



# Stress Sub-Categories and Suicidal Ideation Encountered by Family Carers of Patients with Traumatic Brain Injury

Lourens Schlebusch<sup>1\*</sup> and Janet Walker<sup>2</sup>

<sup>1</sup>Emeritus Professor of Behavioural Medicine, University of KwaZulu-Natal, Durban, South Africa

<sup>2</sup>Registered Counsellor, Johannesburg, South Africa

## Abstract

**Background:** This study's aim was to ascertain differential effects of specific stress-related sub-categories of the total stress response in family members who care for patients with TBI at home, to what extent they are associated with suicidal ideation respectively and their practical implications.

**Materials and methods:** The study sample was comprised of randomly selected volunteer family members (N = 80) caring at home for a relative with TBI. Individually administered standardized measures were used, viz., the Stress Symptom Checklist (SSCL) with three separate sub-categories of stress responses: physical symptoms, psychological symptoms and behavioural symptoms and question 9 (Q9) of the Beck Depression Inventory (BDI).

**Results :** The total stress scores of the sample (including all three sub-categories) were elevated and varied, reflecting their non-normal distribution. However, differences in most scores were higher on the behavioural one associated with suicidal ideation than the physical and psychological sub-categories. The study confirmed that an interaction of stress-related sub-categories affect moderating variables differently in family members who care for TBI patients at home.

**Conclusion :** Early detection and treatment of the onset of the different sub-category symptoms brought on by chronic stress, in particular the often misunderstood behavioural stress-related reactions/symptoms (including possible suicidal ideation) in family carers of TBI patients, can contribute to improving long-term quality of life for both the family caregivers and the patients with TBI they care for.

**Keywords:** Stress sub-categories; Suicidal ideation; Traumatic brain injury; Family carers

## INTRODUCTION

Although the incidence differs between ages, study sites and countries worldwide, Traumatic Brain Injury (TBI) is a serious public health concern [1-10] with some referring to it as a silent epidemic [2] or hidden pandemic [8]. Causes vary, but prominent are the high number of road traffic accidents globally [2], in sub-Saharan Africa [1] and in South Africa [4-6]. An increasing number of patients survive TBI because of progress in modern healthcare while, for several reasons, including resource limitations in some instances, a growing population of patients living with the long-term effects of TBI, are being cared for by family members at home who have to help them reintegrate into family and community environments and with psychological adaptation [8,9,11,12].

TBI can result in longstanding and diverse sequelae, including psychological/psychiatric complications, neuropsychological/cognitive deficits, changes in behaviour/personality and executive functioning, as well as in social, financial, physical and secondary medical ones and the psychological effects of managing and coping with these in patients can cause excessive caregiver burden in families who care for them [9,12-20].

Such experiences can exacerbate challenges in various life domains for family caregivers, which could induce profoundly elevated stress in them, thereby negatively affecting their coping skills that in some carers can be severe enough to lead to suicidal ideation [19]. The human stress response has been shown to follow two pathways, i.e. a physiological

and psychological one and both chronic and acute stress can be critical co-morbid variables in reduced coping with untreated, unhealthy stress leading to detrimental physical, psychological and/or behavioural symptoms [21-31]. This, in turn, can increase existing caregiver burden associated with reduced psychological resilience in family members caring for patients with TBI [20]. However, despite the above there is comparatively limited research on stress in family members who care for patients with TBI at home in low and middle income groups, particularly in South Africa [12,18,19] and notably in respect of the different sub-categories of such stress and its implications for suicidal ideation as explicated in the materials and methods section below.

## MATERIALS AND METHODS

### Aim

As part of an extended research project [12,19,20,32], this study's aim was to ascertain differential effects of specific stress-related sub-categories of the total stress response in family members who care for patients with TBI at home. That is, whether they experienced primarily physical, psychological or behavioural reactions and/or symptoms of stress, to what extent they are associated with suicidal ideation respectively and to provide a synthesis of the key research findings and their practical implications.

