Introduction: The second victim phenomenon that occurs after critical events poses a serious factor for patient and workplace safety. These experiences can be evaluated using the Second Victim Experience and Support Tool (SVEST), originally in English, or the translated and validated Korean or Chinese versions. In 2020, a revised version was published (SVESTR) with the addition of resilience items. The aim of this study is the validation of the German version, the G-SVESTR, in a multiprofessional setting. Methods: The G-SVESTR questionnaire was designed according to World Health Organization recommendations. This entails translation, test for face validity, back translation, pretest, expert panel evaluation, and a test in a large population for validity and reliability. We provided an anonymous online questionnaire to physicians, nurses, paramedics, medical assistants, and physician assistants to test our developed tool. Statistics were accomplished using XL-Stats. Results: Altogether, 72% (306 of 428) of the participants completed the survey. The mean time for completion was 9.4 minutes. Physician assistants and medical assistants were significantly younger than other respondents. The analysis revealed satisfactory reliability (Cronbach α = 0.844). A principal component analysis showed 11 factors with eigenvalues greater than 1. Factor loading on distinct dimensions was satisfactory with one exception, the absenteeism item (item 31), which showed cross-loadings and poor factor loading on the absenteeism dimension. The results of the G-SVESTR revealed only some differences between the professional subgroups. Conclusion: The G-SVESTR is a valid and reliable testing instrument for the evaluation of second victim experiences in different medical professions.

Key Words: second victim, SVEST, SVESTR, multiprofessional

Background

The term “second victim” was first introduced by Wu1 in 2000. It refers to health care professionals (HCPs), whereas the first victim is the patient.2 It is formally defined as the second victim syndrome (SVS): “as the HCPs who commit an error and are traumatized by the event manifesting psychological (shame, guilt, anxiety, grief, and depression), cognitive (compassion dissatisfaction, burnout, secondary traumatic stress), and/or physical reactions that have a personal negative impact.”1,3,4 These traumatizing experiences can be caused by medical error, an unexpected adverse event, injury, or even near-miss.5-7

The prevalence of SVS ranges from 9% to 50% of all health care workers.7,8 Furthermore, these experiences might be related to multiple dysfunctional coping strategies including defensive medicine, posttraumatic stress disorder,9-11 turnover, and even suicide.12 The second victim phenomenon not only affects the health care workers but also any further patients treated by second victims, and has therefore been identified as a key issue in patient safety by experts13 and political leaders.14 Recently, the term “second victim” has been debated for linguistic issues and aspects of responsibility for medical error and malpractice.15,16

Despite the high prevalence and severe manifestations, this phenomenon is still not well known among HCPs. One reason might be that second victims still face stigmatization of being regarded as weak and unsuitable for their job demands.12 To overcome stigmatization rationally, a valid assessment of this phenomenon is necessary.

The Second Victim Experience and Support Tool (SVEST), originally published in English,17 has been validated in different settings18 and translated into Korean,19 Chinese,19 Italian,20 and Danish.21 Since 2020, a novel revised version (SVEST-R) including resilience items has been available in English.5

The SVEST-R comprises 35 items within the following 9 domains addressing persons identifying themselves to be a second victim and those to be involved in critical incidents known to lead to the phenomenon: psychological distress, physical distress, secondary traumatic stress, cognitive (compassion dissatisfaction, burnout, secondary traumatic stress), and/or physical reactions that have a personal negative impact.1,3,4 These traumatizing experiences can be caused by medical error, an unexpected adverse event, injury, or even near-miss.5-7

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Preparation of the G-SVESTR Questionnaire

First, the SVEST-R was translated into the German language. Thereafter, the results were checked for face validity within an expert panel consisting of 4 physicians. Third, a back translation was completed by an English native speaker who was not familiar with the original SVEST or the SVEST-R. In the next step, the results were reevaluated within the expert panel, and pretests and cognitive interviewing were conducted with the support of 10 medical experts (nurses and physicians) with at least 10 years of medical expertise. After reevaluation, some minor modifications were made on 2 items. Thereafter, the questionnaire was distributed for validation and reliability testing.

Setting

Because of the severe acute respiratory syndrome coronavirus 2 pandemic, the survey was conducted online. Steps 1 to 6 were held between October and November 2020, and the last step was conducted between November and December 2020. Participants were recruited in this last step from local and regional networks, online forums, and social media platforms in Germany, Austria, Switzerland, and expats in Norway.

Study Population

Undergraduate and postgraduate health care workers in a broad spectrum of medical disciplines (physicians, nurses, paramedics, palliative care givers, physician assistants, nonacademic medical assistants, medical therapists) were addressed using a written recruitment and information letter. The wide variety of health care providers was chosen to limit the selection bias and low response rates. Three rounds of recruitments were carried out within these networks.

Variables

Using a strict translation of the SVEST-R according to WHO guidelines, there were no further modifications of the survey except for some questions about demographic data, occupation, and profession before the main items (Table 1). At the end of the survey, a single free-text entry for comments on the own experience of SVS and the G-SVESTR was included.

Measurements

The items were analyzed identical to the SVEST-R including the reversed items marked with an “*.” Free-text entries were coded qualitatively, taking a single-coder phenomenological approach. This included simplification of entries (tag allocation), identification of recurring codes (coding), and recontextualization to form themes.

The online survey tool was provided by umfragenonline.com, Enuvo GmBH Zurich, Switzerland. This gave participants the opportunity to complete the survey with different devices, for example, PC, tablet, or smartphone. There were no paper-based versions.

