

Journal of Patient Safety

Validation and psychometric properties of the Spanish version of the Second Victim Experience and Support Tool (SVEST-E) questionnaire

--Manuscript Draft--

Manuscript Number:	
Full Title:	Validation and psychometric properties of the Spanish version of the Second Victim Experience and Support Tool (SVEST-E) questionnaire
Article Type:	Original Study
Keywords:	second victim; SVEST; patient safety; adverse events.
Corresponding Author:	Hector González-de la Torre, PhD Canary Islands Health Service: Servicio Canario de Salud Las Palmas de Gran Canaria, Las Palmas (Canary Islands) SPAIN
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	Canary Islands Health Service: Servicio Canario de Salud
Corresponding Author's Secondary Institution:	
First Author:	Irene Santana-Domínguez, PhD Student
First Author Secondary Information:	
Order of Authors:	Irene Santana-Domínguez, PhD Student Héctor González-de la Torre, PhD José Verdú-Soriano, PhD Andreu Nolasco, PhD Alicia Martín-Martínez, Phd
Order of Authors Secondary Information:	
Manuscript Region of Origin:	SPAIN
Abstract:	<p>Abstract</p> <p>Objectives: To assess the validity and describe the psychometric properties of the Spanish version of the Second Victim Experience and Support Tool (SVEST-E) questionnaire.</p> <p>Methods: Cross-sectional observational study aimed at midwives and obstetricians in Spain. An online survey was conducted consisting of two parts: the first part collected different variables and the second part collected the SVEST-E. The temporal stability of the instrument was evaluated using the test-retest method. For the construct validity and reliability, an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA) were performed using FACTOR programme v.10 with a polychoric correlation matrix.</p> <p>Results: A total of 689 professionals participated in the study, of which 323 were obstetrician physicians and 366 were midwives. The mean score on the SVEST-E for the total sample was 3.09 (SD = 0.50). The parallel analysis of the EFA suggested a 5-factor solution, with a total explained variability of 61.8%. The goodness of fit indices of the model were RMSEA = 0.038 (95% CI: 0.031–0.042), NNFI = 0.985 (95% CI: 0.984–0.989) and CFI = 0.989 (95% CI: 0.988–0.992). The factor model obtained was confirmed by CFA, obtaining the values of RMSEA = 0.038 (95% CI: 0.026–0.053), NNFI = 0.985 (95% CI: 0.957–1.000) and CFI = 0.989 (95% CI: 0.969–1.000). The intraclass correlation coefficient for SVEST-E was 0.97 (95% CI: 0.94–0.99).</p> <p>Conclusions: The SVEST-E instrument maintains the same items as the original questionnaire but introduces changes in the organisation of its dimensions, containing 4 factors and the desired support responses. The Spanish version of the instrument maintains adequate content validity, construct validity, reliability, and temporal stability, so the SVEST-E is a valid tool to evaluate the second victim experience in Spanish</p>

Validation and psychometric properties of the Spanish version of the Second Victim Experience and Support Tool (SVEST-E) questionnaire

Irene Santana-Domínguez, RM. Assistant Midwife. Canary Health Service, PhD student, University of Las Palmas de Gran Canaria, Avda Maritima del Sur S/N.CP:35016, Las Palmas de Gran Canaria-Canary Islands, Spain. E-mail: irenesantanadominguez@gmail.com

Héctor González-de la Torre, PhD, MSc, RM. Assistant Midwife-mentor, Canary Health Service. Nursing Associated Professor, University of La Laguna, Avda Maritima del Sur S/N.CP:35016, Las Palmas de Gran Canaria-Canary Islands, Spain. E-mail: hegontor@live.com/hgonzalt@ull.edu.es

José Verdú-Soriano, PhD, MSc, RN. Nursing Professor, Department of Community Nursing, Preventive Medicine, Public Health and History of Science, Faculty of Health Sciences, University of Alicante, Alicante, Spain. E-mail: pepe.verdu@ua.es

Andreu Nolasco, PhD, Professor, Community Health Research Group, Department of Community Nursing, Preventive Medicine, Public Health and History of Science, Faculty of Health Sciences, University of Alicante, Alicante, Spain. E-mail: nolasco@ua.es