### Sample and Study design

The study sample was comprised of randomly selected volunteer family members (N = 80) caring at home for a relative with TBI and who attended support groups at Headway Gauteng (a brain injury association which is a registered non-profit organisation dedicated to offering various support programmes to adult survivors of TBI, their family members and caregivers), Hyde Park and Soweto branches, Johannesburg, South Africa. Participants ranged between the ages of 18 and 75, were English literate with various educational levels, were able to understand the study and give written informed consent on the appropriate form, prior to being included in the study.

The research incorporated a mixed methodology that involved a cross-sectional descriptive and phenomenological approach. From a theoretical perspective it was based on an integrated biopsychosocial model [24,25,28,33] underpinned by aspects of general systems theory [34], the fact that human health should be holistically perceived in

**Submitted:** 17 April 2024 | **Accepted:** 13 May, 2024 | **Published:** 16 May, 2024

**\*Corresponding author:** Lourens Schlebusch, Emeritus Professor of Behavioural Medicine, University of KwaZulu-Natal, Durban, South Africa

**Copyright:** © 2024 Schlebusch L, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Citation:** Schlebusch L, Walker J. (2024) Stress Sub-Categories and Suicidal Ideation Encountered by Family Carers of Patients with Traumatic Brain Injury. SM J Trauma Care 5: 6.



terms of biological, psychological and social factors, along with the stress-diathesis and stress-vulnerability models of stress and health [28,33,35-38]. We also wanted to highlight consideration that different subcategories of prolonged stress can have different detrimental effects in individuals with specific vulnerabilities.

Individually administered standardized measures were used, viz., the Stress Symptom Checklist (SSCL) [24,25] and question 9 (Q9) of the Beck Depression Inventory (BDI) [39]. The SSCL is a reliable, valid and clinically useful dichotomous-scaled 87-item checklist of the general signs and symptoms of unhealthy stress, with three separate sub-categories of stress responses: physical symptoms (18 items); psychological symptoms (27 items); and behavioural symptoms (42 items). The highest total score is 87, with scoring categories being: low stress = 8 and below; mild stress = 9 to 15; moderate stress = 16 to 30; severe stress = 31 to 45; and profound stress = 46 and above. Stress reactions are measured by how often they occur. Scores higher than three on any of the subcategories indicate symptoms of unhealthy stress for that sub-category. The SSCL has been extensively used in adults in divergent research populations [32,40-46]. Q9 of the BDI has a choice of one of four options: 0 = I don't have any thoughts of killing myself; 1 = I have thoughts of killing myself, but I would not carry them out; 2 = I would like to kill myself, or 3 = I would kill myself if I had the chance. For the purpose of this study, a score of 1 to 3 denoted suicidal ideation. Scores obtained on the SSCL sub-categories were compared with those obtained on Q9 of the BDI. These scores were

non-normally distributed, therefore nonparametric statistical tests were used (including the Kruskal-Wallis, Mann Whitney and Chi-Square Tests with a significance level of  $P = 0.05$ ).

## Results

As per our earlier findings [19], the total SSCL stress scores of the sample (including all three sub-categories) varied, reflecting their non-normal distribution that ranged from low (8.8%), mild (13.8%), moderate (31.3%), severe (17.5%) to profound (28.7%). The majority (77.5%) of family carers of TBI patients suffered from deleterious stress levels and with regard to sub-category differences, the psychological sub-category scores were more elevated than the physical ones. However, although their scores were still very high, most scored lower on the physical and psychological sub-categories compared to the higher behavioural one (Figure 1), which tends to suggest the significance of the behavioural stress-related impact on the carers while potentially downplaying the effects of the other sub-categories [12,19].

Graphic representations of the severity of the sub-category stress symptoms are represented in the boxplots (Figures 2-4), portraying their linear trend with Q9 of the BDI and a positive association between the sub-scores, but with increasing differences in stress levels with most scores being higher on the behavioural one associated with suicidal ideation than the physical and psychological sub-categories of the SSCL.