Bias

We addressed the selection bias of the convenience approach by distributing the survey in different professions and populations. Furthermore, the results of the “finishers” versus the “dropouts” were analyzed under the hypothesis that less motivated people might answer the questions differently from those who are motivated to answer them. To limit the decay of method bias, as few items as possible on one page were presented, resulting in 3 to 5
| No. | Item                                                                 | Mean  | SD    |
|-----|---------------------------------------------------------------------|-------|-------|
| A   | Wie alt sind Sie in Jahren?                                         |       |       |
|     | How old are you?                                                    |       |       |
| B   | Welchem Geschlecht ordnen Sie sich zu?                              |       |       |
|     | What is your gender?                                                |       |       |
| C   | Welcher Berufsgruppe ordnen Sie sich am ehesten zu?                 |       |       |
|     | What is your profession?                                            |       |       |
| D   | Welchem medizinischen Bereich ordnen Sie sich am ehesten zu?         |       |       |
|     | What is the medical sector you work for?                            |       |       |
| E   | Welchem Bereich ordnen Sie sich am ehesten zu?                      |       |       |
|     | What is your medical affiliation?                                   |       |       |
| F   | Befinden Sie sich aktuell in der Ausbildung?                        |       |       |
|     | Are you a trainee?                                                  |       |       |
| G   | Sind Sie in der Ausbildung von medizinischen Fachkräften tätig?     |       |       |
|     | Are you a medical teacher?                                          |       |       |
| H   | In welchem Land arbeiten Sie hauptsächlich?                          |       |       |
|     | In which nation are you working?                                    |       |       |
|     | **Psychischer Stress/Psychological Distress** (Mean of Items 1–4)    | 3.157 | 1.077 |
| 1   | Ich habe durch solche Vorfälle Verlegenheit erlebt.                  | 3.580 | 1.225 |
|     | I have experienced embarrassment from these instances.              |       |       |
| 2   | Meine Beteiligung an solchen Vorfällen haben mir Angst gemacht, dass diese zukünftig erneut auftreten könnten. | 3.131 | 1.283 |
|     | My involvement in these types of instances has made me fearful of future occurrences. |       |       |
| 3   | Meine Erlebnisse haben dazu geführt, dass ich mich elend gefühlt habe. | 3.059 | 1.342 |
|     | My experiences have made me feel miserable.                         |       |       |
| 4   | Ich fühle tiefe Reue/Schuld für die Beteiligung an solchen Vorfällen. | 2.859 | 1.385 |
|     | I feel deep remorse/guilt for my past involvements in these types of events. |       |       |
|     | **Physischer Stress/Physical Distress** (Items 5–9)                  | 2.296 | 0.983 |
| 5   | Die seelische Last meiner Erfahrungen ist erschöpfend.               | 2.341 | 1.156 |
|     | The mental weight of my experience is exhausting.                   |       |       |
| 6   | Meine Erfahrungen mit solchen Vorfällen kann es schwierig machen regelmäßig zu schlafen. | 2.030 | 1.204 |
|     | My experience with these occurrences can make it hard to sleep regularly. |       |       |
| 7   | Der Stress aus solchen Situationen hat dazu geführt, dass ich mich mulmig und unwohl gefühlt habe. | 2.977 | 1.223 |
|     | The stress from these situations has made me feel queasy or nauseous. |       |       |
| 8   | Wenn ich an solche Situationen denke, kann es schwer sein, Appetit zu haben. | 1.869 | 1.122 |
|     | Thinking about these situations can make it difficult to have an appetite. |       |       |
| 9   | Ich habe schon schlechte Träume aufgrund solcher Situationen erlebt. | 2.233 | 1.367 |
|     | I have had bad dreams as a result of these situations.              |       |       |
|     | **Unterstützung durch Kollegen/Colleague Support** (Items 10–13)     | 1.869 | 0.603 |
| 10  | Meine Kollegen können sehr teilnahmslos auf die Effekte reagieren, die solche Vorfälle auf mich hatten. | 2.557 | 1.194 |
|     | My colleagues can be indifferent to the impact these situations have had on me. |       |       |
| 11* | Meine Kollegen helfen mir dabei mich als gute Fachkraft zu fühlen, egal welche Fehler ich gemacht habe. | 2.346 | 1.094 |
|     | My colleagues help me feel that I am still a good healthcare provider despite any mistakes I have made.* |       |       |
| 12  | Meine Kollegen trauen mir nicht mehr.                                | 1.259 | 0.630 |
|     | My colleagues no longer trust me.                                   |       |       |
| 13  | Meine berufliche Reputation wurde wegen solcher Vorfälle beschädigt. | 1.316 | 0.698 |
|     | My professional reputation has been damaged because of these situations. |       |       |
|     | **Unterstützung durch Vorgesetzte/Supervisor Support** (Items 14–17) | 2.599 | 0.595 |
| 14* | Ich spüre, dass mein Vorgesetzter mich nach solchen Vorfällen angemessen behandelt. | 3.593 | 1.269 |
|     | I feel that my supervisor treats me appropriately after these occasions.* |       |       |
| 15* | Die Reaktionen meines Vorgesetzten sind fair.                       | 2.205 | 1.147 |
|     | My supervisor’s responses are fair.*                                |       |       |
| 16  | Mein Vorgesetzter beschuldigt einzelne Personen.                    | 2.182 | 1.283 |
|     | My supervisor blames individuals.                                   |       |       |

