact on the survivors, their families, and their communities at-large. This necessitates a scientific evaluation, and examination of the possible psychological impact of EVD common among Ebola survivors in Liberia. Central to this is the research question "What constitutes psychological impact of Ebola disease on the individual survivor of the infection?"

To answer the question, and to achieve the set objectives of the study, it was important to understand the experience of the EIS who could have a psychosocial, and psychological impact. The most vulnerable to stigma during infectious disease epidemics involve infected individuals, health care workers, and especially frontline medical staff

(Uvais et al., 2020). By design, the research data was collected from four categories of participants:

- EIS (not integrated into Ebola survivors' re-integration service).
- EIS (integrated into Ebola survivors' re-integration service).
- Professional healthcare providers (who survived Ebola virus infection)
- Caregivers (family/friends who survived Ebola virus infection).

The point of convergence for both the qualitative and quantitative data was at the discussion level. The data analysis and presentation of both methods was done independently of each other, but the point of convergence, and integration of both qualitative and quantitative data was at the level of discussion of the findings of the research. The category of population evaluated based on the research objective and questions are as follows:

- Professional healthcare providers who are Ebola infection survivors, and offering healthcare service for Ebola infection survivors
- Ebola infection survivors who are in re-integration service programs
- Ebola infection survivors who are not into re-integration service programs
- Ebola infection survivors who were Caregivers (family and friends) to other Ebola infection survivors

The categories I investigated were based on EIS care and experiences. Also, the groups in best position to discuss the experiential details of the psychosocial impact of Ebola experience as it impacted them as Ebola infection survivors. The mixed methods of data collection ran sequentially.

Nature of the Study

I employed a mixed method of scientific enquiry. This took the form of sequential mix methods. The qualitative aspect of the study was conducted first. I identified the main themes from the qualitative data which I obtained through interviews with the aid of an interview guide developed for the purpose. The quantitative method involved the use of a questionnaire which was adapted from some of the element of Post-Trauma Disorder Syndrome (PTDS) Standard Questionnaire, to the specifics of the objectives of the study and the qualitative data themes.

Role of the Researcher

I was directly involved in every aspect of data collection and analysis. I employed the service of about five local research assistants, who helped in the distribution of the questionnaire and retrieving of the questionnaire. I do not have any formal or informal relationship with any of the participants, nor do I have any pre-knowledge of who the participants would be. Also, I did not have any form of bias towards any of the participants. No establishment had any prior or vested interest in the research, so it remains purely scientific outcome of scientific method of enquiry.

Methodology

Study Participant Selection

The population sample for the research included the following:

- Professional healthcare providers who are EIS, and offering healthcare service for EIS
- EIS who are in re-integration service programs

- EIS who are not into re-integration service programs
- EIS who were caregivers (family and friends) to other EIS

Instrument

A multistage sampling method was employed in drawing sample from the population stated above. The first stage of the sampling procedure employed a simple random sampling method used to collect quantitative data, using paper questionnaire. The questionnaire was administered to EIS (those integrated into the healthcare re-integration program and those not in the re-integration program), EIS who were caregivers (family or friends), and healthcare professionals who were survivors.

The second stage of the sampling for the qualitative aspect of the study employed a purposive sampling method which was considered for the selection of participants among the healthcare personnel. These healthcare professionals are also EIS themselves. Healthcare personnel selected participate in either counselling, clinical care, or nursing care of EIS. Inclusion criteria for all EIS participants in the study is that:

- Male or female individual confirmed negative after EVD treatment in a facility, following prior confirmed positive result on RT-PCR testing for Ebola virus on body fluid and/or an individual who is IgM and/or IgG positive on serological testing for EVD and was not treated against Ebola virus
- EIS above 18 years of age.

Inclusion criteria for sample selection of EIS' professional healthcare provider:

- Male or female, who must not have ever tested positive to result on RT-PCR testing for Ebola virus on body fluid OR an individual who is IgM and/or IgG

negative on serological testing for EVD and was not treated against Ebola virus.

- Must be a healthcare professional in the direct care for Ebola infection survivors.

Inclusion criteria for EIS in re-integration program service:

- Male or female individual confirmed negative after EVD treatment in a facility, following prior confirmed positive result on RT-PCR testing for Ebola virus on body fluid, and/or an individual who is IgM and/or IgG positive on serological testing for EVD and was not treated against Ebola virus.
- Worked/working with either a NG), or NESN) for the EIS.

Inclusion criteria for selection of Ebola infection survivor as caregivers (family/friend):

- Male or female individual confirmed negative after EVD treatment in a facility, following prior confirmed positive result on RT-PCR testing for Ebola virus on body fluid and/or an individual who is IgM and/or IgG positive on serological testing for EVD and was not treated against Ebola virus.
- In addition, provided care to a family/friend confirmed negative after EVD treatment in a facility,

Participants who met the above criteria were enrolled in the study as participants. Each EIS was asked to provide a caregiver who had Ebola infection too (at least one per each Ebola infection survivor) but helped them through their Ebola experience, and this helped in facilitating caregivers' recruitment and participation in the study. Members of the NESNL provided recommendations and referral to EIS. The members network helped

in access to participant recruitment in the local communities. Consent was obtained from participants and documented on consent forms prior to participating in the study. Posters and paper fliers were placed at various locations within Monrovia at strategic places to create additional awareness for the study in local communities. Additionally, word-of mouth helped in the recruitment of Ebola infection caregivers and individual EIS. Healthcare workers for the study came through information from EIS who are in re-integration programs in/around Monteserrado county in Liberia. Interview sessions was conducted individually (not in groups) in environment comfortable to the participants based on arrangements at separate locations in workplaces, and homes to ensure privacy of information.

Sample Size

Power indicates that the more relevant information a study sample hold, the less the number of participants needed to prevent saturation. Therefore, the sample size depended on the aim of the study, theory, research question, analysis strategy etc. (Malterud, et al., 2015).

The Cochran's equation for representative sample for large proportions was adopted to determine the sample size for this section. Cochran (1963) developed the equation to yield a representative sample for proportions of large sample which is above 1,000 (Israel, 1992). Liberia has an estimated 1,550 registered EIS.

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where n_0 is the sample size, Z^2 is the abscissa of the normal curve that cuts off an area α at the tails (1 - α equals the desired confidence level is 95%), e is the desired level of

precision, *p* is the estimated proportion of an attribute that is present in the population, and *q* is 1-*p*. The value for Z is found in statistical tables which contain the area under the normal curve. Assume *p* = 0.5 (maximum variability), Confidence level = 95%, precision = ±5% precision. The resulting sample size is $n_0 = \frac{Z^2pq}{e^2}$

$$n_0 = \frac{Z^2pq}{e^2} = n_0 = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2} = 384.16 \approx 385$$

The population sample for the study was obtained from the sample size calculate above (385). There was no gender preference in the distribution of the questionnaire, as there has not been any notable statistical report that describes the gender distribution of the Ebola virus disease across Liberia. The sample size for the category of Ebola infection survivor caregiver (family/friends) was equated to that of the category of Ebola infection survivors who were never caregivers.

This put the total quantitative sample size for this category at 390 for Ebola infection survivors, and 390 for caregivers who were also Ebola infection survivors, making a total of 780 quantitative samples. This assumption was based on the main cause of evaluating the caregivers in relation to the Ebola infection survivors. Caregivers did not have any isolated quota in the research question or objective.

Data Collection

The research design is a mixed method design. It involved using mixed method (qualitative and quantitative) data collected sequentially. Qualitative and Quantitative primary data for this study was collected in Montserrado county of Liberia between July -

October, 2022. The qualitative data was collected from healthcare practitioners, some had worked/ still work in Ebola treatment specialized care centers across Monrovia (Liberia capital) within Monteserrado county. Monrovia had the highest number of Ebola (fatalities and survivors) cases in Liberia (World Health Organization, 2016). Secondly, the healthcare workers who were Ebola survivors themselves worked in capacities offering healthcare services to Ebola infection survivors.

Qualitative Data

In person, In-depth interview (IDI) method of data collection was employed in collection of qualitative data for the study. In line with existing Covid protocol at the time, the researcher used face masks, throughout the interview sessions. Likewise, researcher provided face masks to participants who did not have to adorn during the interview sessions. Similarly, the health regulation six-feet distance rule, in place at the time was observed. The researcher followed proper handwashing method after field data collections in accordance with health regulations that was still in place at the time. The IDI was conducted in English language. Participating healthcare personnel were presumed to have some higher level of education to have been integrated into healthcare services as a professional.

It is not known if the healthcare professionals interviewed (Ebola infection survivor themselves) used English as the language of interaction with their Ebola infection survivors and caregivers during their administration of services to their patients. In interview guide questions were passed to participating healthcare personnel before the session. This contained set of questions which have was framed based on research

question, past literature, the study objective. Each healthcare professional assisted in other referrals of colleagues, who they had worked together in offering services to Ebola infection survivors.

Researcher used audio recorder was to record during the 10-minute interview sessions and NVivo version 11 software was used for transcribing the data. Additional points were jotted during the interviews. The interview data collected provided an in-depth explanation of the public perception, perceived causalities, and observations made during Ebola infection survivors clinical or therapy visits. psychological impact observed from behaviors, narratives, and other lifestyle issues reported to the healthcare providers by the Ebola infection survivors. Additionally, the data added expressions to real life variations, complaints heard by the healthcare professionals over a period about internalized feelings of their Ebola infection survivor patients.

The qualitative data analysis in addition informed the quantitative data. According to Shannon and Hsieh (2005), conventional content analysis is mostly applicable, when a study design aimed at describing a phenomenon, giving an example of a case of emotional reactions of hospice patients etc. The conventional data analysis method allows for themes to generate simultaneously with the data analysis. This flexibility makes this method of analysis more applicable to this study. The convectional content analysis according to Shannon & Hsieh allows for codes to be defined before, and during data analysis. The codes are derived from theory and relevant research findings and the research objectives. The analytical method permit flexibility (Hsieh & Shannon, 2005).

Quantitative Data

Quantitative data was collected using structured questionnaires (PHQ-9, GAD-7, and IES-R). The questionnaire captures the socio-demographic data, such as the age, income, gender, marital status, employment status of respondents, living arrangement either alone, or with family or friends, etc. Information on anxiety, and depression as well as indicators of quality of life was examined using pre-validated questions obtained from the SF-50 questionnaire bank. The (Public Health Questionnaire (PHQ-9) and General Anxiety Disorder (GAD-7) were developed by Drs Robert L. Spitzer, Janet B. W. Williams, Kurt Kroenke, and colleagues with no permission required to reproduce, translate, or distribute the questionnaire. The Impact of Event Scale-Revised (IES-R) was developed by Daniel S. Weiss (PhD) and Charles R. MarMar (PhD). A stigma is an attribute that discredits an individual, reducing the individual full acceptance in a society. Ebola virus infection survivor groups endure perceived external stigma with a perception that they are devalued by society due to misinformation conceived in minds of the populace during / after the outbreak. The Impact of Event Scale-Revised (ver-6) is a standardized self-administered questionnaires designed in English for self-reporting. The post-traumatic stress disorder will be measured using the Impact of Event Scale-Revised which contain twenty-two items. The IES-R is used often used for determining the extent of post-traumatic events on individuals' psychological well-being after a public health crisis. The Impact event scale used is suitable for repeated measurements over time to monitor progress. It is an appropriate instrument to measure the subjective response to a specific traumatic event in an adult population. Items on IES-R include avoidance

behavior, concentration, stigma reactions/counter-reactions, restrains, feelings/thoughts. The IES-R is not a diagnostic or screening tool for PTSD, but rather it relies on a patients' own report reporting.

Data Analysis

The quantitative data collected using questionnaire was analyzed with SPSS software (version 26) and Z-test. At univariate level, frequency counts, and simple percentages was conducted. At bivariate level, cross-tabulation was employed to show the level of relationship between variables. Also, for quantitative analysis, Z-test is a statistical test used to determine whether two population means (population sampled and general population) are different, or used to compare one mean to a hypothesized value when the variances are known, and the sample size is large.

In this study, Z-test was conducted to compare whether the prevalence of anxiety, depression, and stigma significantly differ between the Liberia general population, and the population of Ebola infection survivors sampled. The qualitative analysis was done using N-Vivo (version 11) which provided opportunity to assess behavioral similarities, resulting from underlying anxiety, depression, and stigma of Ebola infection survivors, and individual factors that contributed to the behavioral expressions and narratives professional healthcare providers noted during services offered to Ebola infection survivors.

Threats to Validity

Instrument validity is the extent to which an instrument measures what it is designed to measure and performs as it is designed to perform. This has two other

variations, but not limited to the two which are external and content validity. The external validity is the ability of the outcome, using an instrument on a sample population and is generalizable to the entire population. Content validity is the measure of the degree of the appropriateness of the research instrument. The content validity is usually ascertained using the following methodology:

a. An exhaustive literature reviews to extract the related items.
b. Content validity survey.
c. Peer or expert in the same field of the research.
d. The content validity ratio (CVR) by employing Lawshe's (1975) method calculation.

The researcher explored the avenues stated by Taherdoost (2016), in order to ensure the instrument validity, credibility, and transferability of the research. The validity is further ensured with the method of sequential mixed method research design.

Ethical Procedures

The study was designed such that participation in the study is voluntary, and the data collection did not target children or vulnerable people. The consent of all participants (18 years and above) was obtained prior to participation. Potential benefits of the research study were discussed to all participants prior to administration of the questionnaires, as well as prior to conducting the interviews. Any participant who wished to withdraw during the course, or at any point during the research study was allowed the opportunity to do so.

All the respondents received assurance of confidentiality and anonymity. Participants identifiable information was optional during the interview sessions, and any identifiable information in the data was de-classified in the data analysis and in reporting the findings. Also, participants were further assured of not being exposed to any form of harm by participating in the research study. Questions that could expose the participants to psychological trauma was avoided, and participants also had the choice of not responding to any question they feel not comfortable with. No special incentive was considered for the research participants. However, given the hot weather at the time of collecting data, research participants received bottle of water, along with a keychain flashlight as a token gift to appreciate their time for answering the interviews or the questionnaire. Due to logistic reasons, data was collected only during daytime. Lessons learned in prior training on Protecting Human Research Participants conducted by National Institutes of Health (see Appendix D) became extremely useful during this research study.

Expected Outcome

The mental and psychological experiences Ebola infection survivors in Liberia face in their communities can be associated with stigma-induced stress, and their socio-demographic status. Many of the Ebola infection survivors, overcoming the first trauma was surviving the Ebola virus disease during the epidemic, and going through the 'After-Ebola' trauma in the hands of their community was quite a challenge. Thus, there were expectations of variations in the level of mental distress / psychological experiences among Enola infection survivors by age, sex, marital status, family support, loss of

family to Ebola, and level of educational attainment of the survivor. Cultural or ethnic difference among participants was not considered to have any significant on the outcome of the study.

However, similarities and differences in the coping mechanisms to distress and stigma, quality of life among Ebola infection survivors was expected. However, it was envisaged that psychosocial outcomes could play out in the communities if the stigma experiences stem from being also a cancer survivor, or a person who had been with living with HIV/AIDS, and now as Ebola infection survivor in Liberia.

Summary

Chapter three highlights the research design for the study, and the rationale for choosing the research design, sampling technique, sampling, method of data collection, the research instrumentation, procedures for recruitment, threats to validity and ethical procedure. In this chapter, the method of data analysis was explained.