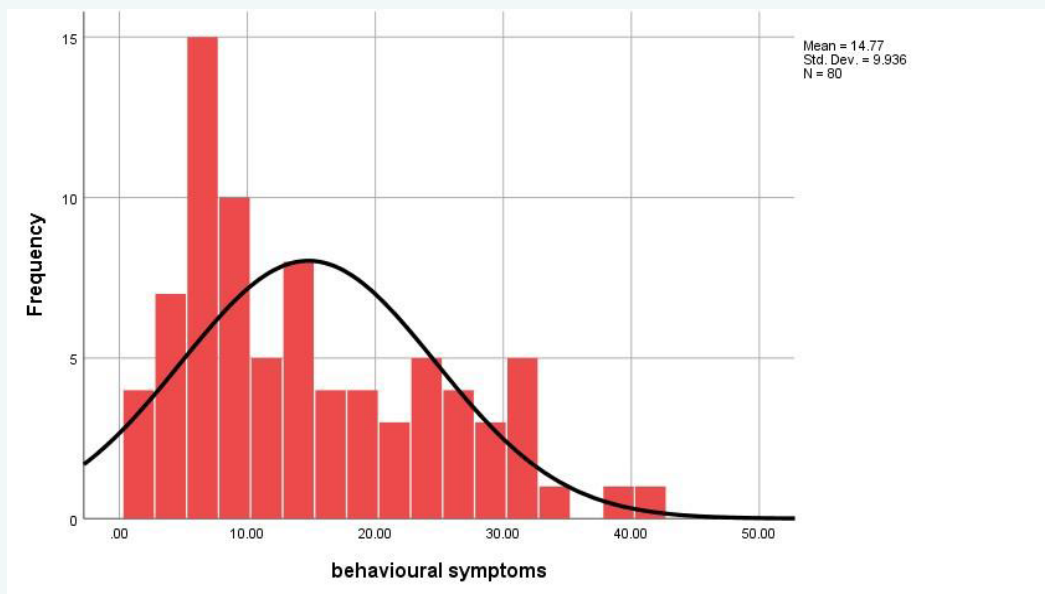


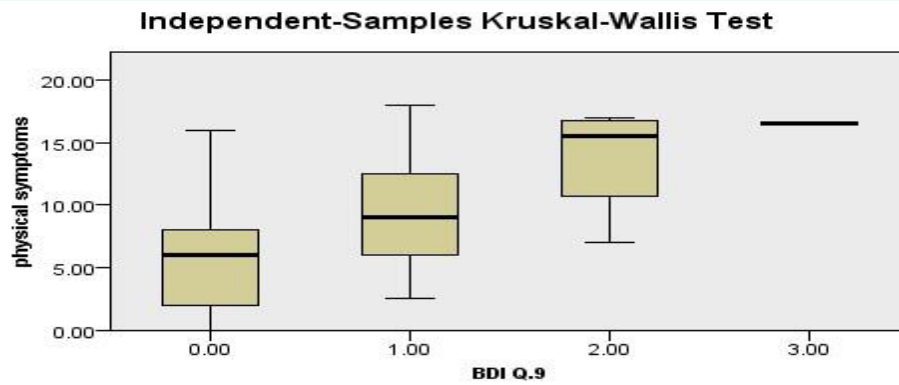
Figure 1 Stress-related behavioural sub-category

## DISCUSSION

Given the study outcome, there is a noteworthy probability that, in addition to overall elevated stress levels experienced by family members who care for patients with TBI, if the behavioural stress-related symptoms are not identified and adequately managed they could lead to suicidal ideation in some family carers and form part of a neglected cause of pathological stress. There can be a lack of awareness of the behavioural changes in patients with TBI such as aggression and disinhibition that have been reported by family members as some of the most difficult to cope with [47,48]. This has also the propensity to effectuate stress-related behavioural reactions in their family caregivers. A tendency towards a high percentage of behavioural stress-related as opposed to physical and psychological symptoms has been noted before, an example

being suicidal behaviour [19].