(Continued next page)
| No. | Item                                                                                                                                                                                                 | Mean  | SD   |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|
| 17* | Ich nehme wahr, dass mein Vorgesetzter die Komplexität der Patientenversorgung berücksichtigt. I feel that my supervisor evaluates these situations in a manner that considers the complexity of patient care practices.*                                                                 | 2.434 | 1.280|
| 18* | Die Organisation, in der ich arbeite, versteht, dass diejenigen, die in solche Vorfälle verwickelt sind, Hilfe benötigen können um die Auswirkungen zu verarbeiten. My organization understands that those involved may need help to process and resolve any effects they may have on care providers.*                                                                 | 3.289 | 1.316|
| 19* | Meine Organisation hat eine Reihe von Angeboten, die mir helfen, solche Ereignisse zu verarbeiten. My organization offers a variety of resources to help me over the effects of involvement with these instances.*                                                                 | 3.597 | 1.287|
| 20  | Die Sorge für das Wohl von Personen, die in solche Vorfälle verwickelt sind, ist nicht stark ausgeprägt in der Organisation, in der ich arbeite. Concern for the well-being of those involved in these situations is not strong at my organization.                                                                 | 2.852 | 1.345|
|     | **Erleben der eigenen Professionalität/Professional Self-Efficacy** (Items 21–24)                                                                                                                                                                             |       |      |
| 21  | Nach meiner Beteiligung in solche Vorfälle habe ich Gefühle der Unzulänglichkeit in Bezug auf meine Fähigkeiten in der Patientenversorgung erfahren. Following my involvement I experienced feelings of inadequacy regarding my patient care abilities.                                                                 | 2.671 | 1.236|
| 22  | Durch meine Erfahrungen frage ich mich, ob ich wirklich eine gute Fachkraft bin. My experience makes me wonder if I am not really a good healthcare provider.                                                                                                              | 2.472 | 1.310|
| 23  | Nach solchen Erfahrungen bin ich ängstlich geworden, schwierige oder riskante Aufgaben zu übernehmen. After my experience, I became afraid to attempt difficult or high-risk procedures.                                                                                                                         | 2.236 | 1.245|
| 24  | Solche Erfahrungen haben meine Arbeitsleistung negativ beeinflusst. These situations have negatively affected my performance at work.                                                                                                                                  | 2.088 | 1.213|
|     | **Berufliche Veränderung/Turnover Intentions** (Items 25–28)                                                                                                                                                                                                    |       |      |
| 25  | Meine Erfahrungen haben zu einem Wunsch geführt, lieber fern der Patientenversorgung zu arbeiten. My experience with these events has led to a desire to take a position outside of patient care.                                                                               | 1.691 | 1.076|
| 26  | Manchmal möchte ich durch den Stress durch Beteiligung an solchen Situationen meine Arbeit aufgeben. Sometimes the stress from being involved with these situations makes me want to quit my job.                                                                       | 2.046 | 1.253|
| 27  | Ich habe begonnen nach anderen beruflichen Möglichkeiten Ausschau zu halten. I have started to ask around about other job opportunities.                                                                                                                        | 2.194 | 1.441|
| 28  | Aufgrund dieser Ereignisse plane ich in den nächsten 6 Monaten meinen Beruf zu verlassen. I plan to leave my job in the next 6 months because of my experience with these events.                                                                                                                            | 1.345 | 0.873|
|     | **Absentismus/Absenteism** (Items 29–31)                                                                                                                                                                                                                         |       |      |
| 29  | Meine Erfahrungen mit einem unerwünschten Ereignis oder Fehler haben dazu geführt, dass ich mir für meine seelische Gesundheit einen Tag frei genommen habe. My experience with an adverse patient event or error has resulted in me taking a mental health day.                                      | 1.758 | 1.286|
| 30  | Ich habe nach solchen Ereignissen mir schon einmal länger im Beruf freigemommen. I have taken time off after one of these instances occurs.                                                                                                                        | 1.298 | 0.831|
| 31  | Wenn ich arbeite, bin ich durch meine Beteiligung an solchen Situationen abgelenkt und nicht hundertprozentig präsent. When I am at work, I am distracted and not 100% present because of my involvement in these situations.                                              | 1.842 | 1.054|
|     | **Resilienz/Resilience**                                                                                                                                                                                                                                         |       |      |
| 32* | Aufgrund solcher Situationen bin ich in meiner Arbeit aufmerksamer geworden. Because of these situations, I have become more attentive to my work.*                                                                                                               | 1.728 | 0.867|
| 33* | Solche Situationen haben dazu geführt, dass ich meine Arbeitsqualität verbessert habe. These situations have caused me to improve the quality of my care.*                                                                                                     | 1.951 | 0.943|
| 34* | Meine Erfahrungen mit unerwünschten Ereignissen am Patienten oder Fehlern haben positive Veränderungen in den Abläufen der Behandlung von Patienten bewirkt. My experience with an adverse patient event or error has resulted in positive changes in procedures or care on our unit.*                    | 2.173 | 1.021|
| 35* | Ich bin durch unerwünschte Ereignisse und Fehler als Fachkraft gewachsen. I have grown as a professional as a result of an adverse patient event or error.*                                                                                                   | 1.787 | 0.944|
|     | **Unterstützungwünsche/SVE Support Option Desirability**                                                                                                                                                                                                      |       |      |
| I   | Die Möglichkeit, sich unmittelbar nach einem Ereignis kurz Zeit nehmen zu können. The ability to immediately take time away from my unit for a little while.                                                                                                           | 4.180 | 0.980|
| II  | Einen ruhigen Rückzugsort, um sich nach einem solchen Ereignis zu sammeln und zu erholen. A specified peaceful location that is available to recover and recompose after one of these types of events.                                                            | 3.873 | 1.148|

(Continued next page)
items per page grouped under the domains, with the exception of 7 items in the section on coping strategies.

Sample Size

Under consideration of the recommendations for psychometric questionnaires, the goal was to recruit at least 300 persons,\textsuperscript{30} with a minimum subject to item ratio of at least 2:1.\textsuperscript{31}

Statistics

We used MS Excel (Microsoft Corporation, Redmond, Washington) with the Add-In XLStats (Addinsoft SARL, New York, New York) for statistical analysis. Calculations of the Cronbach $\alpha$ and the Guttman criteria were applied to test reliability. To test construct validity, a principal component analysis (PCA) was conducted after determining its prerequisites (Bartlet sphericity and the Kayser-Mayer-Olkin criterion). The PCA was used to calculate eigenvalues as well as scree plots and factor loadings after varimax rotation.

