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Post-traumatic stress disorder and depressive symptoms following a Herdsmen attack: The role of life meaning in mediating trait mindfulness

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Abstract

It is well established that mindfulness is beneficial in decreasing Posttraumatic Stress Disorder (PTSD) and depression symptoms, but the explanatory pathway and processes through which this happens are still not clear. The present study investigated two mediation models that explored the psychological process of *presence of meaning* in life as a mechanism connecting mindfulness to reduced PTSD and depressive symptoms in survivors of a violent attack. A sample of 577 survivors of the Fulani herdsmen attack completed relevant self-report measures and the bootstrap method was used to test the models for direct, indirect and total effects. Results revealed that mindfulness was negatively associated to PTSD symptoms, and that this association was fully mediated by the ability to find meaning in life. Mindfulness was also indirectly associated to depression through a greater sense of meaning in life. The findings of this study suggest that the presence of meaning in life is the pathway through which mindfulness alleviates PTSD and depression symptoms, and could therefore serve as an intervention target to decrease such negative outcomes in trauma survivors.

Key words: PTSD, depression, Fulani herdsmen, survivors, mindfulness, meaning in life.

Introduction

Over 60,000 deaths have been recorded in recent years, and well above a million other people have been displaced due to the violent crisis taking place between the Fulani herdsmen and the farming communities in Nigeria (Institute for Economics and Peace, 2018). The Fulani herdsmen, also well known for cattle rearing, usually move from place to place in search of vegetation for their cattle. This random movement of cattle is likely to lead to the destruction of farm produce belonging to the farming communities, frequently resulting in an incessant clash between the two groups. A case in point is an incident involving over 500 armed herdsmen who invaded a farming community in the South-eastern Nigeria, killing many people and destroying properties worth millions of naira. While the Fulani herdsmen accused the farmers of stealing their cattle, the farmers accused the herdsmen of destroying their farm produce. Survivors of this attack are now at greatest risk of experiencing posttraumatic stress disorder (PTSD) and depressive symptoms, which are considered among the most serious and commonly reported negative outcomes in trauma-focused research (Domino, Whiteman, Weathers, Blevins, & Davis, 2020; McGuire et al., 2018).

Over the years, research has demonstrated that survivors of violent crises in Nigeria are quite likely to experience PTSD symptoms (Ajibade et al., 2016; Nwoga, Audu, & Obembe, 2016). This was also confirmed by a recent study, in which the survivors of the Fulani herdsmen attack reported experiencing depressive symptoms (Aliche & Onyishi, 2019). Therefore, research focusing on the role of psychological processes and mechanisms related to PTSD and depression in a largely understudied and unique population is necessary; more specifically, such research should explore the role of mediating mechanisms, such as the presence of

meaning in life, as well as the relationship between mindfulness, PTSD and depressive symptoms in survivors of herdsmen attacks.

Mindfulness has gained much attention in the area of clinical psychology and in healthcare settings due to its impact on individuals' psychological well-being (Aliche et al., 2019; Yela, Crego, Gómez-Martínez, & Jiménez, 2020). It has been identified as a protective factor against the negative impact of traumatic events (Zhong, Zhang, Bao, & Xu, 2019). Mindfulness processes involve the experience of being connected with the self in the present moment, as well as being able to modulate and orient one's thoughts to the *here and now* (Brown & Ryan, 2003). For the purpose of this study, mindfulness is conceptualised as a conscious, open-minded awareness of internal and external stimuli occurring in the present moment (i.e., bodily sensations, cognitions and emotions), even negative ones (i.e., thoughts of herdsmen attacks), with non-judgemental acceptance of those experiences (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006, Smith, Hopkins, Krietemeyer, & Toney, 2006). Mindfulness helps individuals inhibit negative affective responses to trauma and facilitates awareness of potential sources of positive coping strategies (Garland, Gaylord, & Fredrickson, 2011). This is usually achieved through psychological flexibility (Brown & Ryan, 2003), objective responses to external stimuli (Kabat-Zinn, 2003), and more clarity on one's internal processes (Desrosiers, Vine, Klemanski, & Nolen-Hoeksema, 2013). Additionally, mindfulness processes decrease negative emotions (Aliche et al., 2019; Desrosiers et al., 2013), serving as a catalyst for survivors' wellbeing by facilitating positive adjustment in the form of growth and resilience in challenging situations (Garland, Carlson, Cook, Lansdell, & Speca, 2007).

