The prevalence of second victim experiences and baseline resilience of South African shoulder and elbow surgeons

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Abstract

Background

The second victim experience (SVE), defined as the emotional and psychological distress experienced by healthcare workers (HCWs) following adverse medical events, can result in either an individual's growth or in increased staff turnover. Higher levels of resilience, the healthy ability to adapt to stress, has been shown to decrease the SVE. This study aimed to explore the SVE among the members of the Society of South African Shoulder and Elbow Surgeons (SASES), delineate its prevalence, and determine its relationship to resilience.

Methods

This cross-sectional study comprised a retrospective review of a needs assessment survey, conducted in paper-based and online versions, over a six-week period around the SASES annual meeting in May 2023. The survey captured demographic details of members, measured by utilising the Second Victim Experience and Support Tool (SVEST), and the baseline resilience was measured using the 25-item Connor-Davidson Resilience Scale (CD-RISC 25 ©). The prevalence of the SVE and mean resilience were evaluated. Statistical analysis was conducted to test for association between SVEST and CD-RISC 25 © scores.

Results

There were 53 respondents of a total 77 SASES members, accounting for a response rate of 69%. All respondents were male (100%) with a median age of 54 years. Most respondents reported working in the private sector (77%) and had been in practice for a median of 18 years. The predominant negative effects of the SVE in respondents were psychological (59%) and physical distress (40%). The mean score for resilience was 75. Increased resilience scores were associated with a reduction in the negative effects of SVEs.

Conclusion

This study identified that nearly 60% of SASES members who undertook the survey suffered negative psychological effects, while 40% suffered negative physical effects, following an SVE as measured by the SVEST. Their mean baseline level of resilience (75 as measured by CD-RISC 25 ©) is in keeping with South African population norms. Future research should investigate other potential contributing factors to the high SVEST scores of orthopaedic surgeons, as targets for support initiatives to limit the experience.

Level of evidence: 4

Keywords: second victim experience, second victim syndrome, resilience, orthopaedics, South Africa

Introduction

'To err is human', except if you are a healthcare worker (HCW) it would seem. Wu, in his benchmark editorial of 2000 in the British Medical Journal, highlighted that doctors, as a result of societal expectations and personal outlook, presume perfection of themselves with respect to patient management.[1] At the same time, each of us has likely experienced the dreaded identification of an error that we were responsible for, which may or may not have caused a patient harm.[1] Wu believes that doctors struggle to reconcile these experiences, suffer guilt, relive the events, and question their competence.[1] At this vulnerable time and in need of support, doctors may experience criticism from peers and have to contend with institutional and medico-legal investigation processes.[1] Being cautious not to minimise the 'first victim' (patient and family) experience of an adverse medical event, Wu termed

the distress that doctors and other HCWs experience following these encounters, the 'second victim syndrome (SVS)'.[1]

A second victim is currently defined as: 'Any healthcare worker, directly or indirectly involved in an unanticipated adverse patient event, unintentional healthcare error, or patient injury, and who becomes victimised in the sense that they are also negatively impacted'.[2] Brennan describes an adverse event as medical management of a patient that results in an increased hospital stay and/or disability to the patient.[3] While originally the term 'second victim syndrome' was used, it is now understood that the second victim experience (SVE) incorporates a variety of symptoms on a continuum, from mild to severe, rather than a defined set of features.[4] It is believed that each HCW will experience some symptoms, to a greater or lesser extent, at some time during the course of their career.[1,4]

A systematic review in 2020 outlined common symptoms experienced by second victims including: 'anger toward themselves', 'remorse', 'fear of future errors', and 'sleeping difficulties'.[5] Consequently, HCWs' performance may be impaired and they may experience a reduced ability to care for patients.[6] As Scott put it, second victims then either 'drop out' (resign from their jobs), 'survive' (continue working with ongoing second victim symptoms) or 'thrive' (grow out of the experience).[7]