Results from the subgroup analysis were quantified by non-parametric tests in the case of nonnormal distributed ordinal scaled data. Correlations were assessed using Kendall $\tau$ calculations. All tests were Bonferroni corrected for multiple testing. Participants with missing data were not accepted, and these were assigned to the dropout group for post hoc assessment of the selection bias.

RESULTS

Participants

Altogether, 428 participants were enrolled. Of those, 306 (71.5\%) gave answers to all items and were assigned to the “finisher” group. In this group, the mean age was 35.5 years, 203 persons were female (66.4\%), 101 were male (33.0\%), 2 person was non-binary (0.3\%), and one did not answer the question about gender (0.3\%). The dropout group consisted of 122 persons with a mean age of 39 years, comprising 91 women (74.6\%), 29 men (23.8\%), and 2 without answer to the gender question (0.6\%). Age differences were not significant between those groups ($P > 0.05$), but a significant age difference was seen within professions of physician assistants and medical assistants being significantly younger than the other professional groups ($P < 0.05$).

In the finisher group, there were 75 (24.5\%) nurses, 56 (18.3\%) physicians, 24 (7.8\%) medical assistants, 83 (27.1\%) physician assistants, 52 (17\%) paramedics, 15 (4.9\%) medical therapists (e.g., physiotherapists and speech and language therapist), and 1 remedial therapist (0.3\%). Most worked in-hospitals (67\%), whereas 53 worked out-of-hospital (17.3\%) and all other in general practice. Of all the finishers, 24.5\% were pregraduates and 52.6\% worked as teachers and instructors in their profession. Of all the participants, 289 (94.4\%) were working in Germany, the others in Switzerland and Austria, and one was an expat in Norway.

Completing the questionnaire took between 2 and 57 minutes (mean [SD], 9.4 [7.24] minutes). Dropouts abandoned the survey after 3.6 minutes on average (minimal, 0 minutes; maximum, 30 minutes; SD, 16.53).

Main Results

In the analysis of the questionnaire, a high Cronbach $\alpha$ of 0.884, a very high Guttmans lambda-2 of 0.9, and a high lambda-4 of 0.834 were calculated. Tests for Bartlet sphericity ($P < 0.001$) and the Kayser-Mayer-Olkins value of 0.836 justified further analysis

\*Marked items are inverted items.

| No. | Item | Mean | SD |
|-----|------|------|----|
| III | Die Verfügbarkeit eines Mitarbeiters auf Augenhöhe, mit dem man über den Vorfall reden kann. | 4.222 | 0.963 |
| IV  | Ein professionelles Beratungsprogramm außerhalb der Arbeit, in dem Beschäftigte sich frei beraten lassen können. | 3.353 | 1.273 |
| V   | Eine Diskussion mit meinem Vorgesetzten über das Ereignis. | 3.340 | 1.279 |
| VI  | Einen Termin mit einem Berater in meiner Institution, um über das Ereignis zu sprechen. | 2.941 | 1.289 |
| VII | Die Möglichkeit rund um die Uhr mit einer Person vertraulich über ein Ereignis und die Auswirkungen auf mich zu sprechen | 3.196 | 1.393 |