Alicia Martín-Martínez, PhD, MD. Obstetrics and Gynaecology Department, Gran Canaria Maternal and Infant University Hospital Complex, Canary Health Service, Gran Canaria, Spain. University of Las Palmas de Gran Canaria, Avda Maritima del Sur sn.CP:35016, Las Palmas de Gran Canaria-Canary Islands, Spain. E-mail: aliciammartinez@gmail.com

Corresponding author:

Héctor González-de la Torre. PhD, MSc, RM. Assistant Midwife-mentor. Canary Health Service. Nursing Associated Professor, University of La Laguna. Avda Maritima del Sur S/N.CP:35016. Las Palmas de Gran Canaria-Canary Islands, Spain. E-mail: hegontor@live.com/hgonzalt@ull.edu.es

Acknowledgements

We would like to thank all the professionals who participated in this research and made it possible. We would also like to thank the Spanish Society of Gynaecology and Obstetrics, Federation of Spanish Midwives' Associations, Spanish Association of Midwives and the Spanish Midwives' Union. We extend a special thanks to Dr. JD Burlison for his collaboration in the different stages of this research and Dr. MV Brunelli for providing the Argentinean version of the SVEST.

Conflicts of interest and financing:

The authors declare that there are no conflicts of interest related to this manuscript. This study did not receive any type of funding.

Abstract

Objectives: To assess the validity and describe the psychometric properties of the Spanish version of the Second Victim Experience and Support Tool (SVEST-E) questionnaire.

Methods: Cross-sectional observational study aimed at midwives and obstetricians in Spain. An online survey was conducted consisting of two parts: the first part collected different variables and the second part collected the SVEST-E. The temporal stability of the instrument was evaluated using the test-retest method. For the construct validity and reliability, an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA) were performed using FACTOR programme v.10 with a polychoric correlation matrix.

Results: A total of 689 professionals participated in the study, of which 323 were obstetrician physicians and 366 were midwives. The mean score on the SVEST-E for the total sample was 3.09 (SD = 0.50). The parallel analysis of the EFA suggested a 5-factor solution, with a total explained variability of 61.8%. The goodness of fit indices of the model were RMSEA = 0.038 (95% CI: 0.031–0.042), NNFI = 0.985 (95% CI: 0.984–0.989) and CFI = 0.989 (95% CI: 0.988–0.992). The factor model obtained was confirmed by CFA, obtaining the values of RMSEA = 0.038 (95% CI: 0.026–0.053), NNFI = 0.985 (95% CI: 0.957–1.000) and CFI = 0.989 (95% CI: 0.969–1.000). The intraclass correlation coefficient for SVEST-E was 0.97 (95% CI: 0.94–0.99).

Conclusions: The SVEST-E instrument maintains the same items as the original questionnaire but introduces changes in the organisation of its dimensions, containing 4 factors and the desired support responses. The Spanish version of the instrument maintains adequate content validity, construct validity, reliability, and temporal stability, so the SVEST-E is a valid tool to evaluate the second victim experience in Spanish health professionals.

Keywords: second victim, SVEST, patient safety, adverse events.

INTRODUCTION

Since the publication of '*To err is human*' by the *Institute of Medicine of the National Academy of Sciences* of the United States in 2000, global healthcare systems have made tremendous efforts and initiatives to reduce the incidence of healthcare-related adverse events and increase patient safety^{1,2}.

Errors associated with healthcare are common³. Although it is accepted that we cannot completely eliminate human error inherent in healthcare, we can better quantify this problem to design safer systems, mitigate its frequency, improve its visibility and reduce the consequences³. The consequences derived from these errors are generally mild, although a variable percentage can become permanent or serious and even lead to the death of the patient^{3,4}.

When these errors occur, the patient and their relatives are the first affected (first victims)⁵. But in these events, one or more health professionals are generally involved, who also suffer the negative consequences of the event^{5,6}. This is the explanation for the creation of the term 'Second victim'⁵⁻⁷.

The study of the second victims has increased in recent years^{5,6,8}. Health professionals who suffer from second victim experiences feel a wide range of negative feelings that can even lead to the development of serious psychological disorders^{5,8,9}. Feelings such as fatigue, frustration, anguish, fear, anger and guilt can lead to long-term stress, anxiety, depression and the onset of suicidal ideas, among others^{5,8,9}.