Resilience, or 'the ability of an individual to respond to stress in a healthy, adaptive way such that personal goals are achieved at minimal psychological and physical cost', is often ascribed to South African citizens, and may contribute to a 'thrive' response in second victims.[8] Hernandez, in her thesis entitled 'The role of resilience on second-victim outcomes: examining individual and external factors of medical professionals', found that medical professionals with higher levels of resilience experienced second victim symptoms to a lesser degree.[9] According to the 25-item Connor Davidson Resilience Scale (CD-RISC 25 ©), a healthy control group of participants in a South African study conducted by Marx et al. had a high baseline level of resilience (80.7 out of a potential 100).[10]

A review of the literature showed that there is limited knowledge regarding the prevalence of SVEs using a validated SVE scale in surgeons (including orthopaedic surgeons), or evaluations of the relationship between SVEs and resilience. In recent years, the Society of South African Shoulder and Elbow Surgeons (SASES) has noted that several society members have reached out in distress to society leadership for support following an adverse medical event. This prompted a needs assessment, upon which this investigation was based. The aim of the investigation was to quantify the prevalence of SVEs among SASES members, determine how resilient these members are, and to assess if there was a relationship between the two. This information would be invaluable to establish whether support initiatives are in fact required and how to structure these appropriately.

Methods

This cross-sectional study comprised a retrospective review of the anonymous needs assessment survey (online and paper-based) conducted by SASES of its members in May and June 2023. The review was conducted according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.[11] The needs assessment was announced, and paper-based surveys were distributed at the SASES meeting held on 11 and 12 May 2023. The online survey was conducted on REDCap®; it opened for participation on 11 May, and responses were collected until 8 July 2023. A single reminder to complete the survey was emailed to all SASES society members on 27 June 2023. All specialist orthopaedic surgeons and members of SASES working in either the state sector, private sector, or both were eligible for inclusion.

The survey asked respondents to provide basic demographic details including their age, gender, practice location (private, state or both), and number of years in practice. The SVE was measured using the first component of the Second Victim Experience and Support Tool (SVEST), previously developed and validated by Burlison et al.[12] The complete model measures seven dimensions and two outcomes; this investigation centred on the 25 questions that measure the seven dimensions exclusively.[12] The SVEST scores the respondents on a five-point agreement scale (1–5), where it is understood that SVEs occur on a continuum, and so higher scores represent greater negative effects following the SVE.[12] An averaged score of 4 or more for a dimension is considered an SVE with consequential negative effects for the respondent.[12] Resilience was measured using the validated CD-RISC 25 ©.[13] The scale is composed of 25 questions regarding respondents' experiences, which are graded on a 0–4 point Likert-type scale, obtaining a total result between 0 and 100.[13] Lower scores suggest less resilience, and higher scores greater resilience.[13] In studies performed in the US, scores below 55 fell in the first quartile, and suggested the need to support individuals in the development of coping mechanisms.[13] Scores of 81 and above placed individuals in the upper two quartiles.[13] The scale has previously been validated in a South African cohort.[14]

The paper-based survey responses were manually captured on the REDCap® online survey form. These were collated with the online responses, and the data exported to a Microsoft® Excel for Mac (version 16.71) spreadsheet for organisation and the generation of summary statistics. R studio statistical software (version 4+) was utilised for the statistical analysis.

Special considerations were applied to missing data, where a respondent had not answered all questions. Where data were missing for the SVEST questions (a score based on averages which can sufficiently handle missing values without imputation), mean scores were calculated using the remaining values. Given that the baseline resilience score is cumulative, it was important to use imputed values to account for missing data. R studio package 'Multivariate imputation by chained equations' (MICE) was utilised for this purpose. Where answers were missing from the CD-RISC 25 © (question number 20 was omitted from the paper-based survey accounting for 36 individuals' missing responses), the missing values were imputed five times (m = 5), with a maximum of 20 iterations. Trace plots were used to assess convergence; convergence occurred between 10 and 15 iterations. The original CD-RISC 25 © results are reported, represented in tables and discussed, and the five imputed datasets utilised in a linear regression for each dataset, the results of which are presented as a pooled regression estimate to present the relationship to SVEST scores.