*Marked items are inverted items.
| TABLE 2. Questionnaire Items With Factor Analysis |
|--------------------------------------------------|
| Psychological distress                          |
| 1. Ich habe durch solche Vorfälle Verlegenheit erlebt. | 0.630 | −0.159 | 0.139 | 0.100 | −0.183 |
| 2. Meine Beteiligung an solchen Vorfällen haben mir Angst gemacht, dass diese zukünftig erneut auftreten könnten. | 0.752 | −0.085 | 0.129 | 0.112 | −0.026 |
| 3. Meine Erlebnisse haben dazu geführt, dass ich mich elend gefühlt habe. | 0.763 | −0.159 | 0.060 | 0.100 | 0.109 |
| 4. Ich fühle tiefe Reue/Schuld für die Beteiligung an solchen Vorfällen. | 0.739 | −0.116 | 0.024 | 0.107 | 0.046 |
| Physical distress                                |
| 5. Die seelische Last meiner Erfahrungen ist erschöpfend. | 0.635 | 0.032 | 0.087 | 0.007 | 0.372 |
| 6. Meine Erfahrungen mit solchen Vorfällen kann es schwierig machen regelmäßig zu schlafen. | 0.509 | −0.032 | 0.015 | 0.064 | 0.491 |
| 7. Der Stress aus solchen Situationen hat dazu geführt, dass ich mich mulmig und unwohl gefühlt habe. | 0.694 | −0.032 | 0.118 | −0.027 | 0.318 |
| 8. Wenn ich an solche Situationen denke, kann es schwer sein, Appetit zu haben. | 0.477 | −0.052 | −0.042 | 0.071 | 0.426 |
| 9. Ich habe schon schlechte Träume aufgrund solcher Situationen erlebt. | 0.579 | 0.033 | 0.050 | 0.147 | 0.375 |
| Colleague support                                |
| 10. Meine Kollegen können sehr teilnahmslos auf die Effekte reagieren, die solche Vorfälle auf mich hatten. | 0.202 | −0.084 | 0.334 | 0.082 | 0.228 |
| 11. Meine Kollegen helfen mir dabei mich als gute Fachkraft zu fühlen, egal welche Fehler ich gemacht habe.* | 0.078 | 0.065 | 0.541 | −0.141 | 0.087 |
| 12. Meine Kollegen trauen mir nicht mehr. | 0.105 | 0.149 | 0.240 | 0.093 | 0.380 |
| 13. Meine berufliche Reputation wurde wegen solcher Vorfälle beschädigt. | 0.149 | 0.058 | 0.143 | 0.066 | 0.278 |
| Supervisor support                               |
| 14. Ich spüre, dass mein Vorgesetzter mich nach solchen Vorfällen angemessen behandelt.* | −0.130 | 0.096 | 0.690 | 0.000 | 0.291 |
| 15. Die Reaktionen meines Vorgesetzten sind fair.* | −0.104 | 0.149 | 0.707 | −0.100 | 0.303 |
| 16. Mein Vorgesetzter beschuldigt einzelne Personen | 0.033 | −0.021 | 0.590 | 0.102 | 0.121 |
| 17. Ich nehme wahr, dass mein Vorgesetzter die Komplexität der Patientenversorgung berücksichtigt.* | −0.019 | 0.110 | 0.719 | −0.057 | 0.193 |
| Institutional support                            |
| 18. Die Organisation, in der ich arbeite, versteht, dass diejenigen, die in solche Vorfälle verwinkelt sind, Hilfe benötigen können um die Auswirkungen zu verarbeiten.* | 0.186 | 0.008 | 0.671 | 0.026 | −0.168 |
| 19. Meine Organisation hat eine Reihe von Angeboten, die mir helfen, solche Ereignisse zu verarbeiten.* | 0.282 | 0.039 | 0.545 | 0.032 | −0.244 |
| 20. Die Sorge für das Wohl von Personen, die in solche Vorfälle verwinkelt sind, ist nicht stark ausgeprägt in der Organisation, in der ich arbeite. | 0.260 | −0.058 | 0.364 | 0.174 | −0.001 |
| Professional self-efficacy                       |
| 21. Nach meiner Beteiligung in solche Vorfälle habe ich Gefühle der Unzulänglichkeit in Bezug auf meine Fähigkeiten in der Patientenversorgung erfahren. | 0.663 | 0.094 | 0.030 | 0.103 | 0.170 |
| 22. Durch meine Erfahrungen frage ich mich, ob ich wirklich eine gute Fachkraft bin. | 0.614 | 0.121 | 0.057 | 0.136 | 0.128 |
| 23. Nach solchen Erfahrungen, bin ich ängstlich geworden, schwierige oder riskante Aufgaben zu übernehmen. | 0.619 | 0.222 | 0.053 | 0.123 | 0.266 |
| 24. Solche Erfahrungen haben meine Arbeitsleistung negativ beeinflusst. | 0.589 | 0.208 | 0.034 | 0.171 | 0.267 |
| Turnover intentions                              |
| 25. Meine Erfahrungen haben zu einem Wunsch geführt, lieber fern der Patientenversorgung zu arbeiten. | 0.308 | 0.167 | 0.153 | 0.068 | 0.645 |
| 26. Manchmal möchte ich durch den Stress durch Beteiligung an solchen Situationen meine Arbeit aufgeben. | 0.470 | 0.100 | 0.180 | 0.040 | 0.580 |
| 27. Ich habe begonnen nach anderen beruflichen Möglichkeiten Ausschau zu halten. | 0.209 | 0.057 | 0.320 | 0.054 | 0.546 |
| 28. Aufgrund dieser Ereignisse plane ich in den nächsten 6 Monaten meinen Beruf zu verlassen. | 0.070 | −0.067 | 0.252 | 0.007 | 0.594 |
| Absenteeismus                                    |
| 29. Meine Erfahrungen mit einem unerwünschten Ereignis oder Fehler haben dazu geführt, dass ich mir für meine seelische Gesundheit einen Tag frei genommen habe. | 0.103 | 0.001 | −0.007 | −0.004 | 0.599 |
| 30. Ich habe nach solchen Ereignissen mir schon einmal länger im Beruf freigenommen | 0.070 | 0.021 | −0.102 | 0.065 | 0.592 |
| 31. Wenn ich arbeite, bin ich durch meine Beteiligung an solchen Situationen abgelenkt und nicht hundertprozentig präsent. | 0.386 | 0.315 | 0.070 | 0.106 | 0.282 |

(Continued next page)
by a PCA. This analysis confirmed 11 factors accounting for 66.6% of the variance. For specific analysis, only eigenvalues of 1 or higher were included (scree plot; Fig. 2). Five factors accounting for “distress,” “support,” “change,” “resilience,” and “request for support” were identified.

Because of some cross-loadings (correlation of more than 0.3 with a difference of less than 0.2 to the next higher loadings), a 5-factor varimax rotation was conducted. Table 2 shows the factor loadings after this procedure. Some remaining cross-loadings in items 6, 8, 9, 26, and 31 were determined.

After tests for reliability and validity, we analyzed the mean values of the 9 domains (Table 1): high values (>3) were identified for psychological distress, organizational support, and education, were mentioned multiple times: high demand for improvement of the organizational safety culture. Most participants reported about their circumstances and their perceptions for organizational weaknesses in patient safety concerning prevention, identification, and treatment of adverse events. Lack of resources, such as time, professional support, and education, were mentioned multiple times: Open communication concerning these events are mostly prevented by hierarchal structures.

Correlations and Subgroup Analysis

Neither gender- nor age-specific correlations were detected for the time spent on the questionnaire. (Kendall τ > 0.3). The sole exceptions were speech and language therapists, who showed a negative significant correlation concerning age and turnover intentions (P = 0.013, τ = −0.629): the older, the less the desire for change.