This phenomenon has a significant economic and reputational impact on health systems and their institutions^{5,10}, with some studies relating it to burnout and intention to leave the profession^{11,12}.

For this reason, it is important for health institutions to have tools that can evaluate the phenomenon of second victims in their health professionals. The most used tool for evaluating the phenomenon of second victims is the *Second Victim Experience and Support Tool* questionnaire (SVEST)¹³. This instrument works as a questionnaire that specifically measures the phenomenon of second victims and has been validated in various countries: Korea¹⁴, Argentina¹⁵, China¹⁶, Italy¹⁷, Denmark¹⁸ and Iran¹⁹.

The SVEST considers 7 dimensions: Psychological distress (4 items), Physical distress (4 items), Co-workers support (4 items), Supervisor support (4 items), Institutional support (3 items), Non-work-related support (2 items) and Personal self-efficacy (4 items)¹³. The instrument also assesses 2 outcome variables: Intention to change professions (2 items) and

Absenteeism (2 items)¹³. In addition, it provides a section with 7 items as response options for second victims to reflect on their preferences regarding the desired forms of support from the institutions¹³.

In Spain, the study of second victims is still limited, although some approaches have been made to this issue²⁰⁻²². However, the researchers who studied this phenomenon in our country have not used a validated instrument to do so²⁰.

Given the growing interest in this topic, the SVEST questionnaire has recently been adapted, linguistically and culturally, in Spain²³. The objective of this study is to evaluate the validity and describe the psychometric properties of the instrument (SVEST-E) in the Spanish context.

METHODS

Participants, inclusion criteria and sample size

A cross-sectional observational study was proposed for midwives and obstetricians throughout the Spanish territory. The inclusion criteria were the following: being a professional Medical Specialist in Obstetrics and Gynaecology or Midwife and performing their professional work with direct care to women.

The calculation of the sample size was based on the standard recommendation of having at least 10 participants for each item of the instrument to be validated²⁴. Therefore, the minimum estimated number was 360 participants for this case (29 items + 7 support preference responses). A total of 689 professionals participated in the study (n = 689).

Sampling and data collection

To select the sample, a non-probabilistic convenience sampling was used. The research team contacted the Spanish Society of Gynaecology and Obstetrics, the Federation of Associations of Midwives of Spain, the Spanish Association of Midwives and the Union of Midwives of Spain by phone or e-mail. The professionals affiliated to these organisations who wanted to participate were sent a link through which they accessed an online questionnaire available at *Google Forms*[®], following the recommendations of the CHERRIES standards²⁵. The data collection period began on May 15 and ended on September 9, 2020.

Variables and collection instrument

The online questionnaire consisted of two parts. In the first part, the following variables were collected: sex, age, marital status, professional category (obstetrician or midwife), highest level of studies achieved, years of professional experience, type of work centre (public or private),

type of unit-department (specialised hospital care or primary care), region of the country, knowledge of the term second victim (none, medium, or high), existence of support programmes for second victims in their workplace (yes/no/don't know), having second victim experiences at some point (yes/no) and the approximate time they felt as second victims.

In the second part, the SVEST-E questionnaire was collected²³, which maintained the same item and section structure as the original SVEST¹³.

Data analysis

An analysis of the variables was carried out with the statistical programme *IBM© SPSS Statistics v.24.0*, the qualitative variables were expressed in percentages and frequencies and in the case of the quantitative variables, in means, standard deviation and minimum–maximum values.

Pearson's X^2 test was used for categorical variables to establish whether there were differences between groups. The hypothesis of normality in the distribution of the data of the continuous variables was tested (Kolmogorov-Smirnov test). Later, assuming normality, the Student t test was used to compare means, establishing a significance level of $\alpha = 0.05$.

Construct validity

To evaluate the construct validity, a factorial analysis was performed using *FACTOR* programme v.10²⁶⁻²⁹. To investigate the factorial structure of the questionnaire, a random sample of 360 subjects was selected from the 689 included in the total sample, with which an exploratory factor analysis (EFA) was carried out, with a polychoric correlation matrix, due to the ordinal nature and lack of symmetry of the items (the Mardia test for symmetry and kurtosis indicated non-normality), with factor extraction by unweighted least squares and *PROMIN* rotation²⁶. A parallel analysis was used to establish the number of factors to retain. The consistency (reliability) of the retained factors was calculated. Using *bootstrapping*, the 95% confidence intervals (95% CI) of the model measurements were calculated.