The primary analysis involved descriptive summary statistics of demographic data, determination of the prevalence of negative effects of SVEs among respondents, and the baseline level of resilience. Continuous variables are reported as means (standard deviation [SD], range) or medians (with interquartile range [IQR], range) according to their distributions, and categorical variables as numbers and percentages. Linear regression was performed to test the relationship between SVEST and CD-RISC 25 © scores (with imputed data) with demographic variables as covariates. As a form of sensitivity analysis, a repeat linear regression was performed using only the 16 complete cases (with no missing baseline resilience data) to compare to the results obtained with imputed values. Linear regression results are presented as changes in the outcome variable with 95% confidence intervals (95% CI). All tests were two-sided and the level of significance was set at $p < 0.05$.

Table I: Demographic details of questionnaire respondents

	Categories	Median	IQR	Range	Counts	% of total
Age in years (n = 53)		54*	10#	37–76		
Gender (n = 53)	Male				53	100
Practice location (n = 53)	Both private and state practice				10	19
	Private practice				41	77
	State practice				2	4
Years in practice (n = 48)		18	16	0–32		

IQR: interquartile range; %: percentage; * mean; # standard deviation

Results

There were 53 respondents of a total 77 SASES members (74 men and three women at the time of running the survey in 2023), accounting for a response rate of 69%. *Table I* summarises the respondents' demographic details. All respondents were male (100%), with a mean age of 54 years (SD 10, range 37–76). The majority of respondents reported working in the private sector (41 of 53, 77%); only two surgeons worked exclusively in state practice (2 of 53, 4%). Surgeons working exclusively in private practice were on average older (mean 56 years, SD 9, range 38–76) than those in state practice (mean 41 years, SD 5, 37–44). Respondents had been in practice for a median of 18 years (IQR 16, range 0–32).

One surgeon had an SVEST score that averaged more than four in all seven dimensions, and a further 12 respondents (12 of 53, 23%) had overall SVE scores which averaged 3.5 or greater. Regarding the individual dimensions, 31 respondents (31 of 53, 59%) scored 4.0 or more for negative psychological effects of SVEs; 21 (21 of 53, 40%) for negative physical effects of SVEs; and 16 (30%) for negative responses regarding professional self-efficacy. *Table II* outlines the mean scores and the prevalence of negative effects of SVEs for respondents as well as the degree to which support

Table II: Prevalence of negative effects of SVEs in respondents as measured using the seven dimensions (25 questions) of the SVEST

Second victim experience dimension		Counts (%)	Mean score (SD)
1.	Psychological distress	31 (59)	3.9 (0.9)
2.	Physical distress	21 (40)	3.2 (1.3)
3.	Colleague support	0 (0)	2.4 (0.6)
4.	Supervisor support	0 (0)	2.6 (0.6)
5.	Institutional support	11 (21)	3.3 (0.7)
6.	Non-work-related support	8 (15)	2.2 (1.2)
7.	Professional self-efficacy	16 (30)	3.3 (1.1)

SVE: second victim experience; SVEST: Second Victim Experience and Support Tool; %: percentage of total; SD: standard deviation

Table III: The baseline level of resilience of respondents as measured by the 25-item Connor-Davidson Resilience Scale (CD-RISC-25)