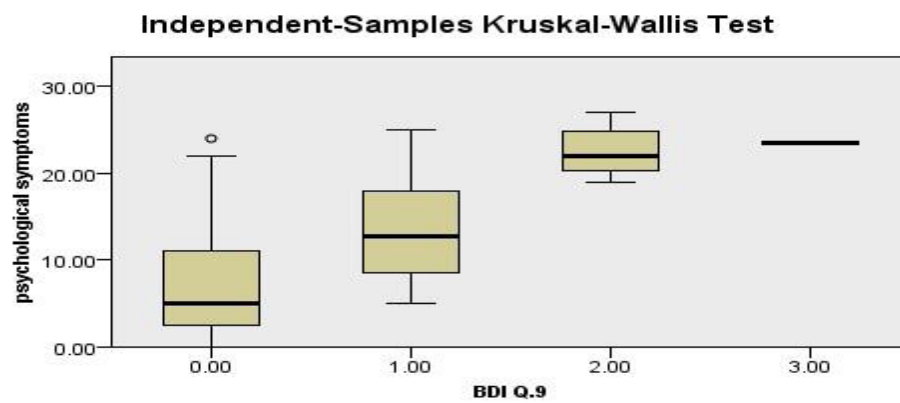
A connection between stress, depression and suicidal ideation can adversely affect the psychological coping of family members who care for patients with TBI at home [19,20], especially if they do not feel adequately prepared by healthcare professionals to deal with the neuropsychological and behavioural aspects of TBI resulting in family conflict once the patient started being cared for at home. Globally and in South Africa suicidal behaviours are high, but there are not always accurate statistics recorded due to several reasons including, inadequate data collection, personal, cultural, religious and other reservations [49-61]. Likewise, psychiatric disorders, psychological distress and their potential suicide risk patients with TBI encounter have been well-examined, as have depression and feelings of hopelessness experienced by caregivers of patients with TBI



<b>Total N</b>	80
<b>Test Statistic</b>	15.034
<b>Degrees of Freedom</b>	3
<b>Asymptotic Sig. (2-sided test)</b>	.002

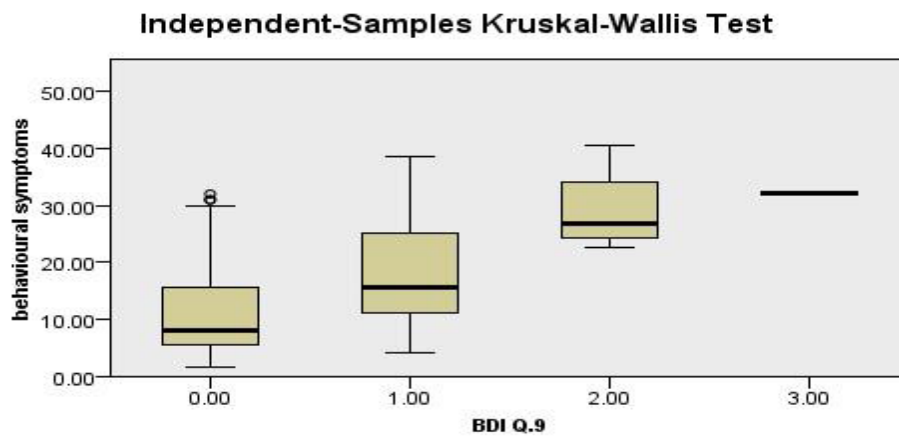
1. The test statistic is adjusted for ties.

Figure 2 Stress-related physical sub-category.



<b>Total N</b>	80
<b>Test Statistic</b>	24.586
<b>Degrees of Freedom</b>	3
<b>Asymptotic Sig. (2-sided test)</b>	.000

Figure 3 Stress-related psychological sub-category.



<b>Total N</b>	80
<b>Test Statistic</b>	18.815
<b>Degrees of Freedom</b>	3
<b>Asymptotic Sig. (2-sided test)</b>	.000

1. The test statistic is adjusted for ties.

**Figure 4** Stress-related behavioural sub-category.

[9,12,19,26,57,60,62-71].

