**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 (EVD) epidemic influenced the lives of survivors physically and psychosocially and the influences necessitate the need for further evaluation of mental health of survivors. Community lockdowns in response to the EVD outbreak gave rise to feelings such as fear of infection, anxiety, worries and dark memories of events during the epidemic.

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

***Methods and materials:*** A Sequential exploratory mixed methods investigated the influence of the EVD epidemic among West Africans now residing in Victoria- Australia. A questionnaire which comprised of closed ended quantitative and open-ended qualitative questions collected data. Descriptive quantitative analysis and discourse and content-based analyses were utilised for both sets of data. Textual data was given 1-2 digits numerical codes and semi-structured interview data were assigned 3 digits codes.

***Result:*** Among the total 36 participants, 52% were women and the age range of most of the participants including men was 18-40 years. Additionally, 9 individuals participated in the semi-structured interviews. Most had high school qualifications obtained in West Africa and/or in Australia and they were employed. Experiences were life changes that caused fear and nightmares, prayers for divine interventions, embracing infection prevention and control procedures.

***Conclusion:*** This study identified willingness to freely embraced IPC, beliefs in divine interventions in the midst of fear, 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 the experiences (Schindell et al., 2024). Other health challenges following such events include the impacts on the psychological/mental health of the survivors in the long-term (Cénat et al., 2020). Psychologically, survivors of the EVD became anxious, stressed, depressed, apprehensive, and also experienced flashbacks after the epidemic ended (Cénat et al., 2020; Keita et al., 2023; Mandoh et al., 2024d; Mohammed et al., 2015) and these feelings could have influenced minimal functioning capacity in the physical and socio-economic environment.

The socioeconomic challenges which include social exclusion through stigma and disruption of cultural activities in the case of the EVD, increased feelings of tension and pressure that could be associated with behaviors that are 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 the providers in families 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 Trauma Stress Disorder (Arthur et al., 2023; Richards et al., 2015). The negative impacts of the strict introduction of Infection Prevention and Control (IPC) measures might have negatively influenced the lives of EVD survivors further.

However, the remodelling of these IPC measures combined improved information education and communication strategies and provision of community supports by non-government organisations 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 sequential exploratory mixed methods which utilised qualitative research methods collected two set of data from participants whose names were coded. Participants who provided textual data were given coded numbers ranging between 1-2 digits. Those who did the semi-structured interviews were assigned 3 digits numerical codes. The study included text-based in an online survey and interview qualitative open-ended questions. The five stages qualitative data analysis was utilised for both data sets. While content-based analysis was initially used for textual data, interview data was also initially organised and prepared by taking notes during the process before creating themes.

**Data collection**

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

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| --- | --- | --- |
| **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 utilised to collect data, and 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 as described (Mandoh et al., 2024)

**Statistics:** Descriptive qualitative methods which included mean, median and percentages were utilised in analysing the quantitative data and findings were presented through charts and tables as described previously by Mandoh et al., (2024).

**Results**

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

Responses from participants indicate that surviving the EVD epidemic was a life changing event. Arriving in Australia was considered as being protective from the horrors of the past EVD epidemic in West Africa. The EVD epidemic influenced feelings such as fear, anxiety, stress, and distress among West African survivors. Furthermore, data showed that participants regarded the EVD epidemic as a ‘never to be forgotten’ experience, which exposed the fragility of life. The EVD influenced fear driven behaviors that include avoidance of people and public places, fear of infection, feeling of being trapped, nightmares, some antisocial behaviors such as stigma and avoidance. On the other hand, the EVD epidemic influences were not entirely negative, there were some positive ones such as the compliance with the Australian government’s infection prevention, and control measures which included social distancing, wearing face masks, and instantly seeking treatment in hospitals and clinics for illnesses.Participants trusted the government of Australia that it can effectively cushion the negative influences of past events on their mental health through appropriate healthcare and supports.

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

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

*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)*

The positive EVD induced behavior change enhanced their compliance with infection prevention and control procedures in Victoria- Australia. Such changes included staying home and observing constant lockdown during the COVID-19 pandemic in Australia. The following participants explained the influences the EVD had 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 it was he/she who saved their lives during widespread infection, illnesses and deaths. Their survival was also attributed to the observation of standard precaution This was expressed in participants’ views that:

*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 positives such as the compliance with standard precaution rules and enhanced resilience, most of the participants reported many negative changes of surviving the EVD epidemic on their lives whilst living in Victoria- Australia. Examples of such changes are feelings such as 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 in West African EVD survivors living in Victoria-Australia. Examples of these changes include being scared forever, belief in divine interventions during difficult moments, 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 a to be forgotten and life changing event and arriving in Australia gave hope of better life, but the other events such as the outbreak of the 2019-23 COVID-19 in Australia awakened feelings of fear, distress, 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 the willingness to follow infection prevention, and control measures.

***Inference on the findings:***Though 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 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 utilised their services. Conversely, there was widespread distrust and avoidance of government run healthcare institutions, which might have increased the infection and death rates from the 2014-16 EVD in homes. The choice of embracing 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 healthcare professionals. In line with this, Murray et al. (2021) maintained that since there was no cure for the EVD in hospitals, ill individuals preferred to remain home than to 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 of either because of lack of healthcare professionals to give 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 the stigma related to EVD infection .