Chapter 4: Results

I examined the sociodemographic characteristics of study participants, anxiety, depression, and stigma among EIS, caregivers and health professionals as this affects the quality of life.

Setting

The target population in this study was comprised of EIS subcategorized as individual EIS, caregivers, and healthcare professionals. Republic of Liberia, is bordered by The Republic of Guinea, Republique du Cote-D'Ivoire (Ivory Coast), and Republic of Sierra-Leone (WHO, 2016). According to WHO (2016), more than half of Liberia population live in the urban area of Montserrado county (around Monrovia), the capital city of Liberia where this study was conducted. Montserrado County is one of the fifteen counties in Liberia. As of the 2022 Census, Montserrado county had a population of 1,920,965 making it the most populous county in Liberia (Liberia: Counties, Major Cities, Towns & Urban Areas - Population Statistics, Maps, Charts, Weather and Web Information (citypopulation.de).

Demographics

For the quantitative section of the study, respondents age, sex, marital status, living status, religion, employment status was obtained (see Table 2). These variables are important in providing a background of the participant which may influence their quality of life.

Data Collection

The primary data for this study was collected between July 2022 and Oct 2022. The de-identified data contained a total of 752 respondents The independent variable in the study is participant being an Ebola infection survivor. The dependent variables were anxiety, depression, stigma.

For this study, I used cross-sectional design approach to collect primary data of EIS, Ebola survivors who were also caregivers to EIS, and Ebola survivors who were healthcare professionals involved in attending to EIS in different capacities.

Data was collected using three questionnaires (PHQ-9, GAD-7, IES-R) among Ebola infection survivors and family caregivers and interviews were conducted with healthcare professionals. Each individual EIS was also given the opportunity to identify at least one caregiver (family or friend) who also catered to them as caregivers who also survived the infection. The caregivers were given questionnaire to also participate in the study. Some EIS living with family, relatives, or friends end up providing more than one caregiver who participated in the study, while some others did not provide any caregiver to participate in the study. Nevertheless, 380 EIS were given survey questionnaires, but only 358 Ebola infection survivors completed and returned the questionnaire. A total of 384 caregivers who are family members/friends participated in the study.

Ten Ebola infection survivors, who were healthcare professionals were also interviewed Each EIS produced either a Certificate of Discharged that was issued at Ebola treatment unit for treatment for EVD (see Appendix A), and/ or other identification (Appendix B) as a member of NESNL, or other Ebola survivor program that were

provided by organizations like PREVAIL (Appendix D) that were involved in re-integration of Ebola infection survivor programs. A total of 752 participants (>18 years of age) were involved in this study. Ninety-four percent of the questionnaire administered to participants was returned completed. The survey was carried out using the PHQ-9, GAD-7, and the IES-R questionnaire. Due to challenges in use of electronic methods, and other logistics (electricity, power, etc.) in the settings, the questionnaire was administered on paper, and subsequently electronically documented. Questionnaires were administered in English language, which is spoken by 2.57 million Liberians out of a total population of 4.81 million (see Eberhard et al., 2020). The interviews conducted with healthcare professionals was also in English Language and captured on audio recording.

Data Analysis

The survey questionnaire (quantitative) data was analyzed using IBM SPSS version 26 and Z-test analysis. Z-test is used to conduct test hypotheses when comparing the sample mean μ to the population mean μ0. In this study, the population sample is large $n \geq 30$ (752).

Recorded audio interviews (qualitative) was analyzed using NVivo version 11. The following research questions, and hypotheses were addressed;

RQ1: Does the prevalence of anxiety significantly differ between Liberia general population and a representative sample of Ebola infection survivors?

$H_0 1$: There is no statistically significant difference in the prevalence of anxiety between Liberia general population and a representative sample of Ebola infection survivors.

H_a1: There is statistically significant difference in the prevalence of anxiety between Liberia general population and a representative sample of Ebola infection survivors.

RQ2: Does the prevalence of depression significantly differ between Liberia general population and a representative sample of Ebola infection survivors?

$H_0 2$: There is no statistically significant difference in the prevalence of depression between Liberia general population and a representative sample of Ebola infection survivors.

$H_a 2$: There is statistically significant difference in the prevalence of depression between Liberia general population and a representative sample of Ebola infection survivors.

RQ3: Does the prevalence of stigma significantly differ between Liberia general population and a representative sample of Ebola infection survivors?

$H_0 3$: There is no statistically significant difference in the prevalence of stigma between

Liberia general population and a representative sample of Ebola infection survivors.

$H_a 3$: There is statistically significant difference in the prevalence of stigma between Liberia general population and a representative sample of Ebola infection survivors.

Results

In the study, I analyzed 752 participants, divided into four age groups, with each group having relevant statistical data. The youngest group, aged 20-29, accounted for 106 individuals, which represents 14.1% of the total sample and denotes individuals in the early stages of adulthood. The largest age group was 30-39, with 374 participants, making up 49.7% of the sample, and reflecting a prime phase of personal and professional development. The 40-49 age group had 245 participants, accounting for 32.6% of the total and representing individuals in their middle adulthood, with established careers and familial responsibilities. The smallest group was aged 50 years and above, with 27 participants, constituting 3.6% of the sample, and representing individuals in their later stages of adulthood, potentially encompassing retirees, or those nearing retirement age. The mean age of all participants was 36.6 years, with a standard deviation of 6.7. This information provided insights into the central tendency and variability of participant ages within the study cohort, facilitating a nuanced understanding of the age composition and distribution within the study population to inform subsequent analyses and interpretations. I also examined the gender distribution within the sample group, with 499 individuals (66.4% of the total sample) identified as male and 253 individuals (33.6% of the total sample) identified as female.

The employment status distribution was presented as part of the foundational aspect of the study's demographic analysis of the participants. The data, derived from a representative sample, offers insights into the occupational landscape of the study population, delineated across three distinct categories: self-employed, job-employed, and

unemployed. Within the dataset, 257 individuals are classified as self-employed, representing 34.2% of the total sample. This cohort encompasses individuals engaged in entrepreneurial endeavors, including business ownership and freelance work, demonstrating a significant segment of independent economic activity within the study area. A subset of 101 participants falls under the category of job employed, constituting 13.4% of the sample population. These individuals are characterized by their formal employment arrangements, wherein they hold positions within organizations or companies, highlighting the presence of structured employment opportunities within the study context. The largest group within the dataset comprises 394 individuals, accounting for 52.4% of the sample. This cohort represents individuals actively seeking employment but currently without job placements, indicating the prevalence of unemployment as a prominent socioeconomic concern within the study area. The employment status distribution serves as a crucial component of the study's demographic profile, offering valuable insights into the occupational dynamics and labor market participation of the study population.

The analysis of marital status was an important aspect of the demographic study, providing insight into the relational dynamics within the participant group. The data was collected and divided into four distinct categories: single, married, widowed, and divorced, offering a comprehensive overview of the participants' marital compositions. Of the total sample, 275 individuals (36.3%) were characterized as single, representing a significant proportion of unmarried individuals within the study cohort. The married demographic included 281 individuals (37.4%), comprising those currently in marital

unions, living together, or cohabiting, pointing to a substantial presence of married individuals within the study context. The widowed category accounted for 20.1% of the total sample, with 151 participants who had experienced the loss of a spouse, highlighting the prevalence of widowhood within the study population. Finally, the divorced category consisted of 45 individuals (6.2%), indicating a smaller yet noteworthy segment of divorced individuals within the study cohort.

I examined the living arrangements of the participants and presented the various setups observed within the cohort. The data was grouped into four categories: alone, with friends, with immediate family, and with extended relatives, offering insights into the prevalent living situations. Eleven-point eight percent of the total sample, comprising 89 individuals, reported living alone. These individuals live independently without any immediate family or friends present in their living environment. Approximately 24.3% of the sample, constituting 183 participants, indicated they live with friends, highlighting the prevalence of communal living arrangements among the study population. Nine-point 1 percent of the total sample, a subset of 68 respondents, reported residing with their immediate family members, indicating the presence of familial support networks within their living environment. The largest group, consisting of approximately 54.8% of the sample or 412 individuals, reported living with extended relatives. This demographic segment includes individuals who share their living space with relatives beyond their immediate family, such as grandparents, aunts, uncles, or cousins. These findings showcase the diverse living arrangements within the study population, reflecting a range of social dynamics and support structures.

The study population's religious affiliations was analyzed, revealing a diverse religious landscape among the participants. The affiliations was categorized into three groups - Christianity, Islam, and other - providing valuable insights into the prevalent religious beliefs and affiliations within the sample. Christianity was the largest religious affiliation among the study population, with 348 individuals, comprising 46.2% of the total respondents. This demographic segment included individuals who identified with various Christian denominations, reflecting the dominance of Christianity within the surveyed cohort. Muslims constituted considerable proportion of the study population, with 387 individuals (51.5%) identifying as such. This indicates the prominence of Islam as the second most prevalent religious affiliation among the respondents. The Muslim demographic included individuals adhering to the Islamic faith and its associated practices. A smaller subset of respondents, 17 individuals (2.3%), fell into the "other" category. This category represented individuals with diverse religious affiliations not captured in the primary categories of Christianity or Islam. These individuals may identify with minority religious groups or hold unconventional spiritual beliefs.

Table 1

Sociodemographic Characteristics of Participants

Variable	Frequency	Percentage (%)
Age group (mean=36.6±6.7SD)		
20 – 29	106	14.1
30 – 39	374	49.7
40 – 49	245	32.6
50 and above	27	3.6
Sex		
Male	499	66.4
Female	253	33.6
Employment status		
Self-employed	257	34.2
Job employed	101	13.4
Unemployed	394	52.4
Marital status		
Single	275	36.3
Married	281	37.4
Widowed	151	20.1
Divorced	45	6.2
Living arrangement		
Alone	89	11.8
With friends	183	24.3
With immediate family	68	9.1
With extended relatives	412	54.8
Religion		
Christianity	348	46.2
Muslim	387	51.5
Other	17	2.3

Patient Health Questionnaire-9

The Patient Health Questionnaire-9 (PHQ-9) is an easy to understand, simple to score questionnaire that is useful in resource limited settings like in sub-Saharan Africa where administering comprehensively structured instruments can be very challenging (Gelaye, Williams, Lemma, Deyessa, Bahretibeb, Shibre, Wondimagegn, Lemenhe, Fann, Vander Stoep, Andrew Zhou, 2013).

. It is a self-administered depression screening tool that is based on the nine Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria often used for the screening and management of major depressive disorders, and it has been validated in stigmatized populations (Woldetensay et al., 2018). It is scored on a 4-point Likert scale of frequency with overall range of 0 to 27. The scores are interpreted to generate a tentative diagnosis of depressive disorder as continuous summary score or determine the scale of severity. The PHQ-9 was administered in English. In considering relationships of participants in terms of general health, PHQ-9 was used for the survey to obtain responses. Participants were asked to respond to how often they have been bothered by some problems over the last 2 weeks. Tables 2 shows the participants' responses on the PHQ-9 while Figure 2 presents the breakdown visually. Table 3 shows the level of depression of participants based on the PHQ-9.

Table 2

Distribution of Participants on PHQ-9

PHQ-9	Not at all (%)	Several days (%)	More than half the Days (%)	Nearly every day (%)	Mean±*SD*
Little interest or pleasure in doing things	17 (2.3)	128 (17)	554 (73.7)	53 (7)	1.9±0.8
Feeling down, depressed or hopeless	19 (2.5)	396 (52.7)	192 (25.5)	145 (19.3)	1.6±0.8
Trouble falling or staying asleep, or sleeping too much	13 (1.7)	178 (23.7)	354 (47.1)	207 (27.5)	2.0±0.8
Feeling tired or having little energy	20 (2.7)	236 (31.4)	325 (43.2)	171 (22.7)	1.9±0.8
Poor appetite or overeating	14 (1.9)	181 (24.1)	311 (41.4)	246 (32.7)	2.0±0.8
Feeling bad about yourself- or that you are a failure or have let yourself or your family down	23 (3.1)	246 (32.7)	297 (39.5)	186 (24.7)	1.9±0.8
Trouble concentrating on things, such as reading the newspaper or watching television	16 (2.1)	218 (29)	280 (37.2)	238 (31.6)	1.9±0.8
Moving or speaking so slowly that other people could have noticed. Or the opposite -being so fidgety or restless that you have being moving around a lot more than usual	21 (2.8)	207 (27.5)	295 (39.2)	229 (30.5)	1.9±0.8
Thoughts that you will be better off dead, or of hurting yourself in some way	20 (2.7)	155 (20.6)	264 (35.1)	313 (41.6)	2.2±0.8
Total Score for each Column					17.4±3.4

Figure 2

Percentage of Responses on PHQ-9 Questionnaire

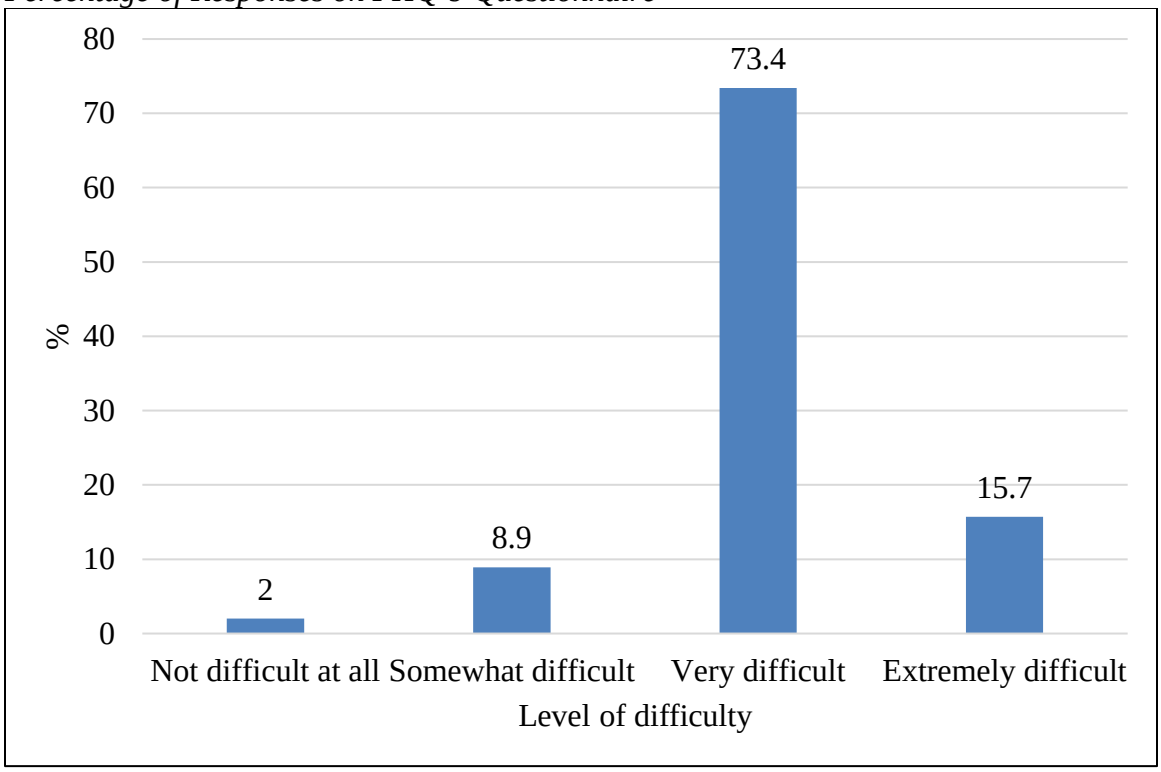

Table 3

Level of Depression

Depression level	Frequency	Percentage (%)
Nonminimal	10	1.3
Mild	21	2.8
Moderate	47	6.3
Moderately severe	518	68.9
Severe	156	20.7

Generalized Anxiety Disorder-7

The Generalized Anxiety Disorder-7 (GAD-7) is also a self-administered screening tool based on seven Diagnostic and Statistical Manual of Mental Disorder criteria for GAD. Both PHQ-9 and GAD-7 tools are validated in sub-Saharan countries

(Gelaye, B., Williams, M. A., Lemma, S., et al., (2013). The GAD scale had been demonstrated to reliably measure depression and anxiety symptoms. Participants were asked to report symptoms of depression and anxiety experienced in the past 2-weeks on a Likert Scale from 0 (Not At All) to 3 (Nearly Every Day) for a maximum score of 12. In considering relationships of participants in terms of Anxiety, The General Anxiety Disorder (GAD-7) Questionnaire was used for the survey to obtain responses. Participants were asked to respond to how often they have been bothered by some problems over the last 2 weeks.