Subsequently, a confirmatory factor analysis (CFA) was performed using the data from the 329 remaining subjects, taking the matrix of factor loadings obtained in the EFA of the first sample as a reference. The load matrix was semi-specified, with values other than zero in the coefficients identified with values greater than 0.30 for each factor and zero value in the rest. In cases in which the factor loading on an item was greater than 0.30 in more than one factor, a value other than 0 was assigned to the one with the highest loading and 0 to the rest, except when the affected item had a value greater than 0.30 in a predefined section (dimension,

outcome variable, or support forms section) of the questionnaire and also a value greater than 0.30 in another section, in which case it was always attributed to the predefined section.

Instrument reliability and stability

The consistency of the factors was evaluated with the ORION coefficients (Overall Reliability of fully-Informative prior Oblique N-EAP scores)^{30,31}.

To study the stability of the instrument, a test-retest was carried out. To do so, a sample of 21 professionals (obstetricians and midwives) was obtained, carrying out 2 measurements with the instrument with an interval of two weeks. The intraclass correlation coefficient and their respective 95% confidence intervals were calculated. A two-factor mixed effect model was used, calculated under 'absolute agreement'. Additionally, a Bland and Altman graph was created for the graphical representation of this property of the instrument.

Ethical considerations

The study was evaluated and approved by the Research Ethics Committee (CEI/CEIm) HUGC Dr. Negrín with the code 2020-140-1. The professionals who agreed to participate in this phase of the research had all the information on the objectives of the project in its entirety, understanding that they were granting informed consent by voluntarily accessing the online questionnaire. Confidentiality and anonymity were ensured in all phases of the study. For data analysis, a blind matrix was used in which no identifiable participant data appeared.

RESULTS

Baseline characteristics of the sample

The final sample consisted of 689 professionals (n = 689) from 19 Spanish regions, of which 323 (46.9%) were obstetrician physicians and 366 (53.1%) were midwives. The average age was 43.44 years (SD = 10.56 years/Minimum = 26, Maximum = 71), with an average professional experience of 15.03 years (SD = 10.42/Minimum = 0, Maximum = 45). Of the total sample, 436 (63.3%) reported second victim experiences after having been involved in an adverse event with patients, while 253 (36.7%) did not.

Of the professionals who had second victim experiences, 217 (49.8%) informed their institutions about this situation and 219 (50.2%) did not. Regarding when this situation occurred, 132 (30.3%) suffered the adverse event less than a year ago, 57 (13.1%) between 1 and 2 years ago, 225 (51.6%) more than 2 years ago and 22 (5.0%) could neither determine nor remember.

The average score on the SVEST-E for the total sample was 3.09 (SD = 0.50). Table 1 shows the mean scores for each dimension, according to the original structure of the SVEST, as well as the other sociodemographic variables considered, depending on whether they reported second victim experiences or not.

CONSTRUCT VALIDITY

Exploratory factor analysis

The EFA presented good adequacy (good), with a Kaiser–Meyer–Olkin measure of 0.86 (95% CI: 0.85–0.87) and a significant Bartlett statistic ($p = 0.00001$). Parallel analysis suggested a 5-factor solution, with a total explained variability of 61.8%. The goodness of fit indices of the model were RMSEA = 0.038 (95% CI: 0.031–0.042) (lower than the 0.05 limit to be considered a good fit), NNFI = 0.985 (95% CI: 0.984–0.989) and CFI = 0.989 (95% CI: 0.988–0.992), higher than 0.95, indicating an excellent fit. Table 2 presents the factor loadings (after rotation) of the obtained model.

It can be observed that, in general, the results obtained maintain the structure of the questionnaire (7 dimensions, 2 result variables and 1 dimension of forms of support), although grouping some of them until reducing to 5 dimensions. Thus, factor F1 collects the dimension of desired forms of support, F2 groups the outcome variables, F3 is considered a factor of physical suffering including dimension 2 of the questionnaire, F4 is the factor that includes dimensions 1-Psychological suffering, 3-Co-workers support, 6-Non-work-related support and 7-Professional self-efficacy; and finally, factor F5 includes dimensions 4 and 5 of supervisor and institutional support. With this structure, all the items have a factor loading greater than 0.30 in the assigned factor, except for item 4.3 ‘My supervisor blames the team members when these cases occur’, which does not receive a sufficiently satisfactory loading for any factor.