Using Bonferroni-corrected Kruskal-Wallis tests, there were only few significant differences between the professional groups (Table 3): physicians showed higher burden concerning physical (P < 0.001) and psychical distress (P = 0.002) than did paramedics, whereas professional self-efficacy was lower in nurses compared with physician assistants (P = 0.003) and paramedics (P < 0.0001). On the side of paramedics, they experienced self-efficacies higher than physicians (P = 0.001). Regarding nurses, turnover intentions were stronger than in paramedics (P = 0.002).

The comparison of finishers and dropouts revealed no significant differences.

Qualitative Data

Altogether, 20 free-text entries (986 words) were analyzed. Taking an iterative approach, we identified the following themes:

1. Participants confirm experience of second victim phenomenon. Two participants reported about incidents resulting in second victim traumatization:

"Impairment due to these events resulted from my job in the ED."

"A new colleague on night shift was challenged with a cardio-pulmonary resuscitation. She did not know where to find the emergency-kit... she did not get the ventilation bag. The doctor failed to intubate and was not able to ventilate. The patient died."

2. There is high demand for improvement of the organizational safety culture. Most participants reported about their circumstances and their perceptions for organizational weaknesses in patient safety concerning prevention, identification, and treatment of adverse events. Lack of resources, such as time, professional support, and education, were mentioned multiple times:

"Up to now, failure and near-missed led to the interruption or end of the career."

"Open communication concerning these events are mostly prevented by hierarchal structures."

"Because of several reasons, e.g., staff shortage, high [unrealistic] expectations by the society and the high workload, errors [and events erroneously treated as errors] cannot be prevented."

"In my opinion, the willingness to bring charges or to consult a lawyer is becoming more common and is intended to get compensation payments or to take revenge."

"I think due to staff shortage there is lack of time for onboarding and familiarization at work."

"The biggest problem is staff shortage. We always work understaffed. In the ED we cannot manage the high numbers of patients with the low numbers of nurses. Errors and mix-ups occur often. And you frequently forget the important activities."

TABLE 2. (Continued)

|                  | D1     | D2     | D3     | D4     | D5     |
|------------------|--------|--------|--------|--------|--------|
| Resilience       |        |        |        |        |        |
| 32. Aufgrund solcher Situationen bin ich in meiner Arbeit aufmerksamer geworden* | −0.195 | 0.772  | 0.027  | −0.052 | 0.030  |
| 33. Solche Situationen haben dazu geführt, dass ich meine Arbeitsqualität verbessert habe.* | −0.019 | 0.838  | 0.039  | −0.091 | 0.006  |
| 34. Meine Erfahrungen mit unerwünschten Ereignissen am Patienten oder Fehlern haben positive Veränderungen in den Abläufen der Behandlung von Patienten bewirkt.* | 0.054  | 0.773  | 0.078  | −0.028 | 0.066  |
| 35. Ich bin durch unerwünschte Ereignisse und Fehler als Fachkraft gewachsen.* | 0.097  | 0.791  | 0.085  | −0.046 | 0.040  |
| SVE support option desirability  |        |        |        |        |        |
| 1. Die Möglichkeit, sich unmittelbar nach einem Ereignis kurz Zeit nehmen zu können. | 0.305  | −0.072 | 0.149  | 0.620  | −0.178 |
| 2. Einen ruhigen Rückzugsort, um sich nach einem solchen Ereignis zu sammeln und zu erholen. | 0.156  | 0.050  | 0.165  | 0.671  | −0.094 |
| 3. Die Verfügbarkeit eines Mitarbeiters auf Augenhöhe, mit dem man über den Vorfall reden kann. | 0.168  | −0.085 | −0.007 | 0.672  | −0.111 |
| 4. Ein professionelles Beratungsprogramm außerhalb der Arbeit, in dem Beschäftigte sich frei beraten lassen können. | 0.139  | −0.044 | 0.009  | 0.689  | 0.229  |
| 5. Eine Diskussion mit meinem Vorgesetzten über das Ereignis. | 0.057  | −0.125 | −0.191 | 0.495  | 0.111  |
| 6. Einen Termin mit einem Berater in meiner Institution, um über das Ereignis zu sprechen. | 0.002  | −0.028 | 0.013  | 0.724  | 0.224  |
| 7. Die Möglichkeit, rund um die Uhr mit einer Person vertraulich über ein Ereignis und die Auswirkungen auf mich zu sprechen. | 0.039  | 0.076  | −0.043 | 0.669  | 0.158  |

Dominant factors loadings are shown in bold print. If 2 dimensions are printed in bold, cross-loadings were present.

*Reverse items.
TABLE 3. Subgroup Analysis for Nonacademic Nurses, Therapists, Nonacademic Medical Assistants, Physician Assistants, Paramedics, and Physicians