Although mindfulness is seen as an individual trait, it can also be developed through a variety of therapy modalities such as Acceptance and Commitment therapy (ACT; Hayes, Strosahl, &

Wilson, 1999); Mindfulness-based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002); Mindfulness-based Stress Reduction (MBSR; Kabat-Zinn, 1993); and Dialectical Behaviour Therapy (DBT; Linehan, 1993). Substantial evidence has shown that mindfulness-based intervention programs are beneficial in relieving a variety of negative emotions including PTSD (Bank, Newman, & Saleem, 2015; Kearney, McDermott, Malte, Martinez, & Simpson, 2013; King et al., 2013; Muller-Engelmann, Wunsch, Volk, & Steil, 2017; Stephenson, Simpson, Martimez, & Kearney, 2017) and depressive symptoms (e.g., Gallegos, Hoerger, Talbot, Moynihan, & Duberstein, 2013; Piet & Hougaard, 2011; Young & Baime, 2010) in both community and clinical samples. Moreover, studies conducted with traumatised populations have shown that the combination of mindfulness-based therapies and other evidence-based trauma-focused treatments, such as cognitive processing therapy and prolonged exposure-based therapies, yielded the most clinical benefits in reducing PTSD symptoms and in maintaining the reduction of symptoms months after treatment (Frye, & Spates, 2012).

These cognitive processing therapies and exposure-based therapies help people with negative posttraumatic outcomes, including PTSD and depression, challenge faulty interpretations and beliefs that may prevent them from coming to terms with the traumatic experience (Holliday, Holder, & Suris, 2018; Johnson, 2009). The core strategy of this treatment is to reduce trauma-related symptoms by teaching patients how to systematically confront feared and avoided situations, thoughts, memories and activities that may serve as reminders of the traumatic events (Foa, Huppert & Cahill, 2006). A large number of randomised controlled trials have demonstrated that cognitive processing therapy and narrative exposure-based therapies reduce PTSD symptoms and other trauma-related mental health symptoms, including those related to

depression and borderline personality disorder (BPD) (Alghamdi, Hunt, & Thomas, 2015; Jeffreys et al., 2013; Pabst et al., 2014; Park, Elbert, & Kim, 2020; Robjant, Roberts, & Katona, 2017).

Added to the above, results of correlational studies have corroborated the above findings on the beneficial effects of mindfulness in PTSD and reduction of depression symptoms (Boelen & Lenferink, 2018; Martin, Bartlett, Reddy, Gonzalez, & Vujanovic, 2018; Stanley et al., 2019) (e.g., Aliche et al., 2019; Desrosiers et al., 2013) among survivors of various kinds of traumatic events. These studies suggest that when survivors are more mindful, they are more able to re-construe and reappraise the traumatic events in such a manner that positive gains will be articulated and some personally-relevant meaning will be made out of the situation (Aliche et al., 2019; Garland et al., 2011). Therefore, understanding the processes through which mindfulness affects PTSD and depressive symptoms can benefit the development of intervention programmes targeting traumatised populations.

Meaning in life may be seen as the degree to which individuals comprehend, make sense of, or have significance in their lives, as well as the existence of a purpose and objectives in life to pursue (Steger, Frazier, Oishi, & Kaler, 2006). Traumatic events are known to shatter assumptions about oneself and the world; however, meaning in life has been identified as one of the most important psychological protective factors when people are faced with major life obstacles (Janoff-Bulman, 1992). According to logotheory (Frankl, 1963) human beings long to experience a personal sense of life meaning and purpose, and have the potential to experience it under every circumstance. This meaning-making desire is nonetheless helpful in reducing

physical and psychological symptoms in both clinical and non-clinical samples (Mascaro & Rosen, 2005; Zhong et al., 2019).

Consequently, the process of finding meaning in life may involve a deeper reflection on life experiences and a conscious effort to reconcile the gap between present achievements and future goals (Schlegel, Hicks, King, & Arndt, 2011). Empirically, finding meaning in life has been associated to increased positive emotions such as happiness and well-being, including awareness of social support, health-promoting behaviour, and a sense of identity (Psarra & Kleftaras, 2013; Winger, Adams, & Mosher, 2016). Meaning-making also aids the enhancement of hope (Mascaro & Rosen, 2005) and facilitates positive adjustment to traumatic experiences (Aliche, Ifeagwazi, Onyishi, & Mefoh, 2019). Trauma survivors who cannot find meaning very often tend to seek psychological care services (Fontana & Rosenheck, 2005). However, an overwhelming number of investigations have identified meaning in life as a protective factor against the exacerbation of PTSD symptoms (Dursun, Saracli, & Konuk, 2014; Owens Steger, Whitesell, & Herrera, 2009; Steger, Frazier, & Zacchanini, 2008) and other indicators of poor wellbeing, such as depression, anxiety and general psychological distress (Braden, Overholser, Fisher, Ridley, 2017; Hedayati & Khazaei, 2014; Mascaro & Rosen, 2005; Steger, Mann, Michels, & Cooper, 2009).