Assigning dimensions to factors F3 and F4 could have been different, since the values of the factor loadings would make it possible to assign dimension 1 to factor F3. However, the subsequent confirmatory analysis, carried out with the second sample, confirmed that the assignment of dimension 1 would be better for factor F4.

Table 3 shows the correlations between the factors of the model. All the factors presented significant correlations with each other, with the exception of factor F5, which was not significantly correlated with either F1 or F2. Its correlation with F3 and F4 was low, less than 0.10.

Confirmatory factor analysis

The factor model obtained with the first sample (n = 360) was confirmed by CFA using the second sample (n = 329). To do so, as already mentioned, a CFA was carried out with a matrix of semi-specified factor loading coefficients. This procedure tests the congruence or similarity with a model for which the factor loadings are 0 for the specified items and different from 0 for the rest. Accordingly, the factor loadings matrix to be confirmed would be that with factor loadings other than 0 in the items obtained from the EFA with the first sample (Table 2). In the proposed 5-factor model, factor F1 loads on the dimension of desired support responses, F2 on the items of the outcome variables, F3 on dimension 2 of Physical suffering, F4 on Dimension 1 of Psychological suffering, 6 of Non-work-related support and 7 of Self-efficacy, and F5 on dimensions 4 of Supervisory support and 5 of Institutional support (Table 4).

The second sample (n = 329) presented good adequacy (good), with a Kaiser–Meyer–Olkin measure of 0.85 (95% CI: 0.84, 0.86) and a significant Bartlett statistic (p = 0.00001), with a variability explained by the 5 factors of 60.5%. The goodness of fit indices of the model were RMSEA = 0.038 (95% CI: 0.026–0.053) (lower than the 0.05 limit to be considered a good fit), NNFI = 0.985 (95% CI: 0.957–1.000) and CFI = 0.989 (95% CI: 0.969–1.000), higher than 0.95, indicating an excellent fit of the model.

Table 5 shows the estimated congruences³² for each of the variables under study between the data from the second sample and the semi-specified 5-factor model. The congruence of item 4.3 is the lowest, which is consistent with the low identification of this item in the factor loadings. The estimated overall congruences for each of the factors were 0.715 (95% CI: 0.535–0.837) for F1, 0.916 (95% CI: 0.890–0.946) for F2, 0.878 (95% CI: 0.806–0.934) for F3, 0.914 (95% CI: 0.883–0.953) and 0.971 (95% CI: 0.851–0.904) for F5, with a global congruence coefficient for the model of 0.861 (95% CI: 0.839–0.894). According to the interpretation indications of this index³², values in the range of 0.85–0.94 suggest a reasonable similarity between the model suggested by the data and the specified theoretical model. In this case, all the factors presented congruences higher than 0.85, except F1, which reached the value of 0.715, moderate. The overall congruence coefficient of the model was greater than 0.85.

Instrument reliability and stability

The values obtained for the ORION coefficients were 0.92 (95% CI: 0.90, 0.94) for F1, 0.93 (95% CI: 0.92, 0.95) for F2, 0.94 (95% CI: 0.93, 0.95) for F3, 0.90 (95% CI: 0.88, 0.92) for F4 and 0.93 (95% CI: 0.91, 0.97), thus obtaining an excellent consistency as all the values were above 0.80, value used to determine adequate consistency.

Table 6 shows the intraclass correlation coefficient values with the confidence intervals obtained in the test-retest. The Bland and Altman plot indicates adequate instrument stability for the SVEST-E total score (Figure 1).

DISCUSSION

The SVEST questionnaire was the first measurement instrument specifically designed to evaluate the experience of health professionals who have demonstrated second victim experiences¹³. While a new tool has been recently developed, the SeViD-I survey³³, the SVEST continues to be the best-known tool for evaluating the second victim phenomenon, having been translated and adapted in numerous countries¹⁴⁻¹⁹ and used in multiple environments³⁴⁻³⁸.