Behavioural difficulties can result from damage to frontal executive functioning and reduced self-awareness in TBI patients [9,48]. In general, behaviour can be understood in terms of cognition (the information-processing aspect), emotionality (involving feelings and motivation) and executive functioning (involving the expression of behaviour) and although interrelated, the cognitive functioning has tended to receive more attention especially in neuropsychological assessment) [9]. In respect of our present research findings, behavioural symptoms can also increase through the stress experienced by family caregivers of TBI patients. Furthermore, such chronic stress can undermine the physiological process of allostasis, effecting an allostatic overload and adversely impact on the individual's health and well-being [23,72,73], which appear to contribute to the high percentage of medical diagnoses reported by family members after they became caregivers to patients with TBI [12]. There is often a misunderstanding by the family members and others of TBI and its effects on the patients' functioning [2,3,9,20]. Since the same applies to the behavioural stress-related effects on the family caregivers, it points to the necessary need of helping carer family members not only to cultivate more effective coping mechanisms to alleviate their overall caregiver burden [9,20,74,75], but how to identify and address the symptoms of different stress-related sub-categories as highlighted by us before [19], and especially the behavioural expressions thereof which can be mired in the complexities of their unmet needs. In this regard the importance of the role of healthcare professionals who treat patients with TBI and their family members can hardly be overstated in terms of educating and preparing the family caregivers and to consider referring them to appropriate sources for relevant support and professional treatment

where necessary [20]. Comprehensive maximized and flexible long-term support [18-20] through facilitating improved coping also requires carer family members' to seek assistance from other family members, support groups, exploring what combination of strategies work for them and to strive not only to understand the behaviour changes in the patient with TBI, but also their own and any underlying potential for suicidal ideation.

In conclusion, the results of the present study confirmed that an interaction of stress-related sub-categories affect moderating variables differently in family members who care for TBI patients at home. Important aspects of their stress management to enhance their ability to cope with the challenges they face are the provision of stresssymptom screening, education, ongoing support and referral by healthcare professionals for appropriate intervention according to individual personal circumstances when required. Early detection and treatment of the onset of the different sub-category symptoms brought on by chronic stress, in particular the often misunderstood behavioural stress-related reactions/symptoms (including possible suicidal ideation) in family carers of TBI patients, can contribute to improving long-term quality of life for both the family caregivers and the patients with TBI they care for.

#### ACKNOWLEDGMENT

The authors would like to express their grateful thanks to Headway Gauteng, Johannesburg, South Africa (the brain injury association), the staff at Headway and to all the research participants. Appreciation is also extended to Adikha Mungaroo and Prenisha Pillay for administrative support and to Tonya Esterhuizen for her biostatistical assistance.



