**Assessment of how the (2014-16) Ebola Virus Disease epidemic influenced the lives of West African survivors now residing in Victoria , Australia**

**ABSTRACT**

***Background:*** The 2014-16 Ebola virus disease epidemic negatively influenced the lives of survivors, necessitating further evaluation of the mental health of survivors. Community lockdowns during the EVD epidemic caused feelings like fear, anxiety, worry, and dark memories of events.

***Objective******:*** To study the influence of the EVD epidemic (2014-2016) on West African survivors residing in Victoria, Australia.

***Methods and materials:*** Survey questionnaire comprising textual open-ended questions which was followed by semi structured interview questions (see Table 1) were used to evaluate the phenomenon of interest among West Africans residing in Victoria, Australia. A five-stage qualitative data analysis was utilized for both datasets. Interviews were transcribed electronically verbatim. Textual data were given 1-2 digits numerical codes, and semi-structured interview data were assigned 3 digits codes.

***Result:*** Among the 36 participants, 53% were women, and the age range of most participants, was 18-40 years. Additionally, nine individuals participated in the interviews. Most had high school qualifications obtained in West Africa and/or Australia and were employed. Experiences included life changes, fear, nightmares, prayers for divine interventions, and embracing Infection Prevention Control measures.

***Conclusion:*** Participants freely embraced IPC and beliefs in divine interventions in the midst of fear and anxiety among participants.

***Keywords:*** Influence, Trauma, psychosocial, Ebola Virus Disease, Strongest memory

**Introduction**

Survival of life changing occurrences, such as the 2014-16 Ebola Virus Disease (EVD) epidemic, leaves the victims physically, psychologically, and socioeconomically challenged. The physical challenges that include residual health problems are described as post-EVD syndrome, which might have arisen from the sequelae of EVD infection or experience (Schindell et al., 2024). Other health challenges following such events include long-term impacts on the psychological and mental health of survivors in the long-term (Cénat et al., 2020). Psychologically, survivors of EVD became anxious, stressed, depressed, apprehensive, and experienced flashbacks after the epidemic ended (Cénat et al., 2020; Keita et al., 2023; Mandoh et al., 2024d; Mohammed et al., 2015) and which could have influenced the minimal functioning capacity in the physical and socio-economic environment.

The socioeconomic challenges that include social exclusion through stigma and disruption of cultural activities in the case of EVD, increased feelings of tension and pressure that could be associated with behaviors influenced by fear, took their tolls on survivors (O'Leary et al., 2018). Additionally, the lockdown of communities coupled with the illnesses and sometimes death of family providers in the absence of government social support (Murray et al., 2021; Rabelo et al., 2016) influenced more negative psychosocial outcomes that can be described as post-traumatic stress disorder (Arthur et al., 2023; Richards et al., 2015). The negative impact of the strict introduction of Infection Prevention and Control (IPC) measures might have negatively influenced the lives of EVD survivors.

However, the remodelling of these IPC measures combined improved information education and communication strategies, and the provision of community support by non-government organizations influenced communities to embrace positive behavioral change, as evidenced by Carter et al.(2017) and Gamma et al.(2017).

**Objective**

To study the influence of the Ebola VD epidemic on West African survivors residing in Victoria, Australia.

**Method**

**Design:** This is a sequential exploratory mixed methods research. Participants were selected through a non-randomised sampling method to ensure that selected individuals are knowledgeable enough to provide rich nuanced data on the phenomena that were evaluated. This study included text-based online survey and was followed by interviews with open-ended, qualitative questions (see T able 1). The survey comprised of 7 research questions one of which (the influence of surviving the ebola epidemic on the lives of West Africans living in Victoria-Australia.) is the focus of this paper.

**Statistics:** Descriptive qualitative methods, including mean, median, and percentages, were utilized to analyse the quantitative data, and findings were presented through charts and tables, as described previously by Mandoh et al. (2024).

**Data collection:** This study collected two sets of data from participants whose names were coded. Participants who provided textual data in the online questionnaire were given coded numbers ranging between 1-2 digits. However, those who participated in the semi-structured interviews were assigned 3 digits numerical codes. Additionally, a five-stage qualitative data analysis was utilized for both datasets. Data derived from interviews were transcribed electronically verbatim (See data access section for link). While content-based analysis was initially used for textual data. Interview data were also organized and prepared by taking notes during the process before creating themes that were integrated before reporting.

**Table 1, Research questions addressed in this study**

|  |  |  |
| --- | --- | --- |
| **Design** | **Type** | **Question** |
| **Qualitative** | Survey question (Online Survey Monkey) | Please describe how surviving the Ebola epidemic has impacted on your life since coming to Australia: |
| **Qualitative** | Interview question (on Zoom) | How do you think that surviving Ebola has changed your life? |

Qualitative questions, as stated in Table 1, were used to collect data. The survey questionnaire was piloted in Victoria, Australia, where this study was conducted to determine the suitability and understanding of the questions.