Table 4

Distribution of Participants on GAD-7 Questionnaire

GAD-7	Not at all (%)	Several days (%)	Over half the days (%)	Nearly every day (%)	Mean±SD
Feeling nervous, anxious, or on edge	18 (2.4)	239 (31.8)	454 (60.4)	41 (5.5)	1.7±0.6
Not being able to stop or control worrying	14 (1.9)	380 (50.5)	232 (30.9)	126 (16.8)	1.6±0.8
Worrying too much about different things	23 (3.1)	242 (32.2)	308 (41)	179 (23.8)	1.9±0.8
Trouble relaxing	15 (2)	276 (36.7)	276 (36.7)	185 (24.6)	1.9±0.8
Being so restless that it's hard to sit still	21 (2.8)	234 (31.1)	250 (33.2)	247 (32.8)	1.9±0.9
Becoming easily annoyed or irritable	22 (2.9)	181 (24.1)	245 (32.6)	304 (40.4)	2.1±0.8
Feeling afraid as if something awful might happen	16 (2.1)	155 (20.6)	269 (35.8)	312 (41.5)	2.2±0.8
Total Score for each column					13.2±2.8

Source: Author's computation, 2024

Figure 3

Percentage of Response on GAD-7 Questionnaire

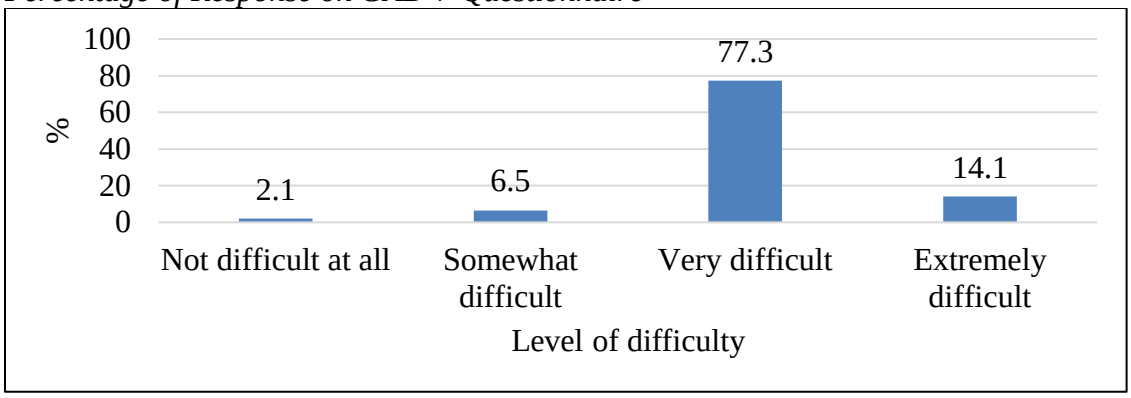

Table 5

Level of Anxiety

Anxiety level	Frequency	Percentage (%)
Minimal anxiety	18	2.4
Mild anxiety	41	5.4
Moderate anxiety	493	65.6
Severe anxiety	200	26.6

Source: Author's computation, 2024

In Table 4; On 'Nearly every day" choice, the question on "Feeling nervous, anxious or on edge" received the lowest at 41 (5.5%) response, response for "Not being able to stop or control worrying" is at 126 (16.8%), "Worrying too much about different things was 179 (23.8%), The question "Trouble relaxing" is at 185 (24.6%), "being so restless that its hard to sit still at 247 (32.8%), "Becoming easily annoyed or irritable" stood at 304 (40.4%). The highest response was for "feeling afraid as if something awful might happen" is 312, representing 41.5%.

In Figure 3; Respondent choice overall answer of 'very difficult" was 77.3%, followed by "Extremely difficult" at 14.1. Response of "Somewhat difficult" was 6.5%

and the lowest of “Not difficult at all” was at 2.1%. In terms of levels of anxiety, Table 5 shows that 65.6% of respondents had “Moderate anxiety”, 26.6% had “severe anxiety”, 5.4% had “Mild anxiety” while 2.4% had “Minimal anxiety”.

Impact of Event Scale-Revised (IES-R)

This tool is used as a measure of stress after traumatic events. The IES-R is a full-scale version of IES-6. It contains 22 items scored from 0 to 88 with demonstrated reliability and validity to measure PTSD symptoms across different cultural settings. The IES-R is not used to diagnose PTSD, it is however used for screening at risk patients with PTSD because it relies on a patient's own report of symptoms (no sooner than two weeks) after a traumatic event, as well as evaluate the patient’s recovery. Symptoms of PTSD was measured by the IES-R. Participants were asked to report PTSD symptoms they experienced in the past seven days on a Likert Scale ranging from 0 (Not At All) to 4 (Extremely). In considering relationships of participants in terms of depression, Impact of Event Scale questionnaire was used for the survey to obtain responses. Participants were asked to respond to how often they have been bothered by some problems over the past seven days.

Table 6

Participant Responses on IES-R

IES-R	Not at all (%)	Little bit (%)	Moderately (%)	Quite a bit (%)	Extremely (%)	Mean±SD
Any reminder brought back feelings about it	41 (5.5)	179 (23.8)	338 (44.9)	158 (21.0)	36 (4.8)	1.9±0.9
Had trouble staying asleep	32 (4.3)	387 (51.5)	132 (17.6)	132 (17.6)	69 (9.2)	1.8±1.1
Other things kept making me think about it	30 (4.0)	163 (21.7)	226 (30.1)	268 (35.6)	65 (8.6)	2.2±1.0
Felt irritable and angry	23 (3.1)	229 (30.5)	282 (37.5)	179 (23.8)	39 (5.2)	1.9±0.9
I avoided letting myself get upset when I thought about it or was reminded of it	25 (3.3)	277 (36.8)	226 (30.1)	170 (22.6)	54 (7.2)	1.9±1.0
I thought about it when I didn't mean to	30 (4.0)	281 (37.4)	209 (27.8)	183 (24.3)	49 (6.5)	1.9±1.0
I felt as if it hadn't happened or wasn't real	22 (2.9)	222 (29.5)	239 (31.8)	220 (29.3)	49 (6.5)	2.1±0.9
I stayed away from reminders about it	27 (3.6)	243 (32.3)	227 (30.2)	189 (25.1)	66 (8.8)	2.0±1.0
Pictures about it popped into my mind	21 (2.8)	257 (34.2)	206 (27.4)	184 (24.5)	84 (11.2)	2.1±1.1
I was jumpy and easily startled	13 (1.7)	201 (26.7)	263 (35.0)	188 (25.0)	87 (11.6)	2.2±1.0
I tried not to think about it	13 (1.7)	260 (34.6)	226 (30.1)	179 (23.8)	74 (9.8)	2.1±1.0
I was aware that I still had a lot of feelings about it, but I didn't deal with them	20 (2.7)	301 (40.0)	224 (29.8)	163 (21.7)	44 (5.9)	1.9±0.9
My feelings about it were kind of numb	23 (3.1)	241 (32.0)	218 (29.0)	209 (27.8)	61 (8.1)	2.1±1.0
I found myself acting or feeling like I was back at that time	34 (4.5)	257 (34.2)	198 (26.3)	197 (26.2)	66 (8.8)	2.0±1.1
I had trouble falling asleep	31 (4.1)	214 (28.5)	246 (32.7)	191 (25.4)	70 (9.3)	2.1±1.0
I had waves of strong feelings about it	18 (2.4)	263 (35.0)	215 (28.6)	185 (24.6)	71 (9.4)	2.0±1.0

I tried to remove it from my memory	14 (1.9)	273 (36.3)	198 (26.3)	217 (28.9)	50 (6.6)	2.0±0.9
I had trouble concentrating	22 (2.9)	227 (30.2)	209 (27.8)	213 (28.3)	81 (10.8)	2.1±1.1
Reminders of it caused me to have physical reactions, such as sweating, trouble breathing	20 (2.7)	282 (37.5)	280 (37.2)	122 (16.2)	48 (6.4)	1.9±0.9
I had dreams about it	16 (2.1)	263 (35.0)	168 (22.3)	245 (32.6)	60 (8.0)	2.1±1.0
I felt watchful and on-guard	17 (2.3)	270 (35.9)	192 (25.5)	211 (28.1)	62 (8.2)	2.0±1.0
I tried not to talk about it.	24 (3.2)	128 (17)	231 (30.7)	166 (22.1)	203 (27)	2.5±1.2
						44.9±5.5

The results in Table 6 highlights the responses of participants on the IES-R. Respondents were asked to select responses; “Not at all”, “Little bit”, “Moderately”, Quite a bit” or “Extremely” on some problems they have been bothered over the past seven days. Responses received indicated “I tried not to talk about it” with the highest response of 2.5±1.2 (Mean±SD) score. “Other things kept making me think about it” at 2.2±1.0, “I was jumpy and easily startled” at 2.2±1.0. “I felt like it hadn’t happened or wasn’t real” was at 2.1±0.9. “Pictures about it popped into my mind” was at 2.1±1.1. Another was “I tried not to think about it” at 2.1±1.0. “My feelings about it were kind of numb” was 2.1±1.0. “I had trouble falling asleep” was also at 2.1±1.0, “I had trouble concentrating” at 2.1± 1.1, “I had dreams about it” was 2.1± 1.0. More responses were “I stayed away from reminders about it” was 2.0± 1.0, “I had waves of strong feelings about it” was 2.0± 1.0“. “I felt watchful and on guard was 2.0±1.0, Any reminder brought back feelings about it” was at 1.9±0.9, “feel irritable and angry” was 1.9±0.9, “I avoided letting myself get upset when I thought about it or was reminded of it” at 1.9±1.0, “I

thought about it when I didn't mean to" was 1.9±1.0. Another response was "I was aware that I still had a lot of feelings about it, but I didn't deal with them" at 1.9±0.9, also "Reminders of it cause me to have physical reactions, such as sweating, trouble breathing" at 1.9±0.9. The least response was from "Had trouble staying asleep" at 1.8±1.1.

In Table 7; The level of Stress was divided into; Intrusion, Avoidance, and Hyperarousal. The mean for Avoidance was 16.6, Intrusion was 16.1, and Hyperarousal was at 12.3.

Table 7

Level of Stress

IES-R	Mean	SD
Intrusion	16.1	3.3
Avoidance	16.6	2.8
Hyperarousal	12.3	1.5
Total IES-R	44.9	5.5

SPSS statistical analysis was used for relationships between levels of socio-demographics and depression, and socio-demographics and anxiety in terms of age, sex employment status, etc. Z-test score was used in comparing if the prevalence of depression, anxiety, and stigma among the population sampled significantly differs from percentages of depression, anxiety, and stigma in the general population. According to WHO (2015), as many as 1 in 5 Liberians suffer a mild to moderate mental disorder. Among the general population in Liberia, prevalence of depression is 20.2%. Likewise, the prevalence of anxiety is 9.9%, and prevalence of stigma is 34% (Secor, et al, 2020; Yuan, 2022).

Z-test was performed using the Mean for variables in the population sampled: Depression (17.4%), Anxiety (13.2%), and Stigma (44.9%) with the Mean in the general population: Depression (20.2%), anxiety (9.9%), and Stigma (34%).

Anxiety

RQ1. Does the prevalence of anxiety significantly differ between Liberia general population and a representative of Ebola infection survivors?

***H*O1**: There is no statistically significant difference in the prevalence of anxiety between Liberia general population and a representative sample of Ebola infection survivors.

***H*A1**: There is a statistically significant difference in the prevalence of anxiety between Liberia general population and a representative sample of Ebola infection survivors.

Z Test for Anxiety was conducted and the hypotheses are indicated as:

- Null (H_0): $\mu = 0$
- Alternative (H_A): $\mu \neq 0$

The values from the study needed to enter into the Z test formula:

- Anxiety score sample mean ($\bar{x}$): 13.2
- Sample size (n): 752
- Hypothesized population mean (μ_0): 9.9
- Population standard deviation (σ): 2.8
- $|Z| > 1.96$)

$Z = (\bar{x}-\mu)/ (\sigma /\sqrt{(n)}$

$= (13.2-9.9) / (2.8 /\sqrt{(752)}$

$= 32.3$

The Z-test score calculated for anxiety was 32.3% which shows a higher percentage of anxiety in the population sampled compared to the prevalence of anxiety in the general population 9.9%.

Conclusion: Since the Z calculated (32.3%) is greater than the Z tabulated (13.2%), the alternative hypothesis (***H*A1)** was therefore accepted, and we conclude that the prevalence of anxiety among the representative sample of Ebola infection survivors is statistically significant at a 5% level.

The GAD-7 questionnaire is a valuable tool for assessing anxiety symptoms in individuals. A thorough analysis of responses from the survey population shown in Table 4 allowed the researcher to focus on specific anxiety-related symptoms. Among the 752 participants, 18 (2.4%) reported no feelings of nervousness, anxiety, or being on edge. 239 participants (31.8%) reported feeling this way for several days, 454 participants (60.4%) reported feeling this way more than half the day, and forty-one participants (5.5%) reported feeling this way nearly every day. The mean score, which indicates the severity of anxiety symptoms, was calculated to be 1.7 with a standard deviation (SD) of 0.6.

The results displayed in Figure 3 indicate that most participants in the sample population experienced a significant burden from generalized anxiety disorder symptoms. Only a small percentage, 2.13%, reported no difficulty in managing their symptoms, while 6.52% experienced mild-to-moderate impairment, and 14.1% reported significant challenges. The largest proportion of participants, 77.26%, reported very high levels of difficulty in coping with anxiety symptoms, suggesting a profound impact on their daily lives and overall functioning. These findings emphasize the need for targeted interventions and support strategies to address the considerable impact of generalized anxiety disorder on individuals' well-being and quality of life.