Resilience subscales	Percentage#	Median	IQR	Range (total possible)	Missing$
Adaptability/flexibility	75	9	3	2–12 (12)	0
Coping	70	14	4	4–19 (20)	1
Meaning/purpose	75	12	4	2–16 (16)	36*
Hardiness	82	23	5	15–28 (28)	7
Optimism	63	5	2	0–8 (8)	0
Recognition of emotion/cognition score	75	6	1	0–8 (8)	0
Self-efficacy	88	7	1	3–8 (8)	4
Resilience total score		**Mean**	**SD**	**Quartiles (range 47–98)**	**Missing$**
		75	13	Q1 68	37
				Q2 78	
				Q3 83	
				Q4 98	
Linear regression with mean SVEST as outcome for CD-RISC 25 scores (with imputed data for missing variables) and years in practice as a covariate			**Beta**	**95% CI**	**p-value**
CD-RISC 25 score			−0.02	−0.03–(−0.01)	**0.001**
Years in practice			0.02	0.00–0.03	**0.033**
Sensitivity analysis Linear regression with mean SVEST as outcome for CD-RISC 25 scores (without imputed data – 16 complete cases)and years in practice as a covariate			**Beta**	**95% CI**	**p-value**
CD-RISC 25 score			−0.02	−0.03–(−0.01)	**< 0.001**
Years in practice			0.04	0.02–0.06	**0.001**

median score as a function of the total possible score for the subscale; $ total number of respondents with incomplete responses; * question 20 was omitted from the paper-based version of the survey accounting for 36 missing responses in the meaning/purpose question set; SD: standard deviation; Q: quartile; CI: confidence interval; value in bold has reached statistical significance

resources are perceived as inadequate. While respondents' mean score for 'non-work-related' support was the lowest of all forms of support measured with the SVEST (suggesting that on average the support of family and friends are the most desirable to respondents during SVEs), this support type showed the greatest variation in response between individuals (SD 1.2). No respondents scored a mean of 4 or greater for colleague or supervisor support (where 15% did for non-work-related support), and thus these support resources seem to be favoured for the majority of respondents.

The mean score for resilience, as measured by the CD-RISC 25 ©, was 75 (SD 13, range 47–98). Respondents scored highest in the 'hardiness' and 'self-efficacy' subscales (*Table III)*. Resilience scores were found to be inversely related to SVEST scores; that is, with greater resilience scores, respondents had lower SVE score means. One unit increase in the CD-RISC 25 © score reduced the mean SVEST score by 0.02, and reached statistical significance (95% CI −0.02 – (−0.01); p-value 0.001). The direction of association remained true with the repeated linear regression using the 16 complete cases, where a one-unit increase in the total resilience score was associated with a 0.02 unit decrease in the SVEST mean score (95% CI −0.03 – (−0.01); p-value < 0.001). One covariate, number of years in practice, was also related to the mean SVEST score. For each year increase in number of years practiced, the SVEST scores increased by 0.02, a result which was statistically significant (95% CI 0.00 – 0.03; p-value 0.033), and remained true in the dataset without imputed variables. Data regarding practice location (state, private or both) were inadequately powered to detect a relationship between SVEST scores and practice location.

Discussion

This study aimed to investigate the prevalence of SVEs among SASES society members and its relationship to their baseline level of resilience. One respondent's average SVEST score suggested negative effects in all dimensions. Fifty-nine per cent (mean score of 3.9) of SASES respondents suffered negative psychological effects, and 40% (mean score 3.2) negative physical effects. These mean scores are greater than the scores obtained in Burlison et al.'s validation study of the SVEST (2.6 and 2.3) for psychological and physical distress respectively, and several other investigations that measured SVEST scores of mixed HCW groups.[12,15,16] The authors of the present investigation share Han et al.'s sentiment that adverse events causing significant distress are more prevalent than anticipated, particularly in light of comparative SVEST score data and the results of an SVEST investigation performed locally.[17] The SVEST was used to explore South African HCWs (4% of whom were doctors) whose scores highlighted the predominant features of SVEs for all HCWs, including those of psychological and physical distress.[18] Doctors in this South African study experienced greater scores for psychological and physical distress than other HCWs (but the scores were still lower than those of the present investigation).[18] The authors argued that doctors, as the natural leaders of healthcare teams, may assume more responsibility for adverse events, and that this could add to their distress.[18] The greater scores in the present group of orthopaedic surgeons may be explained by the fact that the SVE seems to affect surgeons disproportionately when compared to other HCWs.[17,19,20] It is theorised that the 'high stakes' nature of surgery and the immediately apparent negative consequences of a surgical error place surgeons (likely inclusive of orthopaedic surgeons) at higher risk than other disciplines.[17,20] Additionally, surgeons' experiences may be complicated by a pervasive blame culture in some institutions.[20] While the present investigation represents the first to explore SVEs using the SVEST in orthopaedic surgeons, the previous concerns affecting surgeons would also be applicable to the orthopaedic context. This has been partly corroborated in a qualitative investigation which identified negative psychological experiences of orthopaedic surgeons whose patients had developed periprosthetic joint infections following total knee replacement.[21]