**Setting:** This study was conducted in Victoria, Australia, and a detailed description of the location of Victoria, Australia can be found in Mandoh et al.,(2024)

**Results**

**Impact of surviving the Ebola epidemic on lives since coming to Australia**

Responses from the participants indicated that surviving the EVD epidemic was a life-changing event. Arriving in Australia was considered protective against the horrors of the past EVD epidemics in West Africa. The EVD epidemic has influenced feelings such as fear, anxiety, stress, and distress among West African survivors.

This finding is supported by statement from participants:

*Depressed (028)*

*Since coming to Australia away from the Ebola epidemic, I felt safe. However, now, I feel like I am experiencing a fear stronger than I used to experience because in Nigeria, the Ebola case was lower compared to the other West African countries. However, in Australia, the chances of contracting COVID\_19 is higher as a global pandemic.* *(64)*

Furthermore, the data showed that participants regarded the EVD epidemic as a ‘never forgotten’ experience, which exposed the fragility of life.

*I remain scared forever; it feels like it happened yesterday. Not even the distance from home is enough to make me forget. (Participant 001)*

 *I can’t think of any connection of how my surviving Ebola has impacted my life since coming to Australia other than making me very aware of epidemics and how to avoid being infected (Participant 010)*

*It has caused anxiety and depression sometimes and makes me worried and though I feel safe in Australia, I still have dark memories of what happened especially during this pandemic. (63)*

 EVD influenced fear-driven behaviors, including avoidance of people and public places, fear of infection, feeling of being trapped, nightmares, and antisocial behaviors such as stigma and avoidance.

*I remain scared forever; it feels like it happened yesterday. Not even the distance from home is enough to make me forget. (01)*

*It’s impacted me mentally and emotionally (035)*

*I still have flashbacks of the epidemic (59)*

On the other hand, the EVD epidemic influences were not entirely negative; there were some positive ones, such as compliance with the Australian government’s infection prevention and control measures that included social distancing, wearing face masks, and instantly seeking treatment in hospitals and clinics for illnesses. The following statement from participants confirms these findings.

*We are following all the safety advice and measure, and we were constantly in lockdown. For almost a year. This has been me resilience and try to be calm in similar crisis. (6)*

*It was the grace of God and standard precautions we took and ensure we worked with health expert advised. (45)*

Participants trusted the government of Australia that it could effectively cushion the negative influences of past events on their mental health through appropriate health care and support.

**How surviving the 2014-16 Ebola epidemic has changed their lives in Australia**

 The responses could be grouped into two categories: positive changes that improved their awareness of the hazards of EVD and other infectious diseases, and improved resilience to other challenging events. Another positive change was participants’ perceptions of the quality of the healthcare delivery system in Australia, which they described as better than in West Africa. These sentiments are expressed as follows.

*Much better systems in place which makes it even more reassuring. (Participant 5)*

 *I was happy to be back in Australia where the health care system is 100% better than the one in Liberia. (Participant 18)*

*In Australia, I felt safe, being away from the reminder of what happened during the Ebola epidemic. (Participant 58)*

positive EVD induced behavioral change enhanced their compliance with infection prevention and control procedures in Victoria, Australia. Such changes included staying home and observing a constant lockdown during the COVID-19 pandemic in Australia. The following participants explained the influences of EVD on them:

*..I always disseminate information pertaining to any outbreak of sickness to my family as quick as possible(pause) and information dissemination yes. (Participant 008)*

*We were following all the safety advice and measure, and we were constantly in lockdown. For almost a year. This has been me resilience and try to be calm in similar crisis. (Participant 6)*

*… surviving Ebola changed my life especially when it comes to proper hygiene. Especially washing of my hands daily and also using the hand sanitiser after washing your hands and also, I must keep my social distance with people because as previously. (Participant 006)*

*..to educate people to learn about ……take early precaution to stop to prevent this thing to overtake yeah. (Participant 002)*

Additionally, participants believed that it was divine (God) blessings that protected them from harm, which, according to some participants, was they who saved their lives during widespread infection, illnesses, and deaths. Their survival was also attributed to the observation of standard precaution, which was expressed in the participants’ views:

*I was blessed because I survived Ebola virus, some family did not survive. I am happy I am here now, but my friends and family members who did not survive, I miss them for life.* *(Participant 22)*

*It was the grace of God and standard precautions we took and ensure we worked with health expert advised. (Participant 45)*