One of its key components evaluates the extent to which individuals experience difficulties in controlling or stopping worrying, a hallmark characteristic of GAD. The following analysis delves into the frequency distribution of responses to this specific item. A minority of participants, comprising 14 individuals (1.9%) in the study sample, reported experiencing no instances of difficulty in controlling worrying. A substantial proportion of respondents, constituting 380 individuals (50.5%), acknowledged experiencing episodes of struggling to control worrying on several days. For 232 participants (30.9%), the challenge of controlling worrying extended beyond sporadic occurrences, manifesting on more than half of the days. Notably, 126 individuals (16.8%) reported grappling with uncontrollable worrying nearly every day, indicating a persistent and pervasive struggle with this symptom. The mean score calculated for the item "Not being able to stop or control worrying" was 1.6, with a standard deviation (SD) of 0.8. This quantitative summary provides valuable insights into the average intensity and variability of individuals' experiences with this specific symptom within the study population.

The GAD-7 questionnaire includes several items that assess individuals' levels of excessive worrying about various aspects of life. Out of the study cohort, only a small minority of 23 individuals (3.1%) reported no instances of excessive worrying. A sizable proportion of participants, comprising 242 individuals (32.2%), reported experiencing bouts of excessive worrying on several days. For 308 participants (41%), excessive worrying was a persistent challenge that occurred on more than half of the days assessed. Notably, 179 individuals (23.8%) reported grappling with excessive worrying nearly

every day, indicating a pervasive and persistent pattern of worrying. The mean score for the item "Worrying too much about different things" was 1.9, with a standard deviation (SD) of 0.8. This statistical summary provides valuable insights into the average intensity and variability of excessive worrying among individuals in the study population.

Participants in the study were asked to evaluate their experiences with "Trouble Relaxing," referring to difficulties in achieving a state of calmness or relaxation. The analysis revealed that only a small subset of respondents, amounting to 2% or 15 individuals, reported no challenges in achieving relaxation. 36.7% or 276 participants indicated experiencing trouble relaxing on several days during the assessment period, while another 36.7% or 276 participants reported difficulty relaxing on more than half of the days assessed, indicating a frequent occurrence of this symptom. An additional 24.6% or 185 individuals reported struggling with relaxation nearly every day, indicating a persistent challenge in achieving a relaxed state. The mean score for the item "Trouble Relaxing" was at 1.9, with a corresponding standard deviation (SD) of 0.8. This statistical summary provides valuable insights into both the average severity and variability of individuals' experiences with difficulty in relaxing within the study population.

In the survey participants were asked to assess their experiences with restlessness and difficulty remaining calm or stationary. Only a small percentage of respondents (2.8%) did not experience restlessness to the point where it interfered with their ability to sit still, indicating a lack of significant symptoms. A larger portion (31.1%) reported intermittent restlessness, while 33.2% experienced it frequently on more than half of the assessed days. A significant number (32.8%) reported feeling restless almost every day,

highlighting the challenge of maintaining stillness or calmness. The mean score for this item was 1.9, with a standard deviation of 0.9, providing insight into the average severity and variability of restlessness experiences. This analysis contributes to our understanding of restlessness-related symptoms in individuals with generalized anxiety disorder.

In addition, participants were asked to self-report their experiences with heightened irritability or a reduced frustration threshold, as reflected in the item "Becoming easily annoyed or irritable." Of the participants, 22 individuals (2.9%) reported no instances of irritability, indicating an absence of significant irritability-related symptoms. 181 individuals (24.1%) reported experiencing irritability on several days, suggesting an intermittent manifestation of this symptom. 245 individuals (32.6%) reported irritability on more than half of the days assessed, indicating a frequent occurrence of irritability-related symptoms. Meanwhile, a significant majority of respondents, amounting to 304 individuals (40.4%), reported experiencing significant irritability nearly every day, signifying a pervasive and persistent challenge in managing feelings of irritability.

The mean severity score derived from participants' responses to the "Becoming easily annoyed or irritable" item was calculated as 2.1, with a corresponding standard deviation (SD) of 0.8. This statistical summary provides insight into both the average severity and variability of individuals' experiences with irritability within the study population. The analysis of responses to the "Becoming easily annoyed or irritable" item in the GAD-7 questionnaire contributes to a comprehensive understanding of the prevalence and severity of irritability-related symptoms among individuals experiencing

symptoms of generalized anxiety disorder. Such insights are valuable for informing clinical assessments and interventions aimed at addressing GAD-related symptoms and promoting effective coping strategies to manage irritability.

Participants were asked to share their experiences of feeling apprehensive or having thoughts of impending doom, which could be indicative of fear. A small group of individuals (2.1% or 16 participants) reported no fear or apprehension towards negative outcomes, indicating a minimal or non-existent manifestation of this symptom. A notable proportion (20.6% or 155 individuals) reported feeling fear on several days, suggesting an intermittent occurrence of apprehensive thoughts or feelings. A significant number of participants (35.8% or 269 individuals) reported feeling fear on more than half of the assessed days, indicating a frequent manifestation of apprehension regarding potential negative outcomes. Most respondents (41.5% or 312 individuals) reported experiencing significant feelings of fear almost everyday, indicating a persistent challenge in managing such apprehensive thoughts or feelings. The mean severity score for the item "Feeling afraid as if something awful might happen" was at 2.2, with a corresponding standard deviation (SD) of 0.8. This statistical summary provides valuable insight into the average severity and variability of fear-related symptoms experienced by individuals within the study population.

Depression

The research question and hypothesis:

RQ2. Does the prevalence of depression significantly differ between Liberia general population and a representative sample of Ebola infection survivors?

***H*$_O$2**: There is no statistically significant difference in the prevalence of depression between Liberia general population and a representative sample of Ebola infection survivors.

***H*$_A$2**: There is a statistically significant difference in the prevalence of depression between Liberia general population and a representative sample of Ebola infection survivors.

Z Test for Depression was conducted and the hypotheses are indicated as:

- Null (H_0): $\mu = 0$
- Alternative (H_A): $\mu \neq 0$

The values from the study needed to enter into the Z test formula:

- Depression score sample mean ($\bar{x}$): 17.4
- Sample size (n): 752
- Hypothesized population mean (μ_0): 20.2
- Population standard deviation (σ): 3.4
- $|Z| > 1.96$)

$Z = (\bar{x}-\mu)/ (\sigma /\sqrt{(n)}$

$= (20.2-17.4) / (3.4 /\sqrt{(752)}$

$= 22.6$

The Z-test score calculated for depression was 22.6% which shows a higher percentage of depression in the population sampled compared to the prevalence of depression in the general population 20.2%.

Conclusion: Since the Z calculated (22.6%) is greater than the Z tabulated (17.4%), the alternative hypothesis (***H*$_A$2)** is therefore accepted, and we conclude that the prevalence of depression among the representatives of Ebola infection survivors is statistically significant at a 5% level.

The PHQ-9 was designed to assess the severity of depressive symptoms in the study participants as shown in Table 2. It consists of items, each corresponding to a specific symptom of depression. The frequency and severity of depressive symptoms among the study participants are meticulously examined, providing a comprehensive understanding of the psychological well-being within the sampled population. The data on the frequency of specific depressive symptoms over the past two weeks is systematically presented, offering insights into the prevalence and severity of these symptoms. Participants were asked to rate the level of little interest or pleasure in doing things. A minority of participants, comprising 17 individuals (2.3%), reported experiencing little interest or pleasure in doing things. A larger subset of the sample, consisting of 128 participants (17%), indicated experiencing this symptom for several days. Most respondents, amounting to 554 individuals (73.7%), reported experiencing little interest or pleasure in doing things for more than half the days over the past two weeks. A notable proportion of participants, encompassing 53 individuals (7%), reported experiencing this symptom nearly every day during the specified timeframe. The overall mean score for this item is 1.9, with a standard deviation (SD) of 0.8, providing additional insights into the average severity and variability of depressive symptoms within the studied population.

The data collected from the study provides a comprehensive understanding of the frequency and severity of depressive feelings, with a particular focus on the symptom of "Feeling down, depressed, or hopeless." The responses were sorted into four categories based on frequency, revealing a minority subgroup of 19 individuals (2.5%) who reported

an absence of these feelings. On the other hand, a significant portion of the sample, comprising 396 individuals (52.7%), experienced these symptoms intermittently over the past two weeks, indicating a prevalent occurrence. Additionally, 192 participants (25.5%) reported feeling down or depressed more than half of the days during the specified timeframe, while approximately 145 participants (19.3%) consistently felt down or hopeless almost every day. These findings suggest a persistent occurrence of this depressive symptom among a notable segment of the study population. The overall mean severity score for this symptom was 1.6, with a standard deviation (SD) of 0.8, providing a quantitative measure of the average intensity of depressive feelings within the sample.

In the exploration of sleep-related issues within the study population, the frequency of symptoms related to trouble falling, staying asleep, or sleeping too much was assessed. The results showed levels of frequency and offered a detailed understanding of the prevalence and severity of these symptoms among participants. A minimal proportion of participants, comprising thirteen individuals (1.7%), reported an absence of sleep-related issues, indicating that this symptom was virtually non-existent for this subgroup. A noteworthy segment of the study population, 178 individuals (23.7%), experienced trouble falling, staying asleep, or sleeping too much intermittently over the past two weeks. This suggests a substantial prevalence of sleep-related symptoms within the sample. A significant subset of participants, 354 (47.1%), reported a moderate frequency of these sleep-related issues, indicating that they occurred more than half of the days during the specified timeframe. Approximately 207 participants (27.5%) consistently experienced trouble falling or staying asleep or sleeping too much nearly

every day, highlighting a persistent occurrence of these symptoms among a notable segment of the study population. The mean severity score for these sleep-related symptoms was 2.0, with a standard deviation of 0.8. This quantitative measure provides insight into the average intensity of sleep-related issues within the study population. This data contributes valuable insights into the distribution and severity of sleep-related symptoms, offering researchers a nuanced understanding of the sleep health landscape within the studied cohort. The mean severity score and standard deviation further quantify the collective impact of these symptoms, providing a basis for comprehensive analysis.

The result of the study further showed that only a small group of participants (2.7%) reported feeling no fatigue or low energy levels. This indicates that a minority of participants did not experience significant fatigue-related symptoms. However, a notable percentage of participants (31.4%) experienced fatigue intermittently, with symptoms occurring on several days within the specified timeframe, indicating a moderate prevalence of fatigue-related symptoms in a significant subset of patients. Additionally, a substantial segment of participants (43.2%) reported experiencing fatigue frequently, with symptoms manifesting on more than half of the days during the assessment period, suggesting a notable prevalence of moderate to severe fatigue-related symptoms within this population. Almost a quarter of the patients (22.7%) consistently experienced fatigue almost every day over the assessment period, indicating a persistent occurrence of these symptoms among a significant subset of patients. This subgroup represents individuals with the most severe manifestations of fatigue, potentially indicating chronic fatigue

requiring intervention and management. The mean severity score for fatigue-related symptoms was at 1.9, with a standard deviation of 0.8. This quantitative measure provides a comprehensive assessment of the average intensity and variability of fatigue experienced by patients, offering valuable insights into the collective impact of these symptoms on patients' daily functioning and quality of life.

The evaluation of depressive symptoms often involves disruptions in appetite, such as decreased appetite or overeating. The study investigated how prevalent and severe these symptoms were among the participants. The results show the distribution and statistical measures associated with these appetite disturbances. Participants' answers were analyzed to reflect the severity of their symptoms. A small percentage of participants (1.9%) reported not experiencing any appetite disturbances during the evaluation period, indicating that some individuals did not exhibit significant disruptions in their appetite. However, a considerable number of participants (24.1%) reported experiencing appetite disturbances for several days, indicating a moderate prevalence of these symptoms. Moreover, a large group of participants (41.4%) reported experiencing these symptoms for more than half of the evaluation period, suggesting a notable prevalence of moderate to severe appetite disturbances. Lastly, a considerable proportion of participants (32.7%) reported experiencing these symptoms almost every day, indicating chronic and pervasive issues that may require intervention and management. In terms of severity, the mean score for these symptoms was 2.0, with a standard deviation of 0.8, providing valuable information to assess the overall severity of depressive symptoms among the population.

Feelings of low self-worth and perceived failure are hallmark symptoms of depression and are crucial indicators of psychological distress. This study sought to assess the frequency and severity of these symptoms among participants using the Patient Health Questionnaire (PHQ-9). The data presented in Table 2 offered a comprehensive understanding of the prevalence and impact of these symptoms within the study population. Participants' responses regarding feelings of bad about themselves, or feelings of failure or letting oneself or family down, were examined. A minority of participants, comprising 23 individuals (3.1%), reported experiencing no feelings of low self-worth or perceived failure. This subgroup indicates a small subset of participants who did not exhibit significant distress related to self-esteem or perceived inadequacy. A significant proportion of participants, totaling 246 individuals (32.7%), reported experiencing feelings of low self-worth or perceived failure for several days within the assessment period. This suggests a moderate prevalence of these symptoms among a substantial subset of the study population. A substantial segment of participants, accounting for 297 individuals (39.5%), reported experiencing feelings of low self-worth or perceived failure on more than half of the days during the assessment period. This indicates a notable prevalence of moderate to severe symptoms within the study population. Approximately 186 participants (24.7%) consistently experienced feelings of low self-worth or perceived failure nearly every day over the assessment period. This subgroup represents individuals with the most severe manifestations of these symptoms, potentially indicating significant psychological distress and impaired functioning.

The mean severity score of 1.9, with a standard deviation of 0.8, provided crucial quantitative insights into the intensity and variability of feelings of low self-worth or perceived failure among the study participants. This statistical measure serves as a valuable indicator of the overall level of distress experienced by individuals within the study population regarding their self-esteem and perceived competence. The mean severity score of 1.9 indicates that, on average, participants reported experiencing feelings of low self-worth or perceived failure to a moderate extent, falling between the categories of "Several Days" and "More than Half the Days" on the severity scale. This suggests that a considerable proportion of participants endorsed these symptoms at a moderate frequency during the assessment period. Additionally, the standard deviation of 0.8 provides crucial information about the variability or dispersion of severity scores around the mean. A standard deviation of 0.8 indicates a moderate level of variability in severity scores among participants. This variability suggests that while the average severity score is 1.9, individual experiences of feelings of low self-worth or perceived failure may vary within the study population. Some participants may report minimal symptoms, while others may experience more pronounced distress in this regard. Together, these quantitative measures offer a nuanced understanding of the collective impact of feelings of low self-worth or perceived failure on participants' psychological well-being. The mean severity score provides an estimate of the average intensity of symptoms, while the standard deviation highlights the extent to which severity scores deviate from this average, capturing the diversity of experiences within the study population.

An analysis of the study data offers a detailed examination of the widespread and detrimental effects of low self-esteem and perceived failure on those who participated. The analysis combines quantitative data from the PHQ-9 with contextual interpretation to provide a complete overview. The data reveals the severity of depressive symptoms, including concentration difficulties, among the participants. The responses provided by the participants indicate that only a small minority, 16 individuals (2.1%), did not experience concentration difficulties. The most frequently reported category, with 218 respondents (29%), was experiencing trouble concentrating for several days. Concentration difficulties for more than half the days was reported by 280 respondents (37.2%). Additionally, a considerable proportion of participants, 238 individuals (31.6%), struggled with concentration nearly every day.