Most of the studies where the results of adverse events have been addressed have traditionally been based on detecting and evaluating psychological effects (presence of anxiety, depression, stress, burnout, or especially post-traumatic stress disorder [PTSD])^{8,9,39-41}. While these psychological problems are closely related to the phenomenon of second victims, they are not exclusive to it. In our opinion, one of the strengths of the SVEST questionnaire is that it includes other important aspects related to the issue of second victims, such as professional self-efficacy, absenteeism, or intention to leave the profession. These elements have been frequently forgotten when addressing the negative consequences of this phenomenon.

Even so, the psychological sphere is clearly one of the most affected. In the present study, the psychological dimension obtained the highest score (with values above 4 points), although only the group of professionals who were immersed in an adverse event and recognised that they had second victim experiences showed statistically significant differences with the group that did not report second victim experiences. This is consistent with what has been reported in other SVEST validation studies^{13,14,15,18}.

However, this factor analysis proposes a model where the Physical suffering dimension would be integrated into a factor that would include, in addition to this dimension, the dimensions of Support from co-workers, Support not related to work and Professional self-efficacy, so new analyses should be performed to see if this change can greatly modify these results.

A parallel analysis method was chosen for the EFA since this model offers the more rigorous identification of the number of dimensions of a questionnaire^{42,43}, using the polychoric correlation matrix given the nature of the items to calculate the EFA model⁴⁴.

According to this analysis, the SVEST-E seems to fit a 5-factor model and 4 if we exclude the desired support responses, as this dimension is not used to calculate the total score on the SVEST¹³. This differs quite a bit from the models proposed in other validation studies, for

example, eight factors for the Korean version (K-SVEST)¹⁴, seven for the Argentine version¹⁵, and six for the Chinese version (C-SVEST)¹⁶. The Italian version (IT-SVEST) and the Iranian version (P-SVEST) suggest following the original 9-dimensional model¹⁷.

The different analyses with other versions of the SVEST, in other countries, revealed some problems in some dimensions or for certain items.

For example, the dimensions for 3-Co-worker support and 4-Supervisor support obtained low reliability values in the original Burlison study¹³, Brunelli's validation¹⁵, the study by Kim et al.¹⁴ and the Iranian version¹⁷. In our study, the item 4.3 'My supervisor blames individual members of the team when these cases occur' of the dimension/Supervisor support dimension obtained the lowest factor loading in the CFA, and the value is also very striking if compared to the rest of the items. This item was pointed out in the study by Knudsen et al., who proposed eliminating it to increase the Cronbach's alpha coefficient value of the Supervisor Support dimension in the Danish version, although it was ultimately maintained as it was considered relevant in the Danish context¹⁸. In the C-SVEST study and in the Brunelli study, this item was redrafted and eliminated respectively^{15,16}.

Despite this, we can say that, in line with the other studies, the SVEST-E shows high reliability for most of the items, with ORION values above 0.80 from which adequate consistency can be considered.

As far as we know, only in the study of the K-SVEST and the P-SVEST the temporal stability of the instrument has been evaluated^{14,19}. The values of the intraclass correlation coefficient that were obtained for the SVEST-E were excellent, with 0.97 (95% CI: 0.94–0.99) for the total score, above the values obtained in the other studies referenced above^{14,19}. This psychometric property should be explored in the other SVEST versions.

Another psychometric property pending evaluation is the study of the convergent validity of the different versions of the SVEST. The appearance of new tools such as the SeViD-I survey³³ can open this possibility.

This research naturally has some limitations. The most obvious is determined by the fact that the sample was composed only of professionals from a very specific professional area, obstetrics, although experts from other areas participated in the first phase for content validation²³. While this area is very sensitive and a high percentage of midwives and obstetricians will experience serious obstetric events in their professional development that can affect them and trigger second victim experiences⁴⁵⁻⁴⁷, the behaviour of the SVEST-E in professionals from other medical professional areas and nurses in our country should be evaluated in the future. The original version of the SVEST was successfully used to evaluate the

phenomenon of second victims specifically in the obstetrics area in other countries^{36,37,48} and other studies have used midwives in their SVEST validation processes¹⁷, some in a high percentage (for example, 43.3% of the participants in the study by Knudsen et al. were midwives¹⁸). Regardless of the specialty, even though the SVEST is designed for use by any healthcare professional¹³, many of its validation studies have been carried out in populations made up of a specific profession, generally female nurses^{14-16,19}.