## REFERENCES

1. Ackah M, Gazali Salifu M, Osei Yeboah C. Estimated incidence and case fatality rate of traumatic brain injury among children (0-18 years) in Sub-Saharan Africa. A systematic review and meta-analysis. *PLoS ONE*. 2021; 16: e0261831.
2. Dewan MC, Rattani A, Gupta S, Baticulon RE, Hung Y, Punchak M, et al. Estimating the global incidence of traumatic brain injury. *J Neurosurg*. 2018; 130: 1080-1097.
3. Pretorius C, Broodryk M. Misconceptions about traumatic brain injuries among South African university students. *S Afri J Psychiatry*. 2013; 19: 75-79.
4. Baker CE, Martin P, Wilson MH, Ghajari M, Sharp DJ. The relationship between road traffic collision dynamics and traumatic brain injury pathology. *Brian Commun*. 2022; 4: 52.
5. Groshi AGM, Enicker B. Factors influencing the outcomes of patients with severe traumatic brain injury following road traffic crashes. *S Afri J Surg*. 2022; 60: 273-277.
6. Norman R, Matzopoulos R, Groenewald P, Bradshaw D. The high burden of injuries in South Africa. *Bulletin of the World Health Organization*. 2007; 85: 695-702.
7. Naidoo D. Traumatic brain injury: The South African landscape. *S Afri Med J*. 2003; 103: 613-614.
8. Webster J, Taylor A, Balchin R. Traumatic brain injury, the hidden pandemic: A Focused response to family and patient experiences and needs. *S Afri Med J*. 2015; 105: 195-198.
9. Lezak MD, Howieson DB, Bigler ED, Tranel, D. *Neuropsychological assessment*. Lezak MD editor. 5<sup>th</sup> ed. New York: Oxford University Press; 2012.
10. Jerome E, Laing GL, Bruce JL, Sartorius B, Brysiewicz P, Clarke DL. An audit of Traumatic Brain Injury (TBI) in a busy developing-world trauma service exposes a significant deficit in resources available to manage severe TBI. *S Afr Med J*. 2017; 107: 621-625.
11. Hawley L, Hammond FM, Cogan A, Juengst S, Mumbower R, Pappadis MR, et al. Ethical considerations in chronic brain injury. *J Head Trauma Rehabil*. 2019; 34: 433-436.
12. Walker J, Schlebusch L, Gaede B. The impact of stress on depression, ill health and coping in family members caring for patients with acquired brain injury. *S Afri Fam Pract*. 2020; 62: 1-6.
13. Allen K, Linn RT, Gutierrez H, Willer BS. Family burden following traumatic brain injury. *Rehabil Psychol*. 1994; 39: 29-48.
14. Anderson MI, Parmenter TR, Mok M. The relationship between neurobehavioural problems of severe Traumatic Brain Injury (TBI), family functioning and the psychological well-being of the spouse/caregiver: Path model analysis. *Brain Inj*. 2002; 16: 743-757.
15. Ashman TA, Gordon WA, Cantor JB, Hibbard MR. Neurobehavioral consequences of traumatic brain injury. *Mount Sinai J Med*. 2006; 73: 999-1005.
16. Corrigan JD, Hammond FM. Traumatic brain injury as a chronic health condition. *Arch Phys Med Rehabil*. 2013; 94: 1199-1201.
17. Manskow US, Friberg O, Roe C, Braine M, Damsgard E, Anke A. Patterns of change and stability in caregiver burden and life satisfaction from 1 to 2 years after severe traumatic brain injury: A Norwegian longitudinal study. *Neuro Rehabilitation*. 2017; 40: 211-222.
18. Page TA, Gordon S, Balchin R, Tomlinson M. Caregivers' perspectives of the challenges faced with survivors of traumatic brain injury: A scoping review. *NeuroRehabilitation*. 2021; 49: 349-362.