The study collected participants' responses to derive a mean concentration difficulty score of 1.9, with a standard deviation of 0.8. This numerical measure provides valuable insight into the severity and variability of concentration-related symptoms within the population. The mean score of 1.9 indicates a moderate level of impairment in cognitive functioning related to depression, suggesting that participants experience noticeable concentration difficulties. The standard deviation of 0.8 reflects the spread of concentration difficulty scores around the mean. A larger standard deviation implies greater variability, while a smaller standard deviation indicates a more homogeneous experience among participants. These measures offer researchers and clinicians a nuanced understanding of the distribution and magnitude of concentration difficulties

within the studied cohort, guiding effective interventions and treatment strategies for improving mental health outcomes.

The evaluation of motor activity and psychomotor agitation, which includes the contrast between slow movements or speech and restlessness, is crucial to comprehending the expression of depressive symptoms. In this study, participants' responses concerning the frequency of these contrasting behaviors was thoroughly examined. The data is presented as follows: Participants were asked to rate the frequency of two distinct behaviors - "Moving or speaking so slowly that other people could have noticed" and "Being so fidgety or restless that you have been moving around a lot more than usual." Of the participants, 21 (2.8%) reported that they had never experienced either behavior. A considerable number of participants, 207 (27.5%), experienced these behaviors on several days, while 295 (39.2%) reported experiencing them for more than half a day. Additionally, 229 (30.5%) indicated that these behaviors occurred nearly everyday. The quantitative analysis of the responses yielded the following summary statistics: the mean symptom score was 1.9, and the standard deviation (SD) was 0.8. The mean score of 1.9 indicates the average severity of these symptoms within the study population, which suggests a moderate level of manifestation of these behaviors across the cohort. The standard deviation of 0.8 signifies the degree of variability or dispersion of individual scores around the mean, offering insights into the range of experiences among participants.

Furthermore, the study investigated depressive symptomatology, understanding the severity and frequency of suicidal ideation or self-harming thoughts experienced by

the participants in the study. This facet of mental health was evaluated through participants' responses regarding the frequency of thoughts concerning self-harm or the desire for death. The data obtained indicated that 20 participants (2.7%) reported no instances of such thoughts. 155 participants (20.6%) experienced these thoughts on several days. 264 participants (35.1%) reported experiencing these thoughts more than half the days. 313 participants (41.6%) indicated that these thoughts occurred nearly everyday. The quantitative analysis of responses was statistically summarized as follows; mean severity score: 2.2, and standard deviation (SD): 0.8. The mean severity score of 2.2 provides an insight into the average intensity of self-harming or suicidal ideation within the study population.

In Figure 2, respondents' overall choice answer on the PHQ-9. Participants were asked about the impact of depressive symptoms on their daily functioning. Specifically, participants were asked about difficulties related to work, home responsibilities, and interpersonal relationships. The responses indicated that 118 individuals (15.69%) found their symptoms extremely challenging in terms of functioning. Only 15 respondents (1.99%) reported no difficulty. 67 participants (8.91%) experienced some level of difficulty. The majority (552 individuals, 73.4%) found their symptoms significantly impairing.

Stigma

The research question and hypothesis:

> **RQ3.** Does the prevalence of stigma significantly differ between Liberia general population and a representative sample of Ebola infection survivors?

***H*$_O$3**: There is no statistically significant difference in the prevalence of stigma between Liberia general population and a representative sample of Ebola infection survivors.

***H*$_A$3**: There is a statistically significant difference in the prevalence of stigma between Liberia general population and a representative sample of Ebola infection survivors.

Z Test for Stigma was conducted, and the hypotheses are indicated as:

- Null (H_0): $\mu = 0$
- Alternative (H_A): $\mu \neq 0$

Here are the values from the study needed to enter into the Z test formula:

- Stigma score sample mean ($\bar{x}$): 44.9
- Sample size (n): 752
- Hypothesized population mean (μ_0): 34
- Population standard deviation (σ): 5.5
- $|Z| > 1.96$)

$Z = (\bar{x}-\mu)/ (\sigma /\sqrt{(n)}$

$= (44.9-34) / (5.5 /\sqrt{(752)}$

$= 54.3$

The Z-test score calculated was 54.3%, showing a higher percentage of stigma in the population sampled when compared to the percentage of stigma (34%) in the general population.

Conclusion: Since the Z calculated (54.3%) is greater than the Z tabulated (44.9%), the alternative hypothesis (***H*$_A$3)** was therefore accepted, and we conclude that the prevalence of stigma among the representatives of Ebola infection survivors is statistically significant at a 5% level.

Impact of Event Scale-Revised (IES-R) is a tool used as a measure of stress after traumatic events. The IES-R is a full-scale version of IES-6. It contains 22 items scored from 0 to 88 with demonstrated reliability and validity to measure PTSD symptoms across different cultural settings. The IES-R was not used to diagnose PTSD, it is however used for screening at-risk patients with PTSD because it relies on a patient's report of symptoms (no sooner than two weeks) after a traumatic event, as well as evaluating the patient's recovery. Symptoms of PTSD were measured by the IES-R. Participants were asked to report PTSD symptoms they experienced in the past seven days on a Likert Scale ranging from 0 (Not At All) to 4 (Extremely). In considering the relationships of participants in terms of depression, the Impact of Event Scale questionnaire was used for the survey to obtain responses. Participants were asked to respond to how often they have been bothered by some problems over the past seven days.

The IES-R is a valuable tool for assessing the impact of traumatic events on individuals' psychological well-being. Among the respondents, 5.5% reported no distress when reminded of the event, while 23.8% experienced minimal distress. Most respondents, comprising 44.9%, reported moderate distress levels, while 21.0% experienced substantial distress. A small percentage of individuals, 4.8%, reported extreme distress levels. The mean score for the item assessing the impact of reminders was 1.9, with a standard deviation of 0.9, providing insight into the average intensity of distress experienced by participants.

Out of the total sample, thirty-two participants (4.3%) did not report any difficulty staying asleep due to the traumatic event. They did not perceive any significant disruption to their sleep patterns. Mild difficulty staying asleep was reported by 387 participants (51.5%), but it did not affect their sleep quality significantly. On the other hand, 132 participants (17.6%) experienced moderate difficulty staying asleep, which affected their ability to maintain uninterrupted sleep. Similarly, 132 respondents (17.6%) indicated substantial difficulty staying asleep, with sleep disturbances significantly interfering with their ability to achieve restful sleep. Extreme difficulty staying asleep was reported by 69 participants (9.2%), describing their sleep disturbances as overwhelmingly severe, and severely impacting their overall quality of sleep.

In addition, the mean score for the item assessing difficulty staying asleep was calculated as 1.8, with a standard deviation of 1.1. This quantitative measure provides insight into the average severity of sleep disturbances experienced by participants following the traumatic event. These findings highlight the significant impact of traumatic events on sleep quality, with a considerable proportion of individuals reporting varying degrees of sleep disturbances.

When examining the psychological impact of traumatic events, the IES-R also considers the extent to which individuals become preoccupied with thoughts related to the event. The responses collected from participants regarding the item "Other things kept making me think about it" showed that out of the sampled population, 4.0% (30 participants) reported experiencing no preoccupation with thoughts related to the traumatic event. These individuals did not feel significantly distracted or consumed by

intrusive thoughts. 21.7% (163 participants) reported experiencing a slight preoccupation with thoughts related to the event, with relatively mild intrusions that did not significantly disrupt their daily functioning. 30.1% (226 respondents) indicated experiencing a moderate level of preoccupation, with frequent intrusive thoughts that occasionally interfered with their ability to concentrate on other tasks. 35.6% (268 participants) reported experiencing a substantial preoccupation, with intrusive thoughts that significantly interfered with their ability to focus on daily activities. Lastly, 8.6% (65 respondents) reported experiencing an extreme level of preoccupation with overwhelming and pervasive intrusive thoughts that severely affected their ability to concentrate on anything else.

One critical factor is the emergence of heightened irritability and anger after a traumatic event. Results from the study indicated that 23 participants, which account for 3.1% of the sample, reported no feelings of irritability or anger following the traumatic experience. These individuals did not observe significant changes in their emotional responses or encounter outbursts of anger. In contrast, 229 respondents (30.5%) experienced a mild level of irritability and anger, with occasional feelings that did not significantly impact their daily functioning or interpersonal relationships. Meanwhile, 282 participants (37.5%) reported moderate levels of irritability and anger, with frequent occurrences that occasionally affected their ability to regulate emotions and maintain composure in social situations. A total of 179 respondents (23.8%) experienced a considerable level of irritability.

A thorough analysis of the responses of the participants regarding the statement "I avoided letting myself get upset when I thought about it or was reminded of it" revealed that 25 participants, which represents 3.3% of the total sample, reported no avoidance behaviors. These participants stated that they did not consciously try to avoid thoughts or reminders of the traumatic event and were more open to processing such stimuli without trying to suppress or avoid them.

In contrast, 277 respondents (36.8%) reported engaging in avoidance behaviors to a minor extent. These individuals acknowledged some level of avoidance but indicated that they made minimal efforts to prevent themselves from becoming upset when faced with reminders or thoughts about the traumatic event. Furthermore, 226 participants (30.1%) reported employing avoidance strategies to a moderate degree. They described making conscious efforts to avoid thoughts or reminders associated with the traumatic event and occasionally using strategies to suppress emotional distress when these stimuli arose.

In addition, 170 respondents (22.6%) reported engaging in avoidance behaviors to a significant extent. They described making substantial efforts to prevent themselves from becoming upset when faced with reminders or thoughts about the traumatic event, often using avoidance mechanisms as a coping strategy. Finally, 54 participants (7.2%) reported engaging in avoidance behaviors to an extreme degree. They described pervasive, and intense efforts to suppress emotional distress when confronted with reminders or thoughts about the traumatic event, often resorting to extreme forms of avoidance as a coping mechanism.

The mean score for the item assessing avoidance behaviors was 1.9, with a standard deviation of 1.0. This quantitative measure provides valuable insights into the average severity of avoidance behaviors demonstrated by participants in response to reminders or thoughts concerning the traumatic event. as a coping mechanism. The mean score for the item assessing avoidance behaviors was computed as 1.9, with a standard deviation of 1.0. This quantitative measure furnishes valuable insights into the average severity of avoidance behaviors demonstrated by participants in response to reminders or thoughts concerning the traumatic event.

According to the study's analysis, a crucial factor examined was the frequency of unwanted thoughts related to a traumatic event experienced by individuals. Out of the total sample, 30 participants (4.0%) reported no involuntary thoughts, indicating a low level of distress. 281 respondents (37.4%) experienced occasional unwanted thoughts, revealing mild distress. 209 individuals (27.8%) reported moderate levels of unwanted thoughts, indicating a notable amount of distress. 183 respondents (24.3%) experienced significant levels of unwanted thoughts, demonstrating considerable distress. Lastly, 49 participants (6.5%) reported extreme levels of unwanted thoughts, which are indicative of profound distress.

Regarding the statement "I felt as if it hadn’t happened or wasn’t real," a total of 22 participants (2.9%) reported having no difficulty accepting the reality of the traumatic event. This suggests a relatively low level of distress associated with feelings of unreality. However, 222 respondents (29.5%) reported occasional feelings of disbelief or dissociation, while still acknowledging the reality of the event, indicating mild distress.

Additionally, 239 participants (31.8%) experienced moderate levels of feelings of disbelief or dissociation, reflecting a notable degree of distress. Furthermore, 220 respondents (29.3%) experienced significant levels of feelings of disbelief or dissociation, indicating considerable distress. Lastly, 49 participants (6.5%) reported extreme levels of feelings of disbelief or dissociation, which is indicative of profound distress associated with dissociation from the traumatic incident.

The study examined how people distance themselves from reminders of a traumatic event. Out of the total sample, 3.6% did not actively avoid situations, places, or stimuli related to the incident. 32.3% reported mild avoidance behaviors, occasionally trying to steer clear of reminders. 30.2% described moderate avoidance behaviors, making intermittent attempts to avoid reminders. 25.1% engaged in significant avoidance behaviors, frequently and pronouncedly staying away from reminders. Finally, 8.8% indicated extreme avoidance behaviors, with pervasive and overwhelming efforts to avoid any stimuli, situations, or conversations related to the traumatic event. The mean score for the item assessing avoidance behaviors was calculated as 2.0, with a standard deviation of 1.0.

Out of the total sample, 2.8% (21 respondents) did not report any intrusive images related to the traumatic event, indicating a relatively low level of intrusive re-experiencing symptoms. Mild levels of intrusive images were reported by 34.2% (257 participants), with occasional instances of distressing mental images or flashbacks related to the incident. 27.4% (206 respondents) reported moderate levels of intrusive images, with intermittent occurrences of distressing mental images or flashbacks. Significant

levels of intrusive images were reported by 24.5% (184 participants), with frequent and pronounced instances of distressing mental images or flashbacks. Finally, extreme levels of intrusive images were reported by 11.2% (84 respondents), indicating profound intrusive re-experiencing symptoms.

Furthermore, the study explored how participants responded to the statement "I was jumpy and easily startled," which relates to hyperarousal symptoms. Notably, out of the total sample, 1.7% (thirteen individuals) reported not experiencing any jumpy or easily startled behavior. These individuals did not exhibit heightened levels of arousal, such as exaggerated startle responses or increased vigilance towards potential threats, indicating minimal hyperarousal symptoms. On the other hand, 26.7% (201 participants) experienced mild levels of jumpy or easily startled behavior, reporting occasional instances of heightened arousal, slightly exaggerated startle responses, or increased vigilance in response to perceived threats. This is indicative of mild hyperarousal symptoms. For 35.0% (263 participants), their jumpy or easily startled behavior was at a moderate level, describing intermittent occurrences of heightened arousal that were noticeable and frequent, characterized by exaggerated startle responses or heightened vigilance towards potential threats. This is reflective of moderate hyperarousal symptoms. A total of 25.0% (188 participants) reported experiencing significant levels of jumpy or easily startled behavior, describing frequent and pronounced instances of heightened arousal, marked and persistent exaggerated startle responses, or heightened vigilance to perceived threats. This is indicative of considerable hyperarousal symptoms. Finally, 11.6% (eighty-seven respondents) experienced extreme levels of jumpy or easily

startled behavior, describing pervasive and overwhelming occurrences of heightened arousal, intense and persistent exaggerated startle responses, or hypervigilance towards potential threats. This is reflective of profound hyperarousal symptoms.

Among the total sample, 1.7% (thirteen respondents) reported no effort to avoid thinking about the traumatic event. They did not deliberately suppress intrusive thoughts associated with the trauma, indicating minimal use of avoidance coping strategies. 34.6% (260 participants) made mild attempts to avoid thinking about the trauma by occasionally distracting themselves or redirecting their thoughts, signifying limited engagement in avoidance coping strategies. 30.1% (226 respondents) engaged in moderate efforts to suppress intrusive thoughts or memories associated with the trauma, reflecting a moderate level of avoidance coping strategy. 23.8% (179 participants) made significant efforts to avoid thinking about the traumatic event by frequently and deliberately suppressing or avoiding intrusive thoughts, memories, or reminders of the trauma, indicating substantial utilization of avoidance coping strategies. Finally, 9.8% (74 respondents) engaged in extreme efforts to avoid thinking about the traumatic event by persistently and pervasively suppressing or avoiding any reminders or thoughts associated with the trauma, reflecting an intense and profound engagement in avoidance coping strategies. varying degrees of avoidance behaviors adopted by individuals as a means of managing distress associated with traumatic experiences.