| Variable                      | n  | Min | Max  | Mean       | Std. Var. |
|-------------------------------|----|-----|------|------------|-----------|
| Time|Nurses                      | 67 | 4.000| 41.000 | 10.045    | 7.246     |
| Time|Therapists                   | 15 | 6.000| 15.000 | 8.333     | 2.416     |
| Time|Medical Assistants           | 20 | 5.000| 38.000 | 12.000    | 9.984     |
| Time|Physician Assistants         | 64 | 2.000| 57.000 | 10.344    | 8.256     |
| Time|Paramedics                   | 46 | 4.000| 56.000 | 9.326     | 9.636     |
| Time|Physicians                   | 47 | 3.000| 35.000 | 7.979     | 5.011     |
| Age|Nurses                       | 67 | 20.000| 63.000 | 39.776*  | 10.053    |
| Age|Therapists                   | 15 | 24.000| 55.000 | 40.067*  | 9.874     |
| Age|Medical Assistants           | 20 | 21.000| 54.000 | 28.950*  | 8.918     |
| Age|Physician Assistants         | 64 | 19.000| 56.000 | 27.563*  | 8.277     |
| Age|Paramedics                   | 46 | 22.000| 69.000 | 37.000*  | 11.110    |
| Age|Physicians                   | 47 | 31.000| 64.000 | 43.809*  | 8.360     |
| Psych Distress|Nurses               | 67 | 1.000| 5.000  | 3.351     | 1.104     |
| Psych Distress|Therapists            | 15 | 1.500| 4.750  | 3.233     | 1.037     |
| Psych Distress|Medical Assistants      | 20 | 1.000| 4.750  | 2.938     | 1.057     |
| Psych Distress|Physician Assistants    | 64 | 1.000| 5.000  | 3.027     | 0.953     |
| Psych Distress|Paramedics             | 46 | 1.000| 5.000  | 2.875*    | 1.087     |
| Psych Distress|Physicians             | 47 | 1.750| 5.000  | 3.590*    | 1.080     |
| Phys Distress|Nurses                  | 67 | 1.000| 5.000  | 2.576*    | 1.012     |
| Phys Distress|Therapists             | 15 | 1.400| 3.200  | 2.013     | 0.504     |
| Phys Distress|Medical Assistants      | 20 | 1.000| 3.800  | 2.280     | 0.827     |
| Phys Distress|Physician Assistants    | 64 | 1.000| 5.000  | 2.194     | 0.918     |
| Phys Distress|Paramedics             | 46 | 1.000| 4.400  | 1.917*    | 0.866     |
| Phys Distress|Physicians             | 47 | 1.000| 5.000  | 2.604     | 1.166     |
| Colleagues|Nurses                     | 67 | 1.000| 5.000  | 1.948     | 0.631     |
| Colleagues|Medical Assistants       | 15 | 1.000| 4.500  | 1.783     | 0.855     |
| Colleagues|Physician Assistants     | 20 | 1.000| 3.000  | 1.988     | 0.529     |
| Colleagues|Paramedics               | 64 | 1.000| 3.250  | 1.734     | 0.454     |
| Colleagues|Physicians               | 46 | 1.000| 3.500  | 1.826     | 0.516     |
| Supervisors|Nurses                   | 67 | 1.000| 4.750  | 2.059     | 0.781     |
| Supervisors|Medical Assistants      | 15 | 1.750| 3.500  | 2.483     | 0.477     |
| Supervisors|Physician Assistants     | 20 | 1.750| 4.250  | 2.825     | 0.654     |
| Supervisors|Paramedics               | 64 | 1.000| 4.000  | 2.424     | 0.519     |
| Supervisors|Physicians               | 46 | 1.750| 4.000  | 2.592     | 0.631     |
| Institution|Nurses                  | 47 | 2.000| 4.000  | 2.681     | 0.556     |
| Institution|Therapists              | 15 | 1.667| 5.000  | 3.178     | 0.983     |
| Institution|Medical Assistants      | 20 | 1.333| 4.333  | 3.050     | 0.887     |
| Institution|Physician Assistants    | 64 | 1.000| 5.000  | 2.953*†   | 0.887     |
| Institution|Paramedics              | 46 | 1.000| 5.000  | 2.826†    | 1.122     |
| Institution|Physicians              | 47 | 1.000| 5.000  | 3.794†    | 1.087     |
| Professionality|Nurses       | 67 | 1.000| 5.000  | 2.362     | 1.152     |
| Professionality|Therapists   | 15 | 1.500| 4.250  | 2.183     | 0.776     |

*Significant effects between professional groups.
†Significant effects between professional groups.

“...you go home stressed, unsatisfied and tired. You think about how long you can carry on working like this. A shortage of trainees is not the only problem. We cannot get nurses to stay at our hospital.”

“The problem is not that errors occur or how professionals deal with it. The problem is why these errors even happen.”

“Errors and mistakes in nursing mainly happen due to staff shortage. And this leads to depression and quitting the job.”

Some participants reported about already established strategies, for example:

“I am happy to have a well performing team at my side. We make decisions and plan the further therapeutic management together. In my opinion this reduces errors.”

Furthermore, there were many participants who declared the desire for optimization of a safety culture:

“The obligatory implementation of Critical Incident Reporting Systems would be of great benefit for patient safety.”

“It is desired to have an anonymous database to collect and evaluate errors and mistakes.”

3. Critical response to the questionnaire

Five respondents gave constructive criticism about the questionnaire, and 6 declared it to be a feasible and valuable tool. Several persons criticized that the inverted items and the Likert scale were laborious or confusing. One person scrutinized the translation to be inaccurate. In this case, the person seemed to not have understood whether critical incidents leading to second victim traumatization were recent events or those in the past.

**DISCUSSION**

**Key Results**

High reliability for the G-SVESTR was shown with a Cronbach α of 0.884 comparable with or higher than the original SVEST (0.79), the revised SVEST-R (0.86), the Korean version (0.71), and the Chinese version (0.52–0.9). Considering the tests for construct validity, it was possible to show the multidimensional main factors with eigenvalues greater than 1 and acceptable factor loading. This loading was attributable...
to 5 dimensions, namely, distress (D1), which comprises psychological and physical stress and the experience of the own professional efficacy, which might be impaired because of critical events. Supporting factors (D3) were support and help by colleagues, supervisors, and institutions. Resilience (D2), change (D5), and desire concerning support formats (D4) were the other dimensions.

Cross-loadings of items 6, 8, and 9—all considering somatic symptoms—loaded weaker on the dimension “change” than on “distress,” so that they were not removed because of content validity and comparability with other SVEST-R versions. Item 26 also showed a cross-loading on “distress” and “change.” This intercorrelation was explained because the word “stress” was part of the question, and therefore, distress might be the driver to the desire for change. The correlation between distress and turnover intentions is well known, especially in case of burnout and a poor safety culture. In addition, the free-text entries also showed this relationship.