The negative psychological experiences following SVEs can include guilt, remorse, anxiety, troubling memories, a decrease in job satisfaction, embarrassment and fear of harm to reputation.[5,22] Interestingly, two previous studies show that these psychological experiences do not change (get easier) with greater surgical experience (seniority).[23] Also, where less experienced surgeons have identified positives to be gained out of the experiences, such as increased vigilance and new insights, more experienced surgeons are less likely to do so.[24] We ran an analysis to test if there was a difference in negative effects following SVEs for differences in age and years in practice (as surrogate indicators of experience). Age was not related to SVEST scores, but number of years in practice was. Each additional year in practice increased the mean SVE score by 0.02. Perhaps this reflects a perception that, as a more experienced surgeon, one is less 'entitled' to make mistakes, or there is more of a reputation to damage. Either way, one would anticipate increased distress in these instances. Greater scores in more experienced individuals could also indicate an understanding realised with experience that occasionally, despite one's best efforts, adverse events occur due to factors out of our control. Social sciences have shown that individuals struggle to reconcile experiences where there is a perceived lack of control, and experience an increased psychological burden as a result.[25]

The concern with greater SVEST scores was highlighted by Burlison et al. who showed that higher scores are associated with absenteeism and increased turnover (quitting or changing job) intentions.[26] Positively, their investigation also demonstrated that organisational support could mitigate these effects.[26] We did not investigate absenteeism or turnover intention in this cohort; regardless, these hold significant implications for our findings and should direct our efforts to providing individuals with the support they need. Mathebula et al. found that HCWs in their South African investigation desired support the least from non-work-related sources (family and friends), contrary to our findings where institutional support was the least desired among respondents.[18] International investigations highlight, however, that surgeons specifically desire the support of their colleagues and peers, which is in keeping with our findings.[17,18,23,24] Presumably, a surgical colleague is more likely to understand the situation and its implications, and may have experienced an adverse event of their own. Where family and friends will be sympathetic and readily available (accounting for some desirability), the sympathy may not be valued without comprehension of the gravity to the victim (accounting for the variability in response).[18] Scott, one of the authorities on SVEs alongside Wu, has suggested a three-tiered approach to support of individuals involved in SVEs.[27] She advises that SVEs can largely be alleviated through conversations with supportive colleagues, but for a few this may be inadequate and escalation to an experienced supervisor may be required.[27] If the first two tiers are inadequate, a professional's help is required.[27] Most SVE investigations suggest measures to improve institutional support for affected individuals.[17,20,22,23,28] The surgeon respondents in the present investigation's mean scores for institutional support were 3.3 (a high score that reflects a perceived lack of desire for institutional support). The majority of respondents in the present study are self-employed and may perceive that they have no institutional (in the typical sense, like that of an academic hospital or a university affiliation) support, as opposed to not desiring the support. Respondents may not perceive SASES to be an institution. However, through its parent South African Orthopaedic Association,