The mean score for the item assessing efforts to avoid thinking about the traumatic event was calculated as 2.1, with a standard deviation of 1.0. This quantitative

measure provides valuable insights into the average intensity of avoidance coping strategies employed by individuals following exposure to trauma.

The study revealed a wide range of responses among participants. Only a small percentage (2.7%) reported having no awareness of their emotions, while a larger group (40.0%) acknowledged their feelings to some extent. Among those who recognized their emotions, many (29.8%) demonstrated a balanced awareness. However, a significant subset (21.7%) showed a high level of emotional engagement without actively managing their emotions. Additionally, a small fraction (5.9%) exhibited intense emotional connections without effective coping mechanisms. The mean emotional awareness and management score was calculated to be 1.9 (SD = 0.9), indicating that while most participants had some understanding of their emotional state, their subsequent actions varied greatly.

Also, only a small percentage (3.1%) did not report any numbness related to the phenomenon studied. Most respondents (32.0%) reported experiencing mild numbness, while a considerable proportion (29.0%) reported moderate levels of numbness. A substantial number of participants (27.8%) expressed feeling a considerable degree of numbness, and a smaller group (8.1%) reported intense numbness. The overall mean score for this item was 2.1 (standard deviation: 1.0), suggesting that, on average, participants felt moderately numb concerning the phenomenom studied.

Out of the total sample, 34 respondents (4.5%) did not report any instances of feeling or acting as if they were back at the traumatic event. These individuals did not experience any intrusive sensations or behaviors related to the trauma, indicating minimal

intrusion symptoms. 257 participants (34.2%) reported mild instances of feeling or acting as if they were back at the traumatic event. They described occasional episodes of intrusive thoughts, feelings, or behaviors, suggesting a modest level of intrusion symptoms. 198 respondents (26.3%) reported moderate instances of feeling or acting as if they were back at the traumatic event. They described consistent and noticeable episodes of intrusive sensations or behaviors related to the trauma, indicating a moderate level of intrusion symptoms. 197 participants (26.2%) reported significant instances of feeling or acting as if they were back at the traumatic event. They reported frequent and intense episodes of intrusive thoughts, feelings, or behaviors associated with the trauma, indicating a substantial level of intrusion symptoms. Sixty-six respondents (8.8%) reported extreme instances of feeling or acting as if they were back at the traumatic event. They described pervasive and overwhelming episodes of intrusive sensations or behaviors related to the trauma, indicating an intense and profound impact of intrusion symptoms.

The mean score for the item assessing experiences of feeling or acting like being back at the traumatic event was obtained as 2.0, with a standard deviation of 1.1. This quantitative measure provides valuable insights into the average intensity of intrusion symptoms experienced by individuals following exposure to trauma.

Out of the total sample, 4.1% (31 respondents) reported no trouble falling asleep and showed no sleep disturbances related to their traumatic experiences, indicating minimal sleep-related difficulties. 28.5% (214 participants) experienced mild instances of trouble falling asleep, describing occasional episodes of difficulty initiating sleep,

suggesting mild sleep-related disturbances associated with the traumatic event. 32.7% (246 respondents) reported moderate instances of trouble falling asleep, describing consistent and noticeable difficulty in falling asleep, indicating a moderate level of sleep-related disturbances linked to the traumatic experience. 25.4% (191 participants) indicated significant instances of trouble falling asleep, reporting frequent and pronounced difficulty in initiating sleep, reflecting a substantial level of sleep-related disturbances associated with the traumatic event. Lastly, 9.3% (70 respondents) reported extreme instances of trouble falling asleep, describing pervasive and severe difficulty in falling asleep, indicating an intense and profound impact of sleep-related disturbances related to the traumatic experience. The mean score for the item assessing trouble falling asleep was calculated as 2.1, with a standard deviation of 1.0. This quantitative measure provides valuable insights into the average severity of sleep-related difficulties experienced by individuals following exposure to trauma.

The data from the study further revealed that a minority (2.4%) of participants did not experience any emotional response to the phenomenon. The majority (35.0%) expressed mild feelings, indicating some level of impact. A significant portion (28.6%) experienced moderate emotional waves, suggesting a noticeable effect. Another sizable group (24.6%) reported strong feelings, indicating a significant emotional connection. A smaller subset (9.4%) had intense emotional reactions, signifying a profound impact. Overall, the mean score for emotional intensity was 2.0 (with a standard deviation of 1.0), indicating that, on average, participants experienced moderate emotional responses.

Only 1.9% of participants reported that they did not attempt to remove the memory at all. Around 36.3% said they made minimal efforts, while 26.3% fell under the moderate category, signifying a reasonable level of endeavor. A considerable proportion of respondents (28.9%) expressed substantial efforts to erase the memory. A smaller group (6.6%) indicated extreme dedication to removing the memory. Meanwhile, the calculated mean score from these responses stands at 2.0, with a standard deviation of 0.9.

Out of the participants sampled, a smaller proportion, 2.9% (22 individuals) reported minimal to no trouble concentrating. On the other hand, 227 respondents (one-third of the group) experienced mild difficulties with concentration. Approximately 209 participants, just under 30%, faced moderate challenges when it came to maintaining focus. Additionally, 213 individuals (28.3%) encountered significant issues with concentration. Lastly, a smaller group of 81 individuals (about 11%) reported severe difficulties in concentrating. Overall, the mean score for concentration difficulty was 2.1, with a standard deviation of 1.1. These findings offer valuable insights into the subjective experiences of participants concerning their ability to concentrate.

Also in the study, a minimal sample of participants, 2.7% of participants (twenty individuals) reported no physical reactions when reminded of the traumatic event. They did not display any physiological responses such as sweating or difficulty breathing, suggesting minimal physiological arousal. On the other hand, 37.5% (two hundred and eighty-two respondents) reported mild physical reactions like sweating or slight difficulty breathing. This group experienced relatively minor physiological responses, indicating mild physiological arousal triggered by reminders. Additionally, 37.2% (two hundred and

eighty individuals) experienced moderate physical reactions, reporting noticeable physiological responses such as sweating or moderate difficulty breathing, reflecting a moderate level of physiological arousal. 16.2% (one hundred and twenty-two participants) reported significant physical reactions, describing pronounced physiological responses like profuse sweating or considerable difficulty breathing, indicative of a substantial level of physiological arousal. Lastly, 6.4% (forty-eight respondents) reported extreme physical reactions, describing overwhelming physiological responses like severe sweating or intense difficulty breathing, reflecting intense and profound physiological arousal in response to reminders. To gain further insight into the intensity of physiological arousal, the mean score for the item assessing physical reactions to reminders was calculated as 1.9, with a standard deviation of 0.9.

Upon analyzing the responses of the sampled participants, it was discovered that 2.1% of the total sample, or sixteen respondents, reported no occurrence of dreams related to the traumatic event. These individuals experienced no dreams specifically associated with the traumatic experience, suggesting minimal intrusion of the event into their sleep. About 35.0% of the participants, or 263 individuals, reported experiencing dreams related to the traumatic event to a mild extent. These individuals had occasional dreams involving traumatic experiences, indicating a low level of intrusion into their sleep. Additionally, 22.3% of the respondents, or 168 individuals, reported experiencing dreams related to the traumatic event to a moderate degree. These individuals described relatively frequent dreams associated with the traumatic experience, indicating a notable intrusion into their sleep. Furthermore, 32.6% of the participants, or 245 individuals,

reported experiencing dreams related to the traumatic event to a significant extent. These individuals had frequent and vivid dreams involving the traumatic experience, reflecting a substantial intrusion into their sleep patterns. Finally, 8.0% of the respondents, or 60 individuals, reported experiencing dreams related to the traumatic event to an extreme degree. These individuals described intense and distressing dreams closely linked to the traumatic experience, indicating a profound intrusion into their sleep and psychological well-being. Meanwhile, the mean score for the occurrence of dreams related to the traumatic event was obtained as 2.1, with a standard deviation of 1.0.

Within the study's total sample, a small percentage of respondents (2.3%, or 17 individuals) didn't report feeling any sense of constant vigilance or being on guard. For 35.9% (270 individuals), they experienced mild feelings of being watchful and on-guard, with infrequent or mild episodes of heightened awareness. A quarter of respondents (25.5%, or 192 individuals) reported moderate levels of being watchful and on-guard, characterized by consistent or moderately frequent episodes of heightened vigilance. Significant feelings of being watchful and on-guard was reported by 28.1% (211 individuals), with frequent or intense episodes of hyper-vigilance. The remaining 8.2% (62 individuals) experienced extreme feelings of being watchful and on guard, which had a significant impact on their daily functioning and well-being.

The study's mean score for the feeling of being watchful and on-guard was calculated as 2.0, with a standard deviation of 1.0. This quantitative measure provides valuable insight into the average severity and variability of hyper-vigilance experienced by individuals in the study population.

The data provides insight into the respondents' reported experiences while refraining from discussing their traumatic experiences. A small minority, of 24 respondents (3.2%) stated that they would never discuss it, while 128 respondents (17%) reported discussing it only minimally. Moderately, 231 respondents (30.7%) reported that they would talk about it. A considerable number of 166 respondents (22.1%) discussed it quite extensively, while 203 respondents (27%) reported discussing their trauma to an extreme degree. Furthermore, the mean score for this behavior is 2.5, accompanied by a standard deviation of 1.2.

The qualitative data from the in-depth interview conducted with healthcare professionals, the findings are sub-divided into: Observations, Complaints, and Challenges.

Observations

The experiences of Ebola infection survivors (EIS) in the wake of the Ebola epidemic reflected a tapestry of difficulties that go well beyond the scope of the illness itself. A significant collection of themes emerged through the perspectives of those who cared for, and supported the Ebola infection survivors, illuminating the complex challenges faced as they move from the grips of Ebola infection illness to the domain of recovery and societal re-integration.

In West Africa cultural setting, a depressing but pervasive feature in the life of Ebola infection survivors is stigmatization. Concerns were highlighted in the interviewees' voices when they discussed how Ebola infection survivors end up becoming unintentional targets of ostracism in their own groups. They were stigmatized as misfits

and given an erroneous contagiousness label under the shadow of Ebola virus disease (EVD). Other Ebola infection survivor's lingering fear becomes a real barrier that keeps them from experiencing the comfort of human connection that they once knew. The responses bemoaned the Ebola infected survivors' struggle with isolation brought on by society's false perceptions. As one of the respondents stated:

> *They do complain of stigma so much that been a survivor of this ehn, disease that most people in the community do see them as outcast in some cases- John S.*

However, challenges don't merely come from the outside environment. Another observation that appeared is psychological trauma, which becomes a battlefield in the Ebola infection survivors' own thoughts. Long after the physical symptoms of the Ebola virus have passed, the trauma endured during the illness continued. In their responses, respondents provide a vivid portrait of Ebola infection survivors who are plagued by recollections of their weakness, fever, and uncertain existence. Post-traumatic stress disorder (PTSD) and anxiety are the aftershocks of their battles. Some days were overcast with anxiety, while the nights were filled with nightmares. Ebola infection survivors, who triumphantly escaped the clutches of a fatal illness from the Ebola virus disease, were now fighting a different enemy: the psychological effects of their ordeal. One of the professional healthcare respondents reported that:

> *when I was err… interacting with them, what causes this erm they're… where they are living, people don't want to associate with them, they are seeing them as someone with leprosy, and don't want them to be contacted again, and so they have psychological trauma- Evelyn B.*

The Ebola infection survivors still struggle with physical symptoms that transcend the limitations of their illness. As if the mental wounds weren't enough, many feel their bodies, once decimated by Ebola virus, appear to be a breeding ground for a variety of other health problems. Respondents described how Ebola infection survivors returned complaining of weakness, fever, headaches, and muscle soreness. Fears of a comeback of Ebola virus disease was raised when any bleeding occur, a defining feature of the illness, from any orifice, including the nose and ears. It becomes clear that there is a delicate line between post-Ebola symptoms and the fear of re-infection, creating a confusing web of feelings and worries. One of the healthcare respondents said that:

> *Many of these survivors usually come back with some symptoms that many times they're concerned if they are having Ebola again, such thing comes like muscle pain, throat pain err… headache, err… cough and some other symptoms- Victor*

The difficulties Ebola infection survivors experienced were often compounded with the fact that the Ebola virus is frequently mistaken for common illnesses like respiratory infections, even when Ebola infection survivors seek medical assistance for these symptoms. The emotional stress the Ebola infection survivors' experience is sustained by this cycle of misunderstanding, demonstrating the interdependence between their physical and mental health.

In midst of these struggles, a ray of hope emerges – the initial relief of survival. As Respondent #2 describes, survivors are initially grateful for having triumphed over the disease. The gratitude is palpable, a reminder of the human spirit's resilience in the face of adversity. Yet, this relief is often short-lived, overshadowed by the weight of the

stigma, and psychological trauma that follows, slowly eroding the sense of accomplishment that should rightfully belong to them. A healthcare respondent stated that:

> *when I was err… interacting with them, what causes this erm they're… where they are living, people don't want to associate with them, they are seeing them as someone with leprosy, and don't want them to be contacted again and then so they have psychological trauma- Evelyn B*

Through the lenses of the respondents' experiences, it becomes clear that the journey of an Ebola infection survivor is far from linear. It is a labyrinth of emotions, marked by stigmatization, psychological scars, and the delicate dance between interpreting symptoms and confronting fears. As the Ebola infection survivors rebuild their lives, it is the duty of society, healthcare professionals, and their communities to extend a compassionate hand, helping them transcend these obstacles and find a semblance of normalcy.

Complaints Received

The respondents collectively highlighted the enduring challenges faced by Ebola survivors after their physical recovery. These challenges encompassed physical symptoms, psychological trauma, social stigmatization, reintegration struggles, and the need for comprehensive medical, and mental health support. The narratives provided by the respondents also emphasized the multidimensional nature of Ebola infection survivor care and the importance of addressing their complex needs to facilitate a smoother transition back into their respective lives and communities.

Physical Symptoms and Persistent Pain

The respondents consistently mentioned that Ebola infection survivors often experience a range of physical symptoms that persisted after recovery. These symptoms include bleeding through different passages, weakness, muscle pain, headache, fever, and respiratory issues. Some Ebola infection survivors exhibit neuropathic pain in specific parts of their bodies, likely as a result of the disease's impact on their nervous system. This theme underscores the complex and lingering physical repercussions of Ebola virus disease.

Psychological Trauma and Post-Traumatic Stress

Respondents point out that many Ebola infection survivors grapple with psychological trauma. They exhibit signs of post-traumatic stress disorder (PTSD), experiencing flashbacks of the crisis and reliving the traumatic events. Some Ebola infection survivors might exhibit symptoms like dizziness, weakness, and a tendency to feel as if they are on the verge of convulsions. Such psychological effects become triggers that exacerbate their distress.

Honestly… that will be, a times they will just be prinking their nose as if they are bleeding and whereas they are not bleeding, that's just a sign of post traumatic syndrome that they're… that they are exhibiting- Evelyn B.