Mindfulness may also serve as a key protective factor in the wake of traumatic life experiences by facilitating the possibility of finding meaning in life (Allan, Bott, & Suh, 2015; Bishop et al., 2004; Wong, 2012). Mindfulness enhances positive reappraisal, which is a cognitive emotion regulation strategy through which traumatic experiences are reframed as benign,

meaningful, or growth-promoting, thereby improving psychological wellbeing (Aliche et al., 2019). A recent theoretical model has linked mindfulness to meaning in life. According to the *mindfulness-to-meaning making theory* (MMT) (Garland, Farb, Goldin, & Fredrickson, 2015), mindfulness enables individuals to decentre from negative appraisals, broaden their attention and consider previously unattended information. Integration of this information into one's existing schemas promotes positive re-appraisal of life circumstances. Furthermore, mindfulness may foster savouring of the positive features of the socio-environmental context and, along with reappraisal, may contribute to the sense of eudaimonic meaning in life, according to which wellbeing lies in the actualisation of human potential (Waterman, 1993).

Thus, mindfulness may lead to reduction of PTSD and depressive symptoms through the facilitation of meaning-making processes. Furthermore, mindfulness may lead people to become more aware of their feelings, thoughts and experiences, which could help them become more oriented towards their personal values, beliefs and objectives in life (Allan et al., 2015). This can encourage individuals to become more aware of their internal and external experiences, helping them to progress to meaning-making (Weinstein, Ryan, & Deci, 2012), In addition, cognitive scholars have argued that mindfulness, characterised by a focus on the present moment, self-observation, acceptance, and a non-judgemental attitude, facilitates a sense of meaning in life (Allan et al., 2015; Brown & Ryan, 2003). This gives room for a healthier integration of the self and subsequent engagement in behaviours that are intrinsically motivated (Zhong et al., 2019); such behaviours may in turn help attenuate negative outcomes such as PTSD (Owens et al., 2009) and depression (Hedayati & Khazaei, 2014).

Mindfulness-based interventions have shown some clinical benefits in facilitating the meaning-making process (Garland, Stainken, Ahluwalia, Vapiwala, & Mao, 2015; Garland et al., 2007; Henderson et al., 2013). On the other hand, meaning in life, being a cognitive process, may be derived from interventions that are related to cognitive processing, such as cognitive processing therapy (Resick, Monson, & Chard, 2017) and exposure-based therapies (Foa, Hembree, & Rothbaum, 2007; Markowitz et al., 2015). Thus, investigations have shown that exposure-based therapies can be very useful in promoting certain constructs that are intrinsically related to meaning in life; these include facilitation of positive emotional processes in depression treatment (Hayes, 2015), reduction in the use of maladaptive cognitive emotion regulation strategies such as rumination by promoting positive reappraisal strategies (Wisco, Sloan, & Marx, 2013), and improved quality of life in people with PTSD (Glassman et al., 2020).

Meaning in life is usually more distinct in mindful individuals (Crego, Yela, Gómez‐Martínez, & Karim, 2019), as these people are very unlikely, for instance, to engage in habitual worrying and ruminations (Verplanken & Fisher, 2014). On the contrary, they might be able to maintain a solution-focused outlook and exhibit greater resilience capabilities in difficult situations (Allan et al., 2015). With particular reference to the present study, holding an unbiased thought of the Fulani herdsmen attack (regardless of whether it was positive, negative, or neutral), could provide a meta-cognitive insight into the experience. This might have led to accepting the event and its consequences, therefore strengthening the survivors' focus on future goals and aspirations in life.

In the past, only a handful of empirical studies have found mindfulness to positively correlate with meaning in life (e.g., Allan et al., 2015; Crego et al., 2019; Wong, 2012). However, the indirect effect of dispositional mindfulness, also known as trait mindfulness, on psychological problems through the mechanism of meaning in life was recently investigated by other researchers (Zhong et al., 2019). They concluded that dispositional mindfulness could result in an increased ability to find meaning in life. This improved skill was thought to mediate the decrease in perceived stress and psychological symptoms. Similarly, Crego et al. (2019) identified meaning in life as a mechanism through which mindfulness could lead to psychological well-being and mental health. Most recently, meaning in life has been identified as one of the pathways through which mindfulness-related meditation is likely to bring about positive health outcomes (Yela et al., 2020). These findings provide preliminary evidence that meaning in life is a pathway through which mindfulness influences mental health outcomes. However, further exploration is needed particularly among survivors of violent attacks or any other unpredictable adverse events of this nature.