The most problematic item was no. 31 (absenteeism). The results showed 2 loadings (D1 and D2), but no loading on the dimension of the other absenteeism items loaded on (D5). This finding was cross-checked in the translation and the back translation: We translated item 31 of the SVEST-R (“When I am at work, I am distracted and not 100% present because of my involvement in these situations.”) with “Wenn ich arbeite, bin ich durch meine Beteiligung an solchen Situationen abgelenkt und nicht hundertprozentig präsent.” and back-translated it with “When I work, I am distracted by my participation in such situations and am not at hundred percent present.”

The translation is deemed adequate according to the WHO guidelines. Comparing the content of items 31 to 33, the question addresses a form of missing concentration. This might be the case with presenteeism, whereas items 32 and 33 focus on absenteeism—the habitual withdrawal and retreat from the working place due to poor motivation. This issue is comparable with the original SVEST, wherein a weaker factor loading could be derived. To maintain content validity, triple assessment of absenteeism and comparability to other SVEST versions, this item was not removed either. Regarding this finding, it could be beneficial to assess persons agreeing to item 31 but not to 32 or 33 for concentration deficits (e.g., due to neurologic impairment) and presenteeism. For future investigations, item 31 should be measured and interpreted cautiously, and it may furthermore be useful to examine absenteeism and presenteeism parameters as separate themes.

There were only few differences in response behavior concerning the different professions and none between finishers and dropouts. Although motivation and interests are not the only criteria for completion of a survey, the multiprofessional approach was used and the finisher/dropout comparison for reduction of the selection bias. However, there is no complete ruling out of this error innate to all questionnaire settings. Thus, it cannot be known how people would have answered who refused to participate or were not capable to access the survey or who did not know about it. To assess this, distinct populations of more than 300 participants are necessary for generalizability of the responses.

Furthermore, the translated questionnaire as a top-down screening and assessment instrument does not address the distinction between experience of emotionally or morally challenging events and the identification to be a second victim. This is not the purpose of this questionnaire, although after identification of critical events, it is critical to distinguish between a second victim phenomenon with or without identification of the involved person and other entities like posttraumatic stress and moral injury.

The duration of time spent on the questionnaire was about 9.4 minutes in the finisher group and 3.6 minutes in the dropout group, which seems justifiable as a feasible and economic integration into a daily routine. Although the length of a questionnaire should not be the only factor concerning response burden, time-consuming questionnaires may be difficult to implement into daily routine. However, institutions using the G-SVESTR must decide whether identifications of preventable and treatable second victims and following effects on patient safety and economy (e.g., absenteeism, presenteeism, loss of manpower, recruiting of new employees, onboarding processes) justify the time regularly invested in staff assessments.

### Limitations

There are some limitations and possible bias to our study:

1. **Translation**

   Idiomatic translation is a complex process with the need for a valid and reliable process. This issue was addressed by adhering to the WHO recommendations, with support by an English native speaker, an expert panel, and external experts familiar with patient safety.

2. **Study size**

   The study size is a key factor for generalizing the results. According to international recommendations, the objective to recruit 300 participants was achieved and the goal of a 1:2 item to responder ratio was exceeded.

3. **Multiprofessional population**

   The project was conducted within different groups of health care providers and not in distinct groups like in the other SVEST validations. These had distributed the survey among nurses at third-level hospitals only.

A multiprofessional, multisectoral design was chosen, which incorporated different professions of prehospital, primary, secondary, tertiary, and ambulatory care. Because SVS affects health care workers from different professions and health care sectors, this approach to detect differences between professional groups was used for the generation of new hypotheses and to show validity and reliability in all groups and not nurses only.

In addition, this was done because nurses in Germany are a group consisting of many different professions with different academic and nonacademic educational courses and workplace definitions. Thus, a direct comparison of nurses in the United States with those in Germany would not be considered valid.

4. **Response and convenience bias**

   There are many advantages and disadvantages of online-based questionnaires distributed using manifold networks and social media platforms: on the one hand, they are flexible, low cost, and easy to conduct and distribute; reach many people; are robust to transfer errors; evoke a higher motivation to answer; and require lower social interaction and a higher level of standardization. On the other hand, qualitative data are collected at a pure verbal level without assessment of paraverbal and nonverbal activity or the possibility of interaction with an interviewer.

   Furthermore, motivational factors may have played a role (only motivated, perhaps mainly affected persons) in the decision to participate. This was addressed by taking the finisher-dropout approach. In addition, decentralized access to different professions via social media and regional networks improves generalizability. Unfortunately, hardly detectable bias was not addressed, for example, survey fraud.

   To ensure comparability, the English template was copied without supplements, statements, or omissions.
The participants were recruited online according to the convenience sampling approach, except for physician assistants and palliative care nurses, which were sampled in more defined and distinct networks. Contact to these groups was established up to 3 times.28

Although the approach cannot exclude the selection bias completely, recruitment, finisher/dropout comparison, and subgroup analysis may limit it. However, it must be emphasized that the content analysis of the results lacks generalizability because of the small groups, whereas construct validation and reliability analysis meets the expected criteria: The project was not intended to assess the second victim situation in Germany. It was intended to validate the instrument to do so in future investigations. However, the first findings derived from qualitative and quantitative content may be used for hypotheses generation.

CONCLUSIONS

The G-SVESTR questionnaire is a valid and reliable instrument for the assessment of second victim effects in a multiprofessional setting. The sole exception is item 31, which assesses for absenteeism. This item was preserved owing to content validity and comparability to other SVEST versions and should be reevaluated in future versions of the SVESTR. Data from this observation concerning content give input for a hypotheses generation but are limited because of the selection bias and small within-group sample sizes. In summary, the G-SVESTR may be validly used for this effort in multiple settings and professions of all health care sectors.

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