Stigmatization and Social Isolation

The responses highlight the pervasive issue of stigmatization that Ebola infection survivors face upon returning to their communities. Friends, family, and community members are often afraid of being in contact with survivors due to misconceptions about

contagiousness. This leads to a profound sense of isolation for survivors of Ebola virus disease, as many of them were ostracized by their own social circles, making re-integration into society challenging. One respondent stated:

> *Oh! For th… Ebola survivors that came back, the complaint I heard from them is stigmatization, like going back to the community, their friends, their family who already knew they had Ebola prior to now, they are scared of them giving them the illness despite that they've survived the illness- Joy G.*

Challenges with Reintegration: Ebola infection

Survivors encountered difficulties reintegrating into their families and communities due to the stigma surrounding their Ebola history. Some respondents mentioned that survivors of Ebola disease struggled to mingle with friends and relatives due to fear of transmitting the disease out of caution, even though they have fully recovered from the disease. This theme emphasizes the long-term impact of stigmatization on Ebola infection survivors' mental and emotional well-being.

Erm… apart from the ones I already mentioned, sometimes they also complained that they find hard to reintegrate back into the society, to mingle with their friends and families again because of the stigma that comes with this erm… disease Ebola- Sarah B.

Need for Mental Health Support

Many respondents noted the importance of providing mental health support to survivors who exhibit symptoms of post-traumatic stress, anxiety, and depression. Some Ebola infection survivors have trouble sleeping, interacting with others, or facing their

fears. Professional care from mental health physicians is often necessary to help survivors regain a sense of psychological balance and address their emotional struggles.

Yes… yeah, some of the post erm, the post ehn Ebola, complains that we see from these survivors' incudes, some of them includes the, apart from dealing with their mental status, what we normal have is erm form of neuropathic in some cases that is pain in some aspect of the body as a result of the disease which they suffer from- John S.

Referred for Specialized Care

In some cases, survivors require specialized care beyond general medical attention. Respondents mention referring survivors to physiotherapy units, neurologists, and other specialists due to issues such as peripheral neuropathy, persistent bleeding, and severe muscle pains. This indicates that a holistic approach to survivor care, addressing both physical and mental health, is essential.

Then most of them, some of them we do refer to the physiotherapy unit, because of loss some function in some aspects of the body, then some have some post erm respiratory symptoms too, like may be cough occasionally as a result of the you know, the virus that they suffered in the past case-John S.

Challenges

The respondents unveiled a complex tapestry of challenges that Ebola infection survivors confront as they attempt to re-integrate into their communities. The profound impact of stigmatization on their mental health stands as a formidable barrier to acceptance. The Ebola infection survivors' psychological trauma, exacerbated by isolation and fear, often necessitate professional psychological support. Beyond formal

therapy, Ebola infection survivors require emotional re-orientation, often tied to spiritual aspects, to overcome the mental hurdles they face.

Stigmatization and Lack of Awareness

The respondents consistently point out that the foremost challenge faced by Ebola infection survivors during re-integration is the stigma associated with their past Ebola virus disease illness. Community members, family, and friends often lack proper education about the survivors' health status. This lack of awareness leads to unwarranted fear, and reluctance to interact with Ebola infection survivors. The prevailing misconception that any Ebola infection survivor could still be carriers of the disease perpetuates their isolation and impede successful re-integration. One of the respondents stated:

Okay, so, we have found that the greatest challenge is usually the stigma that is associated with having Ebola and then also been a survivor of Ebola diseases- Sere Johnson

Need for Psychological Support

A central theme that emerges is the dire need for psychological and emotional support for Ebola infection survivors. The trauma of the disease, and the subsequent stigmatization take a heavy toll on their mental well-being. Respondents emphasized the importance of Ebola infection survivors having access to psychologists, counsellors, and mental health specialists who can guide them through the challenges of re-integrating into society. These specialized professionals can help Ebola infection survivors address post-traumatic stress, anxiety, depression, and the psychological impact of isolation.

Yeah… as erm, a part of the chat do, erm do occur especially in the mental health course for inclusion, is that, we supposed to have a psychologist or a counsellor that would need, that they will need you know to consult or contact whenever they produce most of these symptoms or whenever they report at the clinic- John S.

Spiritual and Emotional Re-Orientation

In addition to professional mental health support, the respondents underscore the need for Ebola infection survivors to receive one-on-one contact with psychologists or counsellors who can provide reorientation. This involves helping Ebola infection survivors understand that they are now free from the disease and that they can resume a normal life. Spiritual aspects were also mentioned, emphasizing the importance of addressing Ebola infection survivors' spiritual needs to help them find solace and hope in their recovery journey.

And then, their… their spiritual aspects also need to be attended to, that with God all things are possible as we go about live a normal life. So that is what I can say for now- Dr. Bassey

Lack of Social and Family Support

Several respondents mention that Ebola infection survivors often face a lack of social support from their families and communities. Loved ones and even family members might shy away from an Ebola infection survivor due to fear or misinformation. This exacerbates the Ebola infection survivors' feelings of isolation and loneliness, which can further deteriorate mental health of the Ebola infection survivor.

And then also, the lack of social support and the family support is also one of the challenges that Ebola survivors face in the course of reintegration into the society- Sere J.

Physical Implications on Mental Health

The physical repercussions of the disease also contribute Ebola infection survivors' mental health challenges. Respondents note that Ebola infection survivors might experience physical weakness and limitations that affect their ability to conduct daily activities. This physical vulnerability compounds their psychological struggles, making the process of reintegration even more challenging.

Limited Availability of Services

While the need for psychological and counselling services is evident, some respondents mention the limited availability of such services in certain regions. This scarcity presents a significant barrier to addressing the mental health needs of Ebola infection survivors. Despite these limitations, healthcare providers are determined to do their best to support Ebola infection survivors with the resources they have.

Basically, that's what needed; a good counsellor, psychologist or a medial counsellor too is needed- Dr. John S.

Trustworthiness

SPSS statistical data was used to analyze independent variables like age, sex, gender, employment status, marital status and Z-test was used for examining / comparing whether the percentage of depression, anxiety and stigma among the population sampled differs from that of the general population. living arrangement, religion) influence on the

dependent variable (Ebola infection survivor), The Z-test scores obtained was used for comparison whether the prevalence is statistically significant in RQ1, RQ2, and RQ3 to determine if the null or alternative hypotheses can be accepted. Simultaneously, for the qualitative section of the mixed method, interviews was conducted with ten healthcare personnel who had offered care to Ebola infection survivors in re-integration back to normal life. Interview sessions were conducted in English, thus there was no need for an interpreter during the sessions. These sessions were conducted in offices/locations individually and not in groups, on different days to maintain privacy, recorded on digital audio format and analyzed using NVivo version 11.

Summary

In this chapter, the research instruments (questionnaire, interview) often used in mixed method designs was explained. Quantitative data obtained was through closed-ended questionnaires while the qualitative data was through open-ended interview questions. Each has its advantages, with combination of the strengths, flexibility, and a wider reach utilized, mixed method research provides a more comprehensive understanding of a research question, which in turn can increase the validity and reliability of the research.

Chapter 5: Discussion, Conclusions, and Recommendations

The primary purpose of this mixed methods research was to examine the psychological impact of Ebola virus disease on EIS. The study is important because it helps create an understanding of the impact of psychological factors on mental health state of Ebola infection survivors in their re-integration journey to live more productive lives. Over the decades, there has been many debates on role of humanitarian organizations on how best to respond to the burden of psychological distress in low resource settings. Secor et al., (2020), highlighted that Ebola infection survivors from the West-Africa outbreak suffer from symptoms associated with mental health conditions. High level of distress have been documented among EIS in Guinea and Sierra-Leone and health care workers. However, little is known about the epidemic's effect on the mental health of the general population in the Sierra Leone, Liberia, and Guinea (Jalloh, et al., 2018). Before the Ebola virus epidemic, Liberia was just recovering from years of prolonged internal war, and devastated economy with fragile healthcare system. The management of large numbers of EVD survivors after the epidemic, was difficult because there was the highest number of EIS. However, little is known about how to operationalize psychological care for EVD survivors (Hugo, et al., 2015).

Interpretation of the Findings

To answer the RQ1, RQ2, and RQ3 in this study, Z-test scores was used for comparing whether prevalence of anxiety, depression and stigma among the population sampled significantly differs from that of the general population. Z-test was performed using the mean for variables in the population sampled: Depression (17.4%), Anxiety

(13.2%), and Stigma (44.9%) with the mean in the general population: Depression (20.2%), anxiety (9.9%), and Stigma (34%). The Z-test score obtained for Anxiety was 32.3, which is higher than that of the hypothesized general population mean of 9.9. Similarly, the Z-test score obtained for Depression is 22.6, which is higher than that of hypothesized general population mean of 20.2. Also, the Z-test score obtained for Stigma 54.3, which is also higher than the hypothesized general population mean of 34. These indicate that prevalence of anxiety, depression, and stigma among the Ebola virus infection survivors sampled in this study significantly differ from the prevalence of anxiety, depression, and stigma in the general population.

Limitations of the Study

Liberia was still recovering after 14 years (1989-2003) of civil war when country was hit with Ebola epidemic in 2014-2016 (Gbadamosi, Henneh, Aluko, Yawson, Fokoua, Koomson, Torbi, Olorunnado, Lewu, Yusha'u, Keji-Taofik, Biney, Tagoe, 2022). Like in many sub-Sahara African countries, epidemiological data on depression, anxiety, and stigma is poor as country-specific data are absent, and rather replaced by point prevalence in many cases, which in turn can be a limitation to generalization of this study. National research data on Liberia is extremely limited and this pose a limitation to researchers. As such, prevalence data used in this study was from year 2020. Also, the data collected in this study was based on self-recall of events from memory and it may contain biases. In this study, I excluded clinical, and medical records, and only focused on day- to-day life experience of EIS in their reintegration journey in various local communities, and the challenges of coping with stigma-related to Ebola virus. Due to variation in rural-urban

factors such as availability/nonavailability of access to basic amenities, it is possible that Ebola infection survivors living in more remote rural areas in Liberia may have different experiences. It is also important to emphasize the need for the inclusion of Ebola infection survivors in developing any public health intervention programs for Ebola-related stigma, anxiety, and depression among survivors.

Another limitation is that the study only sample EIS adults above 18 years of age. The level of educational achievement of the participants that could have provided valuable data point was not investigated. Spiritual and cultural practices among different tribes of participants also not taken into consideration as such differences or similarities in cultural practices and perceptions can impact psychologically. The results in this study may not be a total representative of all EIS in Liberia because the participants were all within Montesserado county, around Monrovia, capital of Liberia, where majority of Ebola infection survivors in the country live. This can also pose a threat to the validity of the study. Scaling up mental health services for vulnerable population like Ebola infection survivors will demand coordinated, collaboration efforts between governments, health professionals, donors, civil society, communities, and patients and their families. Such joint effort is recommended by the WHO Mental Health Gap Action Program.

Recommendations

Based on the findings in this study, it is recommended that future studies in cultural settings with very limited healthcare resources can pursue a better understanding of how personal characteristics, and perceptions, including psychosocial distress, and fear of unknown long-term implications can serve as pathways for addressing re-integration

issues faced by Ebola virus infection survivors back into communities affected by Ebola virus infectious disease outbreaks. As part of the recommendations in their study, Schultz, et al. (2015) highlighted the need to provide distressed individuals with psychosocial support, and provision of specialized mental health intervention to severely affected survivors as essential step to consider. During the interviews conducted with healthcare personnel, one of the respondents mentioned referring Ebola infection survivors to physiotherapists and psychiatrists. EIS who are religious conscious often sought spiritual aspects as the communities are deeply rooted in faith-based activities along with any medical approach. The view is that meeting EIS' spiritual needs could help find solace in their recovery journey.

Implications for Positive Social Change

The findings in this study shed light on importance of considering the psychological impact of Ebola infection survivors in their day-to-day re-integration back into their communities. The findings provided accounts of from the Ebola infection survivors, caregivers (families/friends) and public health professionals regards experienced events and factors that contribute to psychological, mental health state of Ebola infection survivors in Liberia. I examined how depression, anxiety, quality of life and stigma-induced stress contribute to the overall psychological wellness of the EIS. During the Ebola epidemic, the focus of public health was on eliminating the disease and preventing further fatalities. Re-integration of Ebola infection survivors later became a huge problem to public health, as well the local public healthcare programs after the Ebola epidemic. Table 11 shows that the 2013-2016 EVD epidemic in Liberia and Sierra

Leone, West-Africa produced the highest number of fatalities, as well as the highest number of Ebola infection survivors, since reports on Ebola infectious disease began over 47 years ago (WHO 2016; CDC 2016).

In this cross-sectional study, I looked at day-to-day living and how Ebola infection survivors cope with life after Ebola along with their caregivers (family/friends), and their healthcare professionals. The idea is that policy makers can use the findings to address present and future issues emanating among this sector of their communities, as well as maximizing limited resources tailored to improve re-integration programs in the aftermath of future similar stigmatized infectious disease outbreaks. There is current shortage of psychiatrists in West-African nations. Liberia has just one psychiatrist, Sierra Leone has none, and currently, counselling of the EIS is conducted by aid agencies staffing at a slow pace (Yadav & Rawal, 2015).

The psychological impact of 2014-2016 Ebola outbreak spanned from the individual to the community, and then internationally. The individual level of psychological impact of the outbreak varies in three major degrees: survivors exposed to the psychological impact of the trauma resulting from high mortality witnessed the fear of also dying with unknown long-term implications, the post infection symptoms, shame, guilt, and stigmatization. Another individual level of psychological impact was from individuals that were in direct contact with infected individuals before the disease incubation period and after the symptoms became obvious in the social group context like work, school, and religion settings. The third individual level were the caregivers who experienced traumatic fear for caring for EIS (some caregivers actually got infected), the

stigma they also experienced, in addition to losing or actual death of loved ones, lead to anxiety, and possible posttraumatic stress syndrome (Van Bortel, Basnayake, Wurie, Jambai, Koroma, Muana, Hann, Eaton, Martin, Nellums, 2016)

The psychological impact of Ebola disease at the community level resulted in a cyclical pattern of fear which resulted to a loss of trust in public health services, disruptions of community interactions, and community fracturing (Van Bortel et al., 2016). On the international level, the Ebola outbreak resulted in some psychosocial implications on the affected countries economic investments, travel, and tourism, further exacerbating the existing challenges of the affected countries. Healthcare workers who returned from affected countries also experienced some degree of stigmatization (Van Bortel et al., 2016).

Conclusions

Examination of some contributing factors that could impact EIS' lives psychologically can be helpful in guiding public health interventions, so that limited public health resources in low settings (such as the case in the geographical location of this study), can be better used to maximize the effect of intervention programs on the targeted population. Van Bortel et al. (2016) affirmed that intervention and policy initiatives should embrace EIS' engagement to solicit and learn from survivors' experiences and use it to influence policy and practice to address physical and psychological care needs, especially in areas of stigma and re-integration. Central to this is the question of the psychological events Ebola infection survivors experience in low resource setting long after recovery from Ebola disease. While some people

psychological experience may have been short lived, it is important to know that some people continue to experience persistent psychological problems, and their needs can be easily overlooked, and such people tend to exhibit a decline in social functioning and require psychological care (Hugo et al., 2015).