Although substantial empirical evidence in the Western culture indicates that mindfulness and a meaningful life are independently linked to decreased symptoms of PTSD and depression, the synergistic effect of these cognitive processes has yet to be thoroughly assessed. Specifically, and to our knowledge, no previous study has examined the mediating role of meaning in life on the relationship between mindfulness, symptoms of PTSD and depression. Moreover, there is a paucity of investigations on the role of these contextual and psychological processes on mental health in African populations. Given the severity of the emotional turmoil experienced by the survivors of herdsmen attacks, exploring the role of mindfulness in finding

meaning in life can alleviate PTSD and depression symptoms in this population; it can also be particularly useful in advancing the trauma literature and in informing intervention efforts.

Therefore, the goal of this study is mainly to examine the mediating role of theoretically, conceptually and empirically related variables in a unique population that has largely been under-investigated. In the present study, PTSD and depression were examined as two separate dependent variables. Based on previous studies, we hypothesised tshat:

Hypothesis 1: The relationship between mindfulness and PTSD would be mediated by meaning in life such that survivors with greater mindfulness abilities would experience reduced symptoms of PTSD through a greater sense of meaning in life.

Hypothesis 2: The relationship between mindfulness and depression would be mediated by meaning in life such that survivors with greater mindfulness abilities would experience reduced symptoms of depression through greater sense of meaning in life.

Method

Participants and procedure

A cross-sectional design and a random sampling method were used in the present study. The sample for this study was drawn from a community who had survived a violent attack by the Fulani herdsmen. A letter outlining the aims, nature and methods of this investigation was sent to the community head. Once the community leader had approved for his community to participate, information about the study was passed to other members of the community. This

particular community included 409 households labelled with a number (1- 409). The first household at the entrance of the community was assigned number one and the last one number 409. All households with an odd number were selected for participation in this project. Altogether, 205 households were selected and all individuals in these households, who were over 15 years old and who had an efficient understanding of the Igbo language, were invited to participate in the research project.

The data for the present study was collected from June to August 2018, after receiving ethical approval from the Psychology Research Ethics Committee, University of Nigeria, Nsukka. Five research assistants were recruited and trained for the data collection phase. Research assistants visited the participants in their homes, during evening hours, when it was assumed that everyone had returned home after the day's activity. Participants were given a written informed consent form which outlined the procedure and aims of the study. They were offered the opportunity to withdraw from the study at any time without providing any further explanations and they were reassured that their participation would be anonymous and voluntary. It was also highlighted that any information provided by them would be treated as confidential, and that results with the potential of revealing their identity would not be reported. Informed consent was obtained for all participants and parental consent was given for those under 18 years old. All participants who met the inclusion criteria and provided informed consent completed the self-report measures that had been translated from English to Igbo language by an expert translator. The translated Igbo version of the measures was back-translated into English by two other experts who spoke Igbo fluently. The original version of the measures and the back-translated versions were compared and all syntactic equivalence and

dialectical ambiguities were identified and resolved by the two expert translators and by two other researchers who also spoke Igbo as a native language.

Overall 577 participants completed the questionnaire. There were 290 (58.3%) males and 287 (49.7%) females. Participants' ages ranged from 18 to 70 years (M = 36.24, SD = 12.31). Of the participants, 221 (38.30%) were single, 237(41.08%) married, 100 (17.33%) were divorced and lastly 19 (3.29%) were widow/er). As far as occupation was concerned, the majority, 296 (51.30%), were farmers, 181 (31.37%) were businessmen and 100 (17.33%) were civil servants. However, the number of participants who had lost their relatives in the attack (n = 278, 48.2%) was very similar to those who had not (n = 299, 51.8%), and also to those who had (n = 454, 78.7%) had their homes destroyed in the attack while others (n = 123, 21.3) had not endured the same type of trauma. Although this collective trauma affected the majority of participants, some of them experienced greater loss than others.

Measures

Considered demographic variables were age, occupation, marital status, whether participants had lost a relative or had had their house destroyed during the attack, as well as the binary variable of gender. Information about these variables was obtained via a number of self-report personal questions.

Mindfulness was measured using the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). This measure comprises 5 items (i.e., "I find it difficult to stay focused on what's happening in the present") assessed on a 6-point Likert scale (1= almost always, 6 = almost never), with higher scores indicating higher levels of trait mindfulness. This short form of

MAAS has demonstrated a good convergent validity, a strong and inverse association with unpleasant affect experiences (r = .49), and good internal consistency (α = .92) (Brown & Ryan, 2003). In this sample Cronbach alpha was high (α = .84).