SASES has an established peer-mentoring programme for its members (to assist with the many challenges faced in practice), and advocates for its members undergoing investigation or litigious processes. Alternatively, though, rather than a lack of perceived support, the high score may mean that surgeons find it difficult to report events to supervisors and organisations, recognising the inherent conflict of interest that reporting an adverse medical event and seeking help may represent. Once disclosed, the supervisor or organisation is compelled to investigate the adverse event, and individuals may fear medico-legal ramifications or that it may reveal weaknesses.[17,22,29] Despite these concerns, several institutions have developed programmes to address SVEs in individuals, such as the Resilience In Stressful Events (RISE) programme instituted at the Johns Hopkins Hospital.[30]

It is for this inherent conflict of interest, the implementation of a resilience (albeit institutional resilience) programme for second victim support, and the previously discussed findings that individuals with greater resilience experience the negative effects of SVEs to a lesser degree, that exploration of resilience alongside the SVEST was prompted. Unlike the limited local investigations utilising the SVEST, extensive investigation has been performed examining resilience (using the CD-RISC 25 ©) in South Africa.[10,31,32] Marx et al. provided a mean baseline resilience of a healthy South African cohort at 80.7.[10] The closest comparators to the orthopaedic surgeons of the present investigation was a group of clinical medical students whose reported mean (75.4) was lower than the healthy control, but equivalent to our result (75.3).[32] Although this represents a just over 5-point difference from the healthy cohort mean, prior work by Ye et al. has shown that a 5-point difference likely constitutes the minimum clinically important difference, and so this may not represent a meaningful difference.[33] Our findings also support the relationship between resilience and SVE previously explored by Hernandez.[9] For increases in resilience scores, a decrease in the negative effects of SVEs can be appreciated.[9] Encouragingly, a systematic review of resilience training programmes and interventions has shown that resilience can be developed.[34] However, the usefulness of resilience training in a group of individuals with established resilience levels effectively in the upper two quartiles of a population is questioned. Perhaps it is more important to determine why this group of orthopaedic surgeons with baseline resilience mean scores within the third quartile still have consequential negative effects following SVEs. Adverse medical events are inevitable while surgeons remain fallible humans, but adverse events are especially prevalent in developing nations.[35] It is estimated that 83% of adverse events are preventable, and up to 30% of these result in patient death.[35] Decreasing the number of adverse events will mean addressing system failures that influence errors and is a potential avenue of focus for future investigation.

Due to its retrospective nature, this investigation was limited. It relied on the findings of a needs assessment survey conducted by the SASES executive committee of its members. Additional data of interest such as the turnover intentions and absenteeism were not included in the survey. Regarding collected variables, there were no female respondents. This partly reflects the small proportion of women SASES members, but also represents a gender bias, limiting the interpretation of the role gender may have had in the results. Also collected and likely of interest to many, the practice location (state, private or both), was inadequately powered to determine if this had an effect on SVEST scores. While online survey responses were complete for most respondents, the lack of complete responses (due to the missing question in the print version) necessitated imputation of variables in order to produce accurate scores for the linear regression model of the association between SVEST and CD-RISC 25 © scores.

Conclusion

This study identified that nearly 60% of the Society of South African Shoulder and Elbow Surgeon's survey respondents have negative psychological effects, and 40% have negative physical effects, following an SVE. Their baseline level of resilience of 75 is in keeping with South African population norms.

Ethics statement

The authors declare that this submission is in accordance with the principles laid down by the Responsible Research Publication Position Statements as developed at the 2nd World Conference on Research Integrity in Singapore, 2010. The study complied with the South African Department of Health ethics guidelines (2015), and the University of KwaZulu-Natal policy on research ethics.

Prior to commencement of this research the appropriate ethical approval was obtained from the Biomedical Research Ethics Committee of UKZN (BREC/00007123/2024).

All procedures were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Informed written consent was obtained from all participants included in the study.

Declaration

The authors declare authorship of this article and that they have followed sound scientific research practice. This research is original and does not transgress plagiarism policies.

Author contributions

MoC: conceptualisation, data curation, writing – original draft, writing – review and editing
CA: writing – review and editing
SR: writing – review and editing
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