*… am satisfied I have to be grateful to God. I am I am. Am satisfied yeah. I can’t emphasise mor on that, but I am, yeah. (Participant 002)*

*…. I believe in God, and I believe that eh it was by the grace of God that I could make it. It is not out of my wisdom or my knowledge. …I thank God there is research, I thank God there is a healthcare system from outside coming in to help and thank God that there is United Nations, thank God there is countries like Australia. (Participant 005)*

Despite the confidence and reported positive results such as compliance with standard precaution rules and enhanced resilience, most of the participants reported many negative changes in surviving the EVD epidemic while living in Victoria, Australia. Examples of such changes are feelings of fear, nightmares, flashbacks, and hopelessness, which are evidenced in the following statements:

*I remain scared forever; it feels like it happened yesterday. Not even the distance from home is enough to make me forget. (Participant 1)*

*Since coming to Australia away from the Ebola epidemic, I felt safe. However, now, I feel like I am experiencing a fear stronger than I used to experience because in Nigeria, the Ebola cases were lower compared to the other West African countries. However, in Australia, the chances of contracting COVID-19 is higher as this is a global pandemic. (Participant 64)*

*I still have flashbacks of the epidemic. (Participant 59)*

*Since coming to Australia, I have always had nightmares when I think about my experiences during the Ebola outbreak and how I miraculously survived. (Participant 50)*

*In Australia, I have been experiencing flashbacks and sometimes nightmares when I reflect back to how I narrowly escaped death from the Ebola virus outbreak that took many people in my family and neighbourhood in Sierra Leone. (Participant 51)*

*I have always believed in, the philosophy that says bad em difficult times are things make us stronger and that has always been my belief. … we went through it, we come out of it stronger. (Participant 009)*

The statements above are indicative of the mental changes that have been influenced by West African EVD survivors living in Victoria-Australia. Examples of these changes include being scared forever, believing in divine interventions during difficult moments, and experiencing flashbacks and nightmares.

**Discussion**

**Impact of surviving the Ebola epidemic on life since coming to Australia**

***Observation:*** Data showed that surviving the EVD epidemic was never forgotten and a life-changing event and arriving in Australia gave hope for a better life, but other events such as the outbreak of the 2019-23 COVID-19 in Australia awakened feelings of fear, distress, and anxiety among EVD survivors who had endured such feelings in the recent past before the 2019-23 COVID-19 outbreak. Experiences garnered during the EVD epidemic influenced willingness to follow infection prevention and control measures.

***Inference on the findings:***Although other infectious diseases are endemic in the West African region and therefore might have contributed to the illnesses and deaths, the EVD experience could have been life changing because it was completely strange to the countries with no definite treatment or cure at that time and the disease resulted in widespread deaths not only among family and friends but also among healthcare professionals. Irrespective of the lack of a definite cure and vaccines in government clinics and hospitals, other treatments would have been administered to quench the progression of the disease if people had trusted these facilities and utilized their services. Conversely, there was widespread distrust and avoidance of government-run healthcare institutions, which might have increased the infection and death rates from to 2014-16 EVD in homes. The choice to embrace infection prevention and control measures after the 2014-16 EVD epidemic, such as the period under the 2-19-23 COVID-19 pandemic, could have been influenced by previous experiences of widespread infection, illness, death, stigma, and disruption of the socioeconomic lives of people during the epidemic in West Africa.

***Supporting literature:*** Ji et al. (2017) maintained that death from EVD was not only common among individuals and families, but also among healthcare professionals. In line with this, Murray et al. (2021) maintained that since there was no cure for EVD in hospitals, ill individuals preferred to remain home rather than seek care in a government-run clinic or hospital, which was perceived as a potential source of EVD infection. Additionally, Brolin-Ribacke et al. (2016) observed that individuals dodged government run healthcare clinics and hospitals out of fear either because of a lack of healthcare professionals to provide care or fear of infection at these facilities. Researchers such as Cénat et al.(2020), Murray et al.(2021) and Schindell et al. (2024) associated psychosocial symptoms with stigma related to EVD infection.

***Significance of the findings:*** This study reveals the difficulties and trauma that influenced EVD survivors’ behaviors after the EVD epidemic. It further provides data about the extent to which the mental health of EVD survivors is affected by the extent of their influence on their behaviors. The influence of the 2014-16 EVD epidemic on the behaviors of survivors during and after the epidemic has helped them embrace health-enhancing behaviors such as obeying and practicing infection prevention and control measures that are applicable to prevailing health/disease conditions. This finding provides data that could be utilized by students and researchers alike to further their knowledge about the influence of the 2014-16 EVD epidemic on the lives of West African survivors who now live in Australia. This knowledge could be adapted to other areas of healthcare to guide the design of programs. Patients visiting clinics could potentially present with complex health problems that require evidence-based knowledge to understand and manage. Hence, the data from this study are useful for aiding patient care***.***

***Implications:*** Although there is information promoting understanding of the physical effects and symptoms of EVD in the long term, the psychosocial impact needs to be researched on an ongoing basis to promote better understanding and possibly provide interventions that would mitigate the negative effects of these influences on the lives of the 2014-16 EVD epidemic survivors.