Meaning in life was measured by the sub-scale of the Meaning in Life Questionnaire (MLQ; Steger et al., 2006) which assesses presence of meaning in life. This subscale consists of five items (e.g., "My life has a clear sense of purpose" and "I understand my life's meaning"). Each item was rated following a 7-point Likert scale (1 = *absolutely untrue*, 7 = *absolutely true*) with higher scores indicating higher levels of meaning in life. Steger et al. (2006) found that this sub-scale scores correlate with other measures of well-being and depression. MLQ has shown good internal consistency (Strack, 2007). In this study alpha coefficient was .84 for the presence of meaning sub-scale.

PTSD symptoms: The presence and severity of PTSD symptoms were assessed using the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5; Weathers et al., 2013). The PCL-5 is a 20-item questionnaire, corresponding to the *DSM-5* symptom criteria for PTSD. It has four subscales, namely (a) Intrusion (5 items e.g., 'In the past month, how much were you bothered by repeated, disturbing and unwanted memories of the stressful experience?), (b) Avoidance (2 items e.g., 'In the past month, how much were you bothered by avoiding memories, thoughts, or feelings related to the stressful experience?), (c) Negative alterations in cognitions and mood (7 items e.g., 'In the past month, how much were you bothered by strong negative feelings such as fear, horror, anger, guilt, or shame'?), and (d) Alterations in arousal and reactivity (6 items e.g., 'In the past month, how much were you bothered by irritable behaviour, angry outbursts, or acting aggressively?'). Participants were asked to rate the

frequency of PTSD symptoms during the previous month on a 5-point Likert scale (0 = *"not at all"* to 4 = *"extremely"*) resulting in a total score from 0 to 80. Cut-off score for PTSD diagnosis is between 31 to 33. (Weathers et al., 2013). The PCL-5 has exhibited strong internal consistency (α = .94 - .96), test-retest reliability (*r* = .82 - .84), as well as convergent (*r*s = .74 - .85) and discriminant (*r*s = .31 - .60) validity (Blevins, Weathers, Davis, Witte, & Domino, 2015; Bovin et al., 2016). In this sample, internal consistency was high for the PTSD total score (α = .87), avoidance (α = .81), and negative alterations in cognitions and mood (α = .80) and satisfactory for intrusion (α =.75) and alterations in arousal and reactivity (a = .77)**.**

Depressive symptoms were assessed by the Iowa form (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993) which is a shorter form of the Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). This 11-item scale was designed to assess an individual's mood over the past week, e.g. "In the past week, I felt depressed," "In the past week, I enjoyed life" (reverse coded). Scores are rated on a 3-point scale (ranging from 1 = *rarely or almost none of the time* to 3 = *most or all of the time*) with total score ranging from 11-33. The scale has demonstrated good internal consistency (a = .85) among Nigerian population (Aliche et al., 2019). In the present study, the internal consistency was .81.

Data Analysis

Two analyses were performed in this study. First, we analysed demographic characteristics of the sample and averaged scores of mindfulness, meaning in life, PTSD and depressive symptoms. In the second analysis, we modelled the relationship between meaning

and life, mindfulness and PTSD and depression using a mediation approach. All statistical analyses were done using the computing environment R (R Development Core Team, 2005), lavaan package (). Mediation effects in lavaan were evaluated using a structural equations modelling framework (SEM) that allows for simultaneous fitting all regressions (i.e., both mediation and outcome models) based on an iterative estimation procedure maximizing the agreement between the predicted and the observed covariance matrix. The percentile bootstrap confidence intervals were estimated using the R package 'boot' and 1,000 bootstrap resamples.

Results

Descriptive statistics for mindfulness, meaning in life, PTSD and depression symptoms are presented in Table 1. In this sample, the mean scores indicated an elevated level of PTSD, and depression.

To test whether meaning in life mediated the relationship between mindfulness and PTSD, and between mindfulness and depression scores, we examined two models. In Model 1 we tested the mediating role of meaning in life on the relationship between mindfulness and PTSD. Model 2 examined whether the relationship between mindfulness and depression was mediated by meaning in life. Prior entering the variables into mediation analysis, we ran a series of analyses to gather initial information about the relationship between all variables. First, we performed exploratory correlation analyses. Pearson correlation analysis showed strong relationships among all variables (Table 2). Second, we performed a series of regression