19. Schlebusch L, Walker J. The relationship between stress and suicidal ideation in family members caring for a patient with acquired brain injury. *World Scientific News*. 2020; 140: 156-171.
20. Walker J, Schlebusch L, Gaede B. Support for family members who are caregivers to relatives with acquired brain injury. *J Mind Med Sci*. 2021; 8: 76-85.
21. Everly Jr GS, Lating J M. A clinical guide to the treatment of the human stress response. 4<sup>th</sup> ed. USA: Springer; 2019.
22. Folkman S. Stress, coping, and hope. Carr B, Steel J editors. In: *Psychological aspects of cancer*. Boston MA. Springer. 2013:119-127.
23. McEwen BS. Neurobiological and systemic effects of chronic stress. *Chronic Stress*. 2017; 1: 1-11.
24. Schlebusch L. *Stress management and your health. Mind shift*. Pietermaritzburg. University of KwaZulu-Natal Press; 2000.
25. Schlebusch L. The development of a stress symptom checklist. *S Afri J Psychology*. 2004; 34: 327349.
26. Schlebusch L. *Suicidal Behaviour in South Africa*. Pietermaritzburg. University of KwaZulu-Natal Press; 2005.
27. Schlebusch L. Stress, lifestyle and suicidal behavior. Shrivastava A, Kimbrell M, Lester D, editors. In: *Suicide from a Global Perspective: Psychosocial Approaches*. New York: Nova Science Publishers; 2012. 33-39.
28. Schlebusch L. Suicidal Behavior in the Chronic Medically Ill. Shrivastava A, Kimbrell M, Lester D, editors. In: *Suicide from a Global Perspective: Vulnerable Populations and Controversies*. New York: Nova Science Publishers; 2012. 65-71.
29. Selye H. *The Stress of Life*. New York: McGraw-Hill; 1956.
30. Thoits PA. Stress and health: Major findings and policy implications. *J Health Social Behav*. 2010; 51: S41-S53.
31. Verhaeghe S, Defloor T, Grypdonck M. Stress and coping among families of patients with traumatic brain injury: a review of the literature. *J Clin Nursing*. 2005; 14: 1004-1012.
32. Walker J. Stress, depression and suicidal indeation amongst family members caring for a patient with acquired brain injury. Durban: University of KwaZulu-Natal; 2021.
33. Schlebusch L. *Clinical health psychology. A Behavioural Medicine Perspective*. Johannesburg: Southern Book Publishers; 1990.
34. Bertalanffy LV. *General System Theory: Foundations, Development, Applications*. New York: Georges Braziller; 1968.
35. Engel GL. The need for a new medical model: A challenge for biomedicine science. *Science*. 1977; 196: 129-136.
36. Mann JJ. Neurobiology of suicidal behaviour. *Nature Rev Neurosci*. 2003; 4: 819-828.
37. Mann JJ, Waternaux C, Haas G, Malone K. Toward a clinical model of suicidal behavior in psychiatric patients. *Am J Psychiatry*. 1999; 156: 181-189.
38. Wasserman D. A stress-vulnerability model and the development of the suicidal process. In: *Suicide - An unnecessary death*. London: Martin Dunitz; 2001. 13-27.
39. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry*. 1961; 4: 561-571.
40. Bosch BA. Biopsychosocial changes in the human stress response, with specific reference to stress measurement and certain moderating variables. University of KwaZulu-Natal. 2005.