**How surviving the 2014-16 Ebola epidemic has changed their lives in Australia**

***Observation:*** Participants’ responses were two-fold, which included positive behaviors that enhanced resilience. They trusted the healthcare delivery system of Australia and, therefore, followed the stay at home and isolated orders, especially when infection was suspected. The participants also believed in protection from infection and deaths from 2014-16 to EVD by GOD. Negative experiences included fear of infection, nightmares, flashbacks, and hopelessness.

***Inference:*** Trusting the healthcare system of Australia might have emenated from comparisons with West Africa, where the healthcare delivery system was insufficient and lacked the infrastructure to enhance the optimal support required to combat the 2014-16 EVD epidemic. Alternatively, the negative psychosocial symptoms, the 2014-16 EVD survivors might have been caused by the lack of preparedness and inconsistent messaging from the government, which caused confusion and exacerbated the underlying distrust. This could have further undermined the response to the widespread infection and ongoing psychosocial challenges faced by EVD survivors, even after the epidemic. Additionally, belief in divine interventions could be one of the reasons for EVD survivors praying at Ebola Treatment Units at the height of the epidemic.

***Literature support:*** Considering the scale of the EVD epidemic, Gershon et al. (2016) maintained that the healthcare delivery systems of the countries in the epicentre of the epidemic were inadequate and therefore could not adequatele respond, additionally, Murray et al. (2021) noted that the inadequate and fragile healthcare infrastructure in Sierra Leone was not adequately prepared to respond to the epidemic considering the scale of the EVD epidemic, which might negatively impact the confidence and trust of individuals in Sierra Leone. In line with this, Rabelo et al. (2016) and Murray et al.(2021) associated the distrust of government and healthcare institutions with inconsistent messaging and lack of support from the Liberian and Sierra Leonean governments. Additionally, Rabelo et al. (2016) noted that EVD survivors appreciated when led in prayers at their units.

***Significance of the findings:*** This shows that disaster preparedness in the epicenter of the 2014-16 EVD epidemic could have mitigated the scale of the outbreak and the physical and psychosocial consequences of an unexpected disease outbreak..As infectious disease emergence and re-emergence are becoming frequent with significant impacts on the social and physical well-being of people, knowledge about such impacts could help with the preparation and interventions in case outbreaks occur. Such knowledge will aid in practice, which will ameliorate the long-term impacts of such large-scale events. Knowledge from such events could be adapted to other fields about the effects of highly infectious disease outbreaks that will significantly affect the mental health of those who witness such events. Data gathered from this study could be transformed into work and training manuals that will equip not only trainees but also other interested and related professional colleagues with the latest evidence-based knowledge that will guide practice.

***Implications:*** Large-scale infectious disease outbreaks could potentially create a large number of survivors, whose physical and mental health might be severely affected. Therefore, efforts should be made to monitor the mental health status of EVD survivors in Victoria, Australia.

***Limitations:*** Although this mixed-method research might have neutralized some of the study biases, it is acknowledged that participants in the survey were purposively selected, which could lead to selection bias. Although qualitative methods of investigation provide rich data that consider participants’ nuanced expressions, interviews are recounted experiences from participants’ memory, which could affect the correctness of the data provided and result in a recall bias.

***Conclusion:*** This study showed that experiencing the EVD epidemic was life-changing, and there has been an array of influences not only on physical health but also on the psychosocial well-being of EVD survivors. Participants emphasized the need for ongoing health education and the observance of IPC to prevent infection as the situations dictated. Additional research should be conducted to ascertain the influence of disease outbreaks or other forms of disaster on the lives of West Africans and other miniature immigrant cohorts.

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***Ethical compliance:*** The study has the approval (H20325) of the Human Research Ethics Committee of the Charles Sturt University, New South Wales, Australia.

***Data access:*** Data for both research questions that were investigated in this publication are available at the following sites (1) <https://doi.org/10.6084/m9.figshare.28270607> (2) <https://doi.org/10.6084/m9.figshare.28270322>

***Author contributions*:** SLM designed the manuscript, PTB and EUN supervised the project.

**CONSENT**: Consent was given in writing before the study commenced.

**COMPETING INTEREST**: No competing interest

**CONFLICT OF INTEREST**: There are no conflicts of interest to declare.

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