analyses to test the relationship between (i) the PTSD, depression and meaning in life; (ii) meaning in life and mindfulness; (iii) mindfulness and PTSD, depression. Both PTSD and depression could reliably predict meaning in life (B=-.40, SE=.04, t=-9.91, p<.001, 95% CI [-.48, -.32]; B=-.34, SE=.06, t=5.48, p<.001, 95% CI [-.46, -.22] respectively). Meaning in life could significantly predict mindfulness (B=.12, SE=.02, t =5.48, p<.001, 95% CI [.08, .17]). Moreover, mindfulness could reliably predict either PTSD scores (B=-.25, SE=.07, t=-3.54, p<.001, 95% CI [-.39, -.11] and depression scores (B=-.12, SE=.05, t=2.33, 95% CI [-.21, -.02]. The results of these regressions indicate that although there is a direct relationship between mindfulness and either the PTSD symptoms and depression, meaning in life could mediate this relationship. We tested this assumption by estimating the changes in the direct path (the relationship between mindfulness and PTSD, depression) when we introduce meaning in life as a moderator.

The results of Model 1 are summarized in Figure1, A. As hypothesised, introducing meaning in life as a mediator, resulted in non-significant direct effect between mindfulness and the PTSD scores (B=-.11, SE=.07, p=.10, 95% CI [-.30, .75]). The indirect path (mindfulness ->meaning in life ->PTSD) was significant (B=-.12, SE=.03, p<.001, 95% CI [-.21, -.09]. The total effect reminded also significant (B=-.25, SE=.07, p<.001, 95%CI [-.45, -.05]. These results indicated that a unit increase in the mindfulness increases the meaning in life by .41 units, which decreases the severity of PTSD symptoms by .35 units (on a 0 to 1 scale). Following suggestion of MacKinnon, Warsi, Dwyer (1995), we calculated effect size for mediation by computing the ratio between indirect effect and total effect (-.14/-.25=.56). The results of Model 1 showed that introducing the meaning in life variable as a mediator to the model yielded a non-significant direct effect indicating indirect-only mediation. Hypothesis 1 was therefore confirmed.

Figure1, B demonstrates the results of Model 2. Introducing meaning in life as a mediator, resulted in non-significant direct path between mindfulness and depression (B=0.06, SE=.05, p=.23, 95%CI [-.16, .04] while the indirect path (mindfulness->meaning in life->depression) reminded significant (B=-.06, SE=.02, p<.001, 95%CI [-.09, -.03]. The total effect in the model also reminded significant (B=-.16, SE=.05, p=.02, 95%CI [-.21, -.01]. The effect size for mediation Model 2 was 0.49. The results suggest an indirect-only mediation effect of the meaning in life on the relationship between mindfulness and depression. Hypothesis 2 was confirmed.

Discussion

The present study examined the mediating role of meaning in life on the relationship between mindfulness, PTSD and depression among survivors of a herdsmen attack. The findings of the study are in agreement with the study hypotheses. Greater mindfulness was associated with decreased severity of PTSD symptoms, and reduced frequency of depression symptoms. Greater sense of meaning in life was associated with fewer symptoms of PTSD and depression. However, as expected, greater sense of meaning in life mediated the relationship between mindfulness, fewer symptoms of PTSD and depression, suggesting that meaning in life was the potential mechanism underlying the association between mindfulness, fewer symptoms of PTSD and depression. Collectively, mindfulness contributed to decreasing PTSD and

depression symptoms among survivors of this herdsmen attack, through the pathway of increased sense of meaning in life.

Although individuals who are going through negative posttraumatic outcomes such as PTSD and depression are very likely to judge their thoughts, memories and feelings as negative, the findings of this study have highlighted that mindfulness abilities help survivors mitigate these upsetting feelings with calmness and peace of mind. Being more mindful allows survivors to engage in the present moment and to observe the memories of the trauma as they are, without judging them as positive, negative or neutral (Yela et al., 2020). This finding has corroborated much of the current literature pointing towards the positive impact of mindfulness on PTSD and depressive symptoms reduction (Aliche et al., 2019; Bank et al., 2015; Muller-Engelmann et al., 2017; Stephenson et al., 2017). Thus, clinical interventions for these survivors may consider integrating mindfulness-based training programs, or other evidence-based trauma-related interventions, such as cognitive processing therapy and exposure-based therapies; these therapies have been effective in alleviating trauma-related problems including PTSD and depression (Jeffreys et al., 2013; Pabst et al., 2014; Park et al., 2020; Robjant, Roberts, & Katona, 2017).