41. Lo Castro A. A comparative cross-cultural analysis of the effects of cancer on loneliness, stress and body-image changes in terms of psychoneuroimmunology and relative to quality of life and coping behaviour. University of Natal. 2003.
42. Noor-Mahomed SB, Schlebusch L, Bosch BA. Suicidal behaviour in patients diagnosed with cancer of the cervix. *Crisis*. 2003; 24: 168-172.
43. Selmer CA. An investigation of psychological stress, coping styles and strategies and psychological adjustment in a sample of Indian South African women with breast cancer in different developmental stages of the life-cycle. University of KwaZulu-Natal. 2010.
44. Shadwell A. Stress and ill health associated with fungi, indoor environmental factors and personal factors in hospitals. University of KwaZulu-Natal. 2003.
45. van Oers H, Schlebusch L. Breast cancer patients' experiences of psychological distress, hopelessness, and suicidal ideation. *J Nature Sci Med*. 2021; 4: 250-257.
46. Vawda NBM. Perceived stress, coping behaviour and health outcomes among South African undergraduate medical students. University of KwaZulu-Natal. 2004.
47. Froud-Cummins B, Hopwood M. Ethical behaviour intervention for clients with a TBI: When is it OK to intervene? *InPsych*. 2012; 34: 16-17.
48. Port A, Willmot C, Charlton J. Self-awareness following traumatic brain injury and implications for rehabilitation. *Brain Inj*. 2002; 16: 277-289.
49. Bantjes J, Kagee A. Epidemiology of suicide in South Africa: Setting an agenda for future research. *S Afri J Psychology*. 2013; 43: 238-251.
50. Bertolote JM, Fleischmann A. A Global Perspective on the Magnitude of Suicide Mortality. Wasserman D, Wasserman C, editors. In: *Oxford Textbook of Suicidology and Suicide Prevention. A Global Perspective*. Oxford University Press; 2009. 91-98.
51. Burrows S, Schlebusch L. Suicide Prevention in South Africa. In: Wasserman D, Wasserman C, editors. *Oxford Textbook of Suicidology and Suicide Prevention. A Global Perspective*. Oxford University Press. 2009; 755-757.
52. Engelbrecht C, Blumenthal B, Morris N, Saayman G. Suicide in Pretoria: A retrospective review, 2007-2010. *S Afri Med J*. 2017; 107: 715-718.
53. Govender RD, Schlebusch L. Suicidal ideation in seropositive patients seen at a South African HIV voluntary counselling and testing clinic. *Afri J Psychiatry*. 2012; 15(2): 94-98.
54. Govender RD, Schlebusch L, Esterhuizen T. Brief suicide preventive intervention in newly diagnosed HIV-positive persons. *Afri J Psychiatry*. 2014; 17: 543-547.
55. Mars B, Burrows S, Hjelmeland H, Gunnell D. Suicidal behaviour across the African continent: A review of the literature. *BMC Public Health*. 2014; 14: 606.
56. Naidoo SS, Schlebusch L. Sociodemographic characteristics of persons committing suicide in Durban, South Africa: 2006-2007. *Afri J Prm Health Care Fam Med*. 2014; 6: 568.
57. Schlebusch L. An overview of suicidal behaviour in Africa. Ndeti DM, Szabo CP, editors. In: *Contemporary psychiatry in Africa: A review of theory, practice and research*. Nairobi: Acrodile Publishing Limited. 2011; 375-396.
58. Schlebusch L. Postvention in suicide survivor support: Some ethical considerations. *Mental Health Matters*. 2020; 7: 12-13.
59. Schlebusch L, Govender R. Age, gender and suicidal ideation following voluntary HIV counselling and testing. *Int J of Environ Res Public Health*. 2012; 9: 521-530.
60. Wasserman D, Wasserman C, editors. *Oxford Textbook of Suicidology and Suicide Prevention: A Global Perspective*. Oxford University Press; 2009.
61. World Health Organization. *National suicide prevention strategies: Progress, examples and indicators*. Switzerland, Geneva. World Health Organization. 2018.
62. Berman AL. *Medical Conditions Associated with Suicide Risk*. Pompili ME, editor. Washington DC: American Association of Suicidology; 2011.
63. Calvete E, de Arroyabe EL. Depression and grief in Spanish family caregivers of people with traumatic brain injury: The roles of social support and coping. *Brain Inj*. 2012; 26: 834-843.
64. Cerri CG, Perin C, Cornaggia CM, Beghi M. Is post-traumatic stress disorder a too underestimated factor in the early rehabilitation of cerebro-vascular events? *Neurol Sci*. 2020; 41: 1287-1288.
65. Chan J, Parmenter T, Stancliffe R. The impact of traumatic brain injury on the mental health outcomes of individuals and their family carers. *A e-J A M H*. 2009; 8: 155-164.
66. Harris JK, Godfrey HP, Partridge FM, Knight RG. Caregiver depression following Traumatic Brain Injury (TBI): A consequence of adverse effects on family. *Brain Inj*. 2001; 15: 223-238.
67. Mainio A, Kyllönen T, Viilo K, Hakko H, Särkioja T, Räsänen P. Traumatic brain injury, psychiatric disorders and suicide: A population-based study of suicide victims during the years 1988-2004 in Northern Finland. *Brain Inj*. 2007; 21: 851-855.
68. Meroni R, Beghi E, Beghi M, Brambilla G, Cerri C, Perin C, et al. Psychiatric disorders in patients suffering from an acute cerebrovascular accident or traumatic injury, and their effects on rehabilitation. An observational study. *Eur J Phys Rehabil Med*. 2013; 49: 31-39.
69. Kreutzer JS, Gervasio AH, Camplair PS. Primary caregivers' psychological status and family functioning after traumatic brain injury. *Brain Inj*. 1994; 8: 197-210.
70. Kreutzer JS, Rapport LJ, Marwitz JH, Harrison-Felix C, Hart T, Glenn M, et al. Caregivers' wellbeing after traumatic brain injury: A multicentre prospective investigation. *Archi Phys Med Rehabil*. 2009; 90: 939-946.
71. Marsh V, Kersel DA, Havill J H, Sleigh JW. Caregiver burden at 1 year following severe traumatic brain injury. *Brain Inj*. 1998; 12: 1045-1059.
72. Logan JG, Barksdale DJ. Allostasis and allostatic load: Expanding the discourse on stress and cardiovascular disease. *J Clin Nursing*. 2008; 17: 201-208.
73. McEwen BS. Allostasis and allostatic load: Implications for neuropsychopharmacology. *Neuropsychopharmacology*. 2000; 22: 108-124.
74. Benedict RH, Shapiro A, Priore R, Miller C, Munschauer F, Jacobs L. Neuropsychological counselling improves social behaviour in cognitively-impaired multiple sclerosis patients. *Multiple Sclerosis J*. 2000; 6: 391-396.
75. Smith LM, Godfrey HPD. *Family support programs and rehabilitation: A cognitive-behavioural approach to traumatic brain injury*. New York: Plenum Press; 1995.