***Significance of the findings:*** This finding reveals the difficulties and trauma, which influenced EVD survivors’ behaviors after the EVD epidemic. It further provides data about the extent to which the mental health of EVD survivors was affected to the extent of influencing their behaviors. The influence of the 2014-16 EVD epidemic on the behaviors of survivors during and after the EVD epidemic, has helped them to 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 which could be utilised 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. The knowledge could be adapted to other areas of healthcare that would guide the design of programmes. Patients visiting clinics could potentially present with complex health problems that require evidence-based knowledge to understand and manage them. Hence data from this study is useful in aiding patient care***.***

***Implications:*** Though there is information promoting understanding of the physical effects and symptoms of the EVD on 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 of 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 are two-fold, which includes positive behaviors that enhanced resilience. They trusted the healthcare delivery system of Australia, and therefore, followed the stay at home and isolating orders especially when infection was suspected. Participants also believed protection from infection and deaths from 2014-16 EVD by GOD. The negative experiences include fear of infection, nightmares, flashbacks, and hopelessness.

***Inference:*** Trusting the healthcare system of Australia might have emenated from comparisons between West Africa where the healthcare delivery system was insufficient and lacked the infrastructures to enhance optimal support required to combat the 2014-16 EVD epidemic. Alternatively, the negative psychosocial symptoms, which 2014-16 EVD survivors endured might been caused by the lack of preparedness and the inconsistent messaging from government, which caused confussion and exacerbated underlying distrust. This could have further undermined the response to the widespread infection and ongoing psychosocial challenges which EVD survivors faced even after the epidemic. Additionally, the belief in divine interventions could be one of the reasons for EVD survivors praying at Ebola Treatment Units at the height 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 impacted 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 to the inconsistent messaging and lack of supports from the Liberian and Sierra Leonean governments. Additionally, Rabelo et al. (2016) noted that EVD survivors appreciated when they were led in prayers at their units.

***Significance of the findings:*** This finding shows that disaster preparedness in the epicentre of the 2014-16 EVD epidemic could have mitigated scale of the outbreak and the physical and psychosocial consequences of an unexpected disease outbreak..As infectious disease emergence and reemergence are becoming frequent with significant impacts on the social and physical wellbeing of people, knowledge about such impacts could help with the preparation and interventions in case outbreak occurs. Such knowledge will aid 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 highly infectious disease outbreaks that will significantly affect the sanity of the mental health of those who witness such events. Data gathered from this study could be transformed to work and training manuals that will equip not only trainees but also other interested and related professional colleagues with 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 made to keep monitoring EVD status of the mental health of EVD survivors in Victoria- Australia.

**Limitations:**Though this a mixed methods research that might have neutralised 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 investigations provide rich data that take into account participants nuanced expressions, interviews are recounted experiences from participants memory which could affect the correctness of the data provided and result to a recall bias.

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

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

**COMPETING INTEREST**: No competing interest

**CONFLICT OF INTEREST**: There is no conflict of interest in this research.

**References**

Arthur, R. F., Horng, L. M., Tandanpolie, A. F., Gilstad, J. R., Tantum, L. K., & Luby, S. P. (2023). The lasting influence of Ebola: a qualitative study of community-level behaviors, trust, and perceptions three years after the 2014-16 Ebola epidemic in Liberia. *BMC Public Health*, *23*(1), 682. <https://doi.org/10.1186/s12889-023-15559-1>

Brolin-Ribacke, Brolin, K. J., van Duinen, A. J., Nordenstedt, H., Höijer, J., Molnes, R., Froseth, T. W., Koroma, A. P., Darj, E., Bolkan, H. A., & Ekström, A. (2016). The impact of the West Africa Ebola outbreak on obstetric health care in Sierra Leone. *Public Library of Science One*, *11*(2), e0150080. Available:. <https://doi.org/10.1371/journal.pone.0150080>

Carter, S. E., O’Reilly, M., Frith-Powell, J., Umar Kargbo, A., Byrne, D., & Niederberger, E. (2017). Treatment Seeking and Ebola Community Care Centers in Sierra Leone: A Qualitative Study [Article]. *Journal of Health Communication*, *22*, 66-71. Available:. <https://doi.org/10.1080/10810730.2016.1216204>

Cénat , J. M., Mukunzi, J. N., Noorishad, P.-G., Rousseau, C., Derivois, D., & Bukaka, J. (2020). A systematic review of mental health programs among populations affected by the Ebola virus disease. *British Journal of Psychiatry Open 131*, 109966. Available at:. <https://doi.org/10.1016/j.jpsychores.2020.109966>

Gamma, A. E., Slekiene, J., Von Medeazza, G., Asplund, F., Cardoso, P., & Mosler, H. J. (2017). Contextual and psychosocial factors predicting Ebola prevention behaviours using the RANAS approach to behaviour change in Guinea-Bissau [Article]. *BioMedical Central Public Health*, *17*(1), Available:, Article 446. <https://doi.org/10.1186/s12889-017-4360-2>