As anticipated, meaning in life predicted decreased symptoms of PTSD and depression among survivors. This finding is in agreement with previous literature (Braden et al., 2017; Hedayati & Khazaei, 2014; Owens et al., 2009; Steger et al., 2008; Steger et al., 2009). Meaning in life is a widely recognised and essential indicator of psychological health following traumatic event. A greater tendency toward meaning in life is linked to decreased existential distress by facilitating healthier recovery from life threatening illness (Zhong et al., 2019). Although the

herdsmen attack has been identified as an event that is capable of shattering survivors' assumptions about the self and the world, finding meaning in life in this situation has been found to contribute to cushioning the effect of the attack on their psychological wellbeing by facilitating growth and resilience (Aliche et al., 2019). The meaning-making processes following the attack might lead towards a deeper reflection on the event, the losses, the gains, and the willingness to reconcile them in a way that positive lessons can be articulated and individuals' life goals pursued. Previous studies have also shown that meaning in life helps facilitate healthier psychological adjustments to traumatic experiences and promotes a positive emotional life in other populations (Zhong et al., 2019)

The finding that meaning in life mediated the relationship between mindfulness and PTSD, and between mindfulness and depression is of greatest importance to this study. This finding demonstrates that a meaningful life can serve as a mechanism that explains the relationship between mindfulness and decreased symptoms of PTSD and depression among survivors of a herdsmen attack.

This result is consistent with most recent studies which have provided evidence that meaning in life mediates mindfulness and better mental health outcomes (Crego et al., 2019; Zhong et al., 2019). Thus, the facilitation of meaning in life, especially during challenging situations, should be considered as one of the most effective mindfulness mechanisms in the area of clinical psychology practice. Moreover, the findings of this study have contributed to and reinforced the literature on logotherapy (Frankl, 1963) by extending it to survivors of a herdsmen attack and it also lends support to the mindfulness-to-meaning theory (Garland et al., 2015). The mediation result has indeed showed that mindfulness can be a positive predictor of

meaning in life, and can play an important role in facilitating meaning-making processes, leading to positive adjustment in survivors.

Furthermore, results of the present study have also highlighted the negative relationship between mindfulness and PTSD and depressive symptoms in survivors of herdsmen attacks. Survivors characterised by greater mindfulness abilities can be more aware of present moment experiences and be more acceptable towards them; these behaviours may facilitate their desire to find purpose in life and can lead to satisfaction about their personal beliefs, values and goals. Thus, such survivors are thought to be more capable of integrating themselves, their thoughts and attitudes (Zhong et al., 2019), indicating greater skills in finding meaning in their life (Garland et al., 2015; Weinstein et al., 2012; Zhong et al., 2019). The greater the survivors' level of meaning in life, the more likely they are to take responsibilities for their lives, deal with challenges and adversities, while remaining unhindered from pursuing their future goals (Zhong et al., 2019). This can in turn alleviate PTSD (Owens et al., 2009; Steger et al., 2008) and depression symptoms (Braden et al., 2017; Hedayati & Khazaei, 2014).

Taken together, these findings demonstrate that the attitude survivors have during adverse life events and the manner in which they process the event, may contribute to the severity of the posttraumatic outcome. Mindfulness-based therapies (Kabat-Zinn, 1993; Segal et al., 2002), cognitive processing therapies (Resick et al., 2017) and exposure-based therapies (Foa et al., 2007) can help develop mindfulness and meaning in life (i.e., Allan et al., 2015; Garland et al., 2015) which our research showed to be negatively linked to PTSD and depressive symptoms. Thus, it is suggested that integrating these therapies may be beneficial to those who are at risk

of developing PTSD and depressive symptoms after surviving a traumatic experience. This combination of therapies has shown to yield optimum clinical benefits in the reduction of trauma-related symptoms in traumatised populations (Frye & Spates, 2012). The action mechanism of these therapies encompasses the potency of cognitive processing and exposure therapies in helping survivors recall and confront posttraumatic symptoms activated by specific stimuli. Mindfulness-based intervention programs are thought to help the affected individual to be non-judgemental when confronted with cues and memories of traumatic events, and accept them the way they are and whenever they occur. These therapies may jointly help foster mindfulness skills and possibly promote meaning-making abilities, needed to achieve a positive posttraumatic outcome.

There are a number of limitations to this study that need to be addressed in future research. First, as a cross sectional study, this investigation did not give room for causal conclusion. Future studies should identify the direction of the identified relations. Longitudinal data are needed to identify relationships between mindfulness, meaning in life and decreased PTSD and depressive symptoms, which can persist many years after the traumatic event. Also, longitudinal data can exclude other possibilities, such as that mindfulness predicts decreases in PTSD and depressive symptoms which are then likely to predict meaning in life. Secondly, our participants only included a community sample drawn from a specific geopolitical region in Nigeria (South-east), precluding generalisability of findings to other geopolitical regions with diverse ethnic backgrounds. Future research would benefit from the inclusion of samples from other ethnic backgrounds. Thirdly, the findings of this study drew on the use of self-report measures and thus the possibility of common source bias must be acknowledged. However, the self-report instruments used in this investigation are well-established measures with

satisfactory psychometric properties; thus they offer potential for anonymity, ease of administration and are low cost and non-time-consuming. Lastly, although a mediation model was examined in this study, future studies should explore other potential mediators or moderators of the association between mindfulness, PTSD and depression within and beyond our sample, as this may have useful implications for clinical practice and theory.