Andrykowski et al. (2008) further explained that understanding of factors that influence psychological health can increase understanding of the process of psychological adjustment and recovery. When greater resources are available to cope with stress or burden posed by a traumatic experience, it can help lower the risk for poor psychological health. As such, intervention on mental health of Ebola infection survivors in a low resource setting may need to be locally integrated, involving survivors' engagement after understanding the underlying factors contributing to the stress and burden. While some Ebola infection survivors rely on family/friends support, others lack such social support to get back on their feet. In either way, there is evidence that psychological issues persist among Ebola infection survivors in Liberia. Healthcare workers, and caregivers who attended to (and still attending to) Ebola infected survivors' treatment or rehabilitation needs also attested to this reality.

The outbreak of Ebola disease in West Africa spread fast widely across the globe with gruesome pictures on mass media, social media, and magnified fear of Ebola. This created a major distortion in the normal psychosocial functioning between those who were infected, or affected and those scared about possibility of getting infected thereby causing fear-induced stigmatization which adversely affected Ebola infection survivors (Leary et al., 2018). The psychological impact of Ebola disease was not only based on

experiences of separation of Ebola victims from their friend and families, but also on disruption in the burial practices in sub-Sahara Africa because it created situation where Ebola infection survivors and families who suffered loss of loved ones due to Ebola infection could not bury their loved ones according to the existing tradition/ custom in the Africa settings. The intensity of psychological experience varies depending on each Ebola infection survivors' socio cultural, religious, and environment factors. Understanding the psychological and social aspects of stigma, and its effects could reduce inequities such as assess to care and treatment in the re-integration journey for EVD survivors. As such, this study can be further explored into applications of re-integration programs to benefit Ebola infection survivors in Liberia, and other similar low-resource, cultural settings in West Africa, specifically in respect to re-integration programs for survivors of stigmatized infectious disease outbreak.

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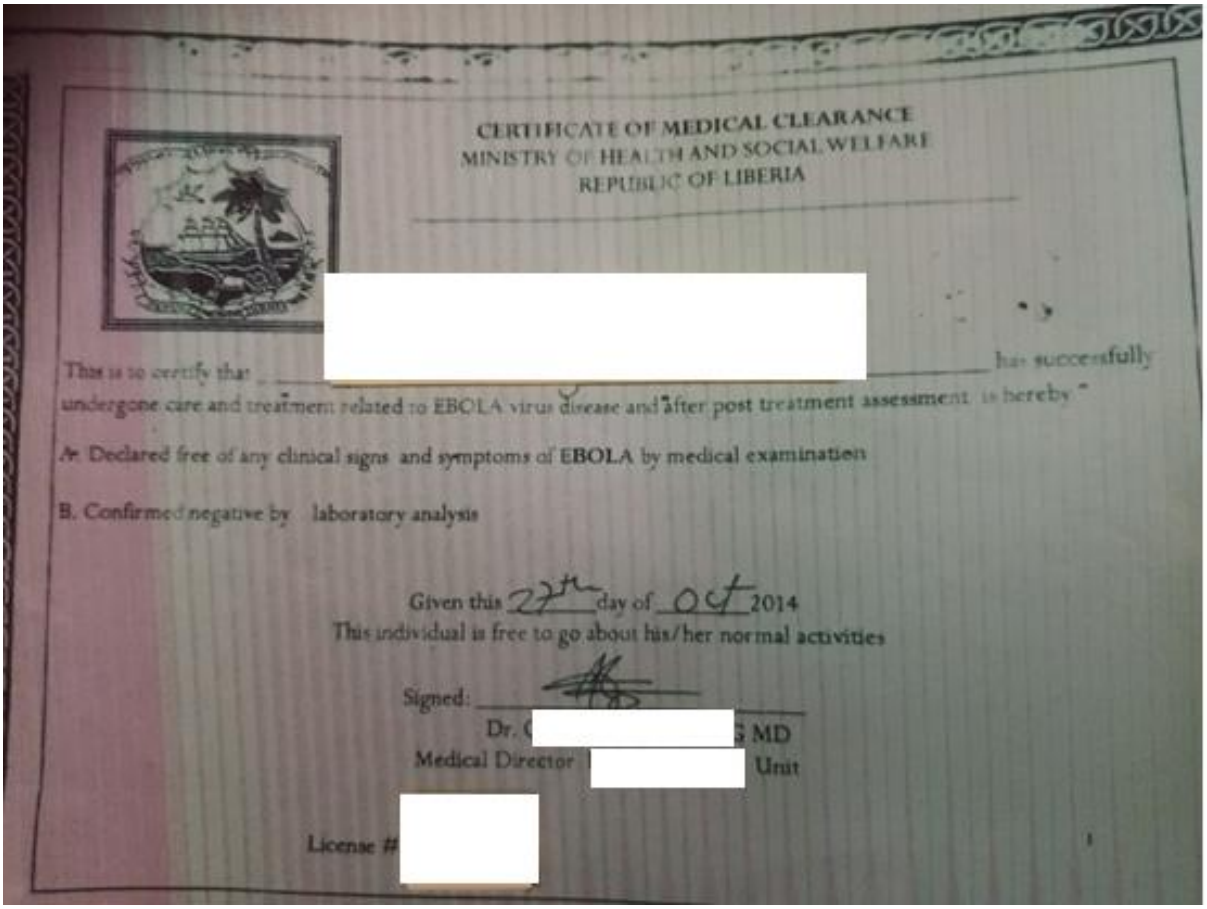
Appendix A: Certificate of Medical Clearance from Ebola Treatment Unit (ETU)



CERTIFICATE OF MEDICAL CLEARANCE
MINISTRY OF HEALTH AND SOCIAL WELFARE
REPUBLIC OF LIBERIA

[redacted] has successfully

This is to certify that [redacted]

undergone care and treatment related to EBOLA virus disease and after post treatment assessment is hereby

A. Declared free of any clinical signs and symptoms of EBOLA by medical examination

B. Confirmed negative by laboratory analysis

Given this 27th day of Oct 2014

This individual is free to go about his/her normal activities

Signed: [redacted]

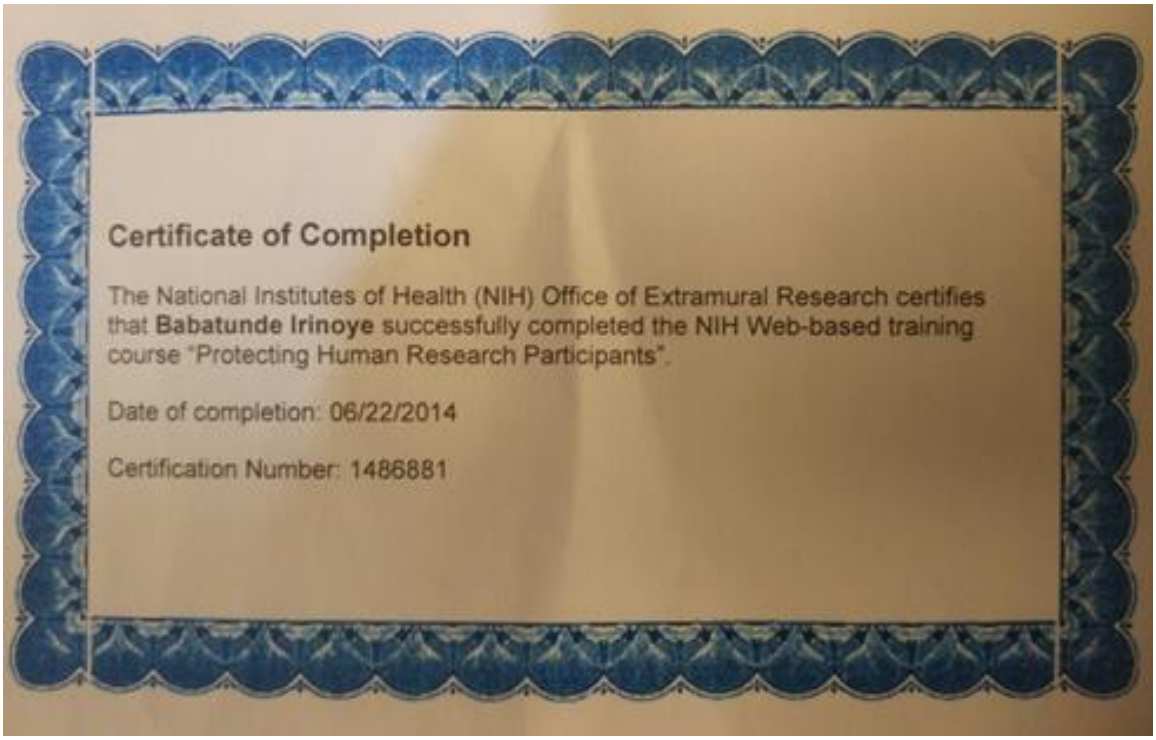
Dr. [redacted] MD

Medical Director [redacted] Unit

License # [redacted]

Appendix B: Identity Issued by Organizations re-integrating Ebola Infection Survivors in Liberia

Appendix C: Protecting Human Research Participants



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Babatunde Irinoye** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 06/22/2014

Certification Number: 1486881

Appendix D: A Record of Ebola Virus Disease Outbreaks and Source of Spread

Table D1

Ebola Outbreaks and Source of Spread

Year	Country / Village	EboV subtype	Number of human cases	Number of deaths	Mortality	Source and spread of infection
1976	Sudan, Maruda and Nzara	Sudan virus	284	151	53%	Spread by close contact within hospitals, many hospital staff were infected
1976	Zaire, Yambuku	Ebola virus	318	280	88%	Contaminated needles and syringes in hospitals
1976	England	Sudan virus	1	0		Laboratory infection, accident-stick of contaminated needles
1977	Zaire, Tandala	Sudan virus	1	1	100%	Noted retrospectively
1979	Sudan, Maruda and Nzara	Sudan virus	34	22	65%	Recurrent outbreak at the same site as the 1976
1989	USA, Viriginia, and Pennsylvania	Restone virus	0	0		EboV was introduced in to quarantine facility by monkeys from the Philippines
1989-1990	Philippines	Restone virus	3	0		Source: macaques from USA. Three workers (animal facility) developed antibodies, did not get sick
1990	USA, Viriginia		4	0		The same to 1989
1994	Gabon	Ebola virus	52	31	60%	Initially thought to be yellow fever, identified as Ebola in 1995
1994	Cote d'Ivoire	Tai Forest	1	0		Scientist become ill after autopsy on a wild chimpanzee (Tai Forest)
1995	Democratic Republic of Congo	Ebola virus	315	250	81%	Case-patient worked in the forest, spread through families and hospitals
1996	Gabon	Ebola virus	37	21	57%	Chimpanzee found dead in the forest was eaten by hunters, spread in family members
1996-1997	Gabon	Ebola virus				Case-patient was a hunter from forest camp, spread by cloth contact
1996	South Africa	Ebola virus	2	1	50%	Infected medical professional traveled
1996	Russia	Ebola virus	1	1	100%	Laboratory contamination
2000-2001	Uganda	Sudan virus	425	224	53%	Providing medical care to Ebola case-patient without using adequate personal protective measures
2001-2002	Gabon	Ebola virus	65	53	82%	Outbreak occurred over border of Gabon and Republic of Congo
2001-2002	Republic of the Congo	Ebola virus	57	43	75%	Outbreak occurred over border of Gabon and Republic of the Congo
2002-2003	Republic of the Congo	Ebola virus	143	128	89%	Outbreak in the districts of Mbomo and kelle in Cuvette Ouest Department
2003	Republic of the Congo	Ebola virus	35	29	83%	Outbreak in villages located in Mbomo district, Cuvette Ouest Department
2004	Sudan, Yambio	Sudan virus	17	7	41%	Outbreak concurrent with an outbreak of measles, and several cases were later reclassified as measles
2004	Russia	Ebola virus	1	1	100%	Laboratory infection
2007	Democratc republic ofthe	Ebola virus	264	187	71%	The outbreak was declared over November 20. Last death on October 10
2007-2008	Uganda	Bundibugyo virus	149	37	25%	First reported occurrence of a new strain

Year	Country / Village	EboV subtype	Number of human cases	Number of deaths	Mortality	Source and spread of infection
2008	Philippines	Reston virus	6	0%		Six workers (pig farm) developed antibodies, did not become ill
2008-2009	Democratic Republic of the Congo	Ebola virus	32	15	47%	Not well identified
2011	Uganda	Sudan virus	1	1	100%	The Uganda Ministry of Health informed the public a patient with suspected Ebola died on May 6, 2011
2012	Uganda, Kibaale	Sudan	11	4	36%	Laboratory tests of blood samples were conducted by the UVRI and the CDC
2012	Democratic Republic of the Congo	Bundibugyo virus	36	13	36%	This outbreak had no link to the contemporaneous Ebola outbreak in the kibaale, Uganda
2012-2013	Uganda	Sudan virus	6	3	50%	CDC assisted the ministry of Health in the epidemiology and diagnosis of the outbreak
2014	Democratic Republic of the Congo	Zaire virus	66	49	74%	The outbreak was unrelated to the outbreak of West Africa

Adapted from Gebretadik, F., Seifu, M., & Gelaw, B. (2015). Review on Ebola virus disease: Its outbreak and current status. *Epidemiology (Sunnyvale)*, *5*(4), 1–8. https://doi.org/10.4172/2161-1165.1000204

Appendix E: Ebola Virus Disease Outbreaks, Morbidity, and Case Fatalities

Table E1

Ebola Virus Disease Outbreaks, Morbidity, and Case Fatalities

Year	Country	Virus	Cases	Deaths	CFR (%)*
1976	Democratic Republic of Congo	EBOV	318	280	88
1976	South Sudan	SUDV	284	151	53
1977	Democratic Republic of Congo	EBOV	1	1	100
1979	South Sudan	SUDV	34	22	65
1994	Gabon	EBOV	52	31	60
1994	Côte d'Ivoire	TAFV	1	0	0
1995	Democratic Republic of Congo	EBOV	315	250	79
1996	Gabon	EBOV	37	21	57
1996–1997	Gabon	EBOV	60	45	75
1996	South Africa	EBOV	2	1	50
2000–2001	Uganda	SUDV	425	224	53
2001–2002	Gabon	EBOV	65	53	82
2001–2002	Republic of Congo	EBOV	57	43	75
2002–2003	Republic of Congo	EBOV	143	128	89
2003	Republic of Congo	EBOV	35	29	83
2004	South Sudan	SUDV	17	7	41
2005	Republic of Congo	EBOV	12	10	83
2007	Democratic Republic of Congo	EBOV	264	187	71
2007–2008	Uganda	BDBV	149	37	25
2008–2009	Democratic Republic of Congo	EBOV	32	15	47
2011	Uganda	SUDV	1	1	100
2012	Uganda	SUDV	11	4	36
2012	Democratic Republic of Congo	Bundibugyo	36	13	36
2012	Uganda	SUDV	6	3	50
2014	Democratic Republic of Congo	EBOV	69	49	71
2014	Guinea	EBOV	3814	2544	67
2014	Liberia	EBOV	10678	4810	45
2014	Sierra Leone	EBOV	14124	3659	26
2014	Nigeria	EBOV	20	8	40
2014	Mali	EBOV	8	6	75
2017	Democratic Republic of Congo	EBOV	8	4	50
2018	Democratic Republic of Congo	EBOV	54	33	61
2018–2019	Democratic Republic of Congo	EBOV	3220	2150	67
2019	Uganda	EBOV	4	4	100
Total			34356	14823	

Source: WHO, Centers for Disease Control and Prevention (https://www.cdc.gov/vhf/ebola/history/chronology.html),