Gershon, R., Dernehl, L. A., Nwankwo, E., Zhi, Q., & Qureshi, K. (2016). Experiences and Psychosocial Impact of West Africa Ebola Deployment on US Health Care Volunteers. *Public Library of Science Current outbreaks*, *8*. <https://doi.org/10.1371/currents.outbreaks.c7afaae124e35d2da39ee7e07291b6b5>

Ji, D., Ji, Y. J., Duan, X. Z., Li, W. G., Sun, Z. Q., Song, X. A., Meng, Y. H., Tang, H. M., Chu, F., & Niu, X. X. (2017). Prevalence of psychological symptoms among Ebola survivors and healthcare workers during the 2014-2015 Ebola outbreak in Sierra Leone: a cross-sectional study. *Oncotarget*, *8*(8), 12784. Available:. <https://doi.org/10.18632/oncotarget.14498>

Keita, M., Talisuna, A., Chamla, D., Burmen, B., Cherif, M. S., Polonsky, J. A., Boland, S., Barry, B., Mesfin, S., Traoré, F. A., Traoré, J., Kimenyi, J. P., Diallo, A. B., Godjedo, T. P., Traore, T., Delamou, A., Ki-Zerbo, G. A., Dagron, S., Keiser, O., & Gueye, A. S. (2023). Investing in preparedness for rapid detection and control of epidemics: analysis of health system reforms and their effect on 2021 Ebola virus disease epidemic response in Guinea. *British Medical Journal Global Health*, *8*(1), Available:. <https://doi.org/10.1136/bmjgh-2022-010984>

Mandoh , S. L., Bwititi, P. T., & Nwose, E. U. (2024). Study protocol for psychosocial impacts of COVID-19 pandemic on Australian based West Africans who survived the 2014-2016 Ebola epidemic. *Protocol.io*, Available:. <https://www.protocols.io/view/study-protocol-for-psychosocial-impacts-of-covid-1-5qpvokzk9l4o/v1>

Mandoh , S. L., Bwititi, P. T., & Nwose, E. U. (2024d). Systematic Review of the Literature on the Psychosocial Impacts of Ebola Virus Disease on West Africans Who Survived the Epidemic. . *Journal of Complementary and Alternative Medical Research, 25(12),*(25(12), 70–88. ). <https://doi.org/10.9734/jocamr/2024/v25i12597>

Mohammed, A., Sheikh, T. L., Poggensee, G., Nguku, P., Olayinka, A., Ohuabunwo, C., & Eaton, J. (2015). Mental health in emergency response: lessons from Ebola. *The Lancet Psychiatry*, *2*(11), 955-957. [https://doi.org/10.1016/S2215-0366(15)00451-4](https://doi.org/10.1016/S2215-0366%2815%2900451-4)

Murray, R. T., Drew, L. B., Memmott, C., Bangura, Y.-M., & Maring, E. F. (2021). A community’s experience during and after the Ebola epidemic of 2014—2016 in Sierra Leone: A qualitative study. *Public Library of Science neglected tropical diseases*, *15*(2), e0009203. Available:. <https://doi.org/10.1371/journal.pntd.0009203>

O'Leary, A., Jalloh, M. F., & Neria, Y. (2018). Fear and culture: contextualising mental health impact of the 2014-2016 Ebola epidemic in West Africa. *British Medical Journal Global Health*, *3*(3), e000924. <https://doi.org/10.1136/bmjgh-2018-000924>

Rabelo, I., Lee, V., Fallah, M. P., Massaquoi, M., Evlampidou, I., Crestani, R., Decroo, T., Van den Bergh, R., & Severy, N. (2016). Psychological Distress among ebola survivors Discharged from an ebola Treatment Unit in Monrovia, liberia–a Qualitative study. *Frontiers in public health*, *4*, 142. Available:. <https://doi.org/10.3389/fpubh.2016.00142>

Richards , P., Amara, J., Ferme, M. C., Kamara, P., Mokuwa, E., Sheriff, A. I., Suluku, R., & Voors, M. (2015). Social pathways for Ebola virus disease in rural Sierra Leone, and some implications for containment. *Public Library of Science Neglected Tropical Diseases*, *9*(4), e0003567. Available at:. <https://doi.org/10.1371/journal.pntd.0003567>

Schindell, B. G., Fredborg, B., Kowalec, K., Shaw, S., Kangbai, J. B., & Kindrachuk, J. (2024). The state of mental health among Ebola virus disease survivors through a cross-sectional study in Sierra Leone. *BioMed Journal Global Health 9*(5), e015098. <https://doi.org/10.1136/bmjgh-2024-015098>

Schindell , B. G., Kangbai, J. B., Shaw, S. Y., & Kindrachuk, J. (2024). Stigmatization of Ebola virus disease survivors in 2022: A cross-sectional study of survivors in Sierra Leone. *Journal of Infection, Public Health*, *17*(1), 35-43. Available:. <https://doi.org/10.1016/j.jiph.2023.10.025>