In conclusion, the findings of this study have contributed to trauma literature demonstrating that the beneficial effect of mindfulness on PTSD and depressive symptoms reduction is transmitted through the mechanism of meaning in life. Thus, intervention programs for survivors of the herdsmen attack should target these mechanisms as they play an important role in positive adjustment to traumatic experiences.

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Table 1

Descriptive Statistics of Psychological Variables

Variables	*M*	*SD*	Scale range	Observed range
Mindfulness	23.05	5.56	5-30	5-30
Meaning in life	23.34	10.04	5-35	5-35
PTSD total	47.00	9.51	0-80	12-80
Depression	22.74	6.60	11-33	11-33

Table 2

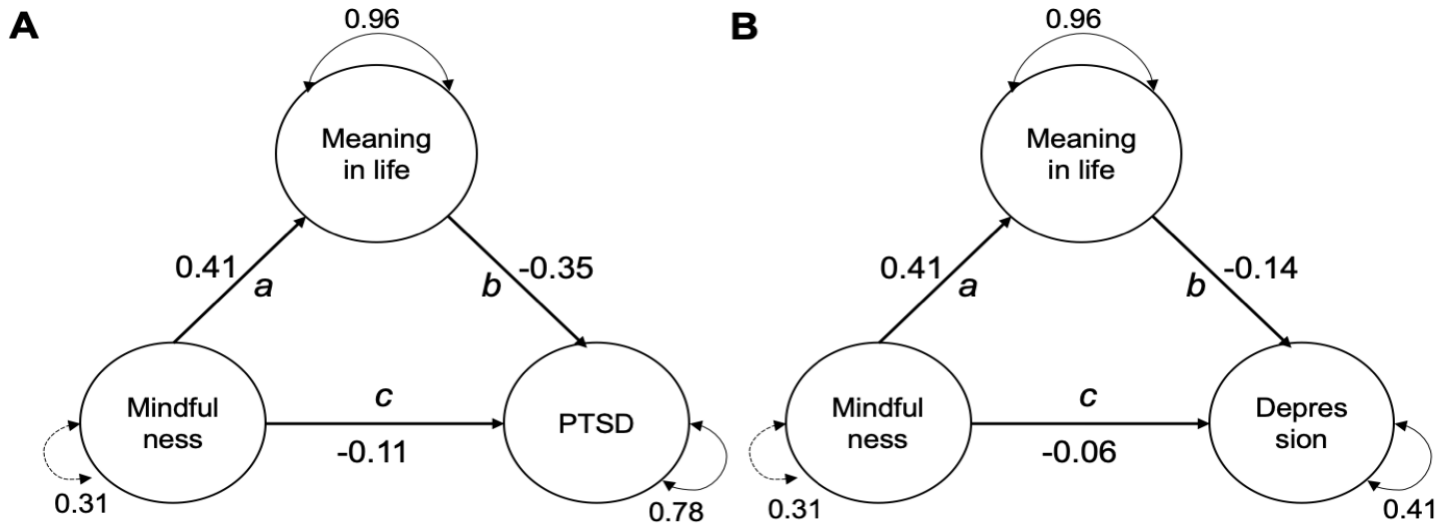
Pearson's Correlation Between Psychological Variables

Variables	1	2	3	4
1. Mindfulness	–			
2. Meaning	-.22***	–		
3. PTSD total	-.15***	-.38***	–	
4. Depression	-.10*	-.22***	.26***	–

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; meaning = presence of meaning in life

Figure A and B

Mediation Model 1 and Model 2



Note. Model 1 has mindfulness as a predictor, meaning in life as a mediator and total score of PTSD symptoms as the outcome variable. Path a represents direct effect of mindfulness on meaning in life; Path b represents the direct effect of meaning in life on PTSD symptoms and Path c represents direct effect of mindfulness on PTSD symptoms. Mediation Model 2 has mindfulness as a predictor, meaning in life as a mediator, and depression as the outcome variable. Path a represent the association between mindfulness and meaning in life, Path b represent the association between meaning in life and depression whereas Path c represents the association between mindfulness and depression. The round arrows in both Mediation Model 1 and 2 indicate the estimated residual variance of each variable (i.e., the total variance explained by the other variables in the model).