Another potential limitation can be identified by the type of sampling used. However, professionals from all regions of the country confirmed a number that we consider sufficient to be representative. Most of the validation studies had smaller sample sizes^{14-15,17-19}, except the study with the Chinese version¹⁶.

The method used for data collection should also be considered, which was able to influence the precision of the results, since perhaps the professionals who were more aware of the subject had greater participation. This aspect has also been pointed out in previous studies³⁶, but in our study, only a minimal percentage of participants indicated high knowledge of the subject (14.0% for the group that recognised second victim experiences and 6.3% for those who did not).

Finally, there is the limitation that the survey was conducted once, regardless of when the triggering adverse event occurred, which could introduce a recall bias, but this limitation is common for studies conducted on this phenomenon^{15,18,19,36}.

CONCLUSION

The process of adapting and validating the SVEST to the Spanish context resulted in a version (SVEST-E) that while maintaining the same items of the original questionnaire introduces changes in the organisation of its dimensions, containing 4 factors and the desired support responses. The results obtained show that this version of the instrument maintains adequate content validity, construct validity, reliability and temporal stability. Therefore, the SVEST-E is a valid tool to evaluate the experience of second victims in Spanish health professionals.

REFERENCES

- 1-Rigamonti D, Rigamonti KH. Achieving and Maintaining Safety in Healthcare Requires Unwavering Institutional and Individual Commitments. *Cureus*. 2021;13: e13192.
- 2-Eng DM, Schweikart SJ. Why Accountability Sharing in Health Care Organisational Cultures Means Patients Are Probably Safer. *AMA J Ethics*. 2020;22:E779-783.
- 3-Makary MA, Daniel M. Medical error-the third leading cause of death in the US. *BMJ*. 2016;353:i2139.
- 4-Haukland EC, Mevik K, von Plessen C et al. Contribution of adverse events to death of hospitalised patients. *BMJ Open Qual*. 2019;8:e000377.
- 5-Elizabeth Marran J. Supporting staff who are second victims after adverse healthcare events. *Nurs Manag (Harrow)*. 2019;26:36-43.
- 6-Rinaldi C, Leigheb F, Vanhaecht K et al. Becoming a "second victim" in health care: Pathway of recovery after adverse event. *Rev Calid Asist*. 2016;31 Suppl 2:11-9.
- 7-Wu AW. Medical error: the second victim. *West J Med*. 2000; 172:358-9.
- 8-Busch IM, Moretti F, Purgato M et al. Psychological and Psychosomatic Symptoms of Second Victims of Adverse Events: a Systematic Review and Meta-Analysis. *J Patient Saf*. 2020; 16:e61-e74.
- 9-Chan ST, Khong PCB, Wang W. Psychological responses, coping and supporting needs of healthcare professionals as second victims. *Int Nurs Rev*. 2017;64:242-62.
- 10-White RM, Delacroix R. Second victim phenomenon: Is 'just culture' a reality? An integrative review. *Appl Nurs Res*. 2020;56:151319.
- 11-Gupta K, Lisker S, Rivadeneira NA et al. Decisions and repercussions of second victim experiences for mothers in medicine (SAVE DR MoM). *BMJ Qual Saf*. 2019;28:564-573.
- 12-Burlison JD, Quillivan RR, Scott SD et al. The Effects of the Second Victim Phenomenon on Work-Related Outcomes: Connecting Self-Reported Caregiver Distress to Turnover Intentions and Absenteeism. *J Patient Saf*. 2021;17(3):195-199.
- 13-Burlison JD, Scott SD, Browne EK, et al. The second victim experience and support tool: validation of an organisational resource for assessing second victim effects and the quality of support resources. *J Patient Saf*. 2017;13: 93-102.
- 14-Kim EM, Kim SA, Lee JR et al. Psychometric Properties of Korean Version of the Second Victim Experience and Support Tool (K-SVEST). *J Patient Saf*. 2020;16:179-186.
- 15-Brunelli MV, Estrada S, Celano C. Cross-Cultural Adaptation and Psychometric Evaluation of a Second Victim Experience and Support Tool (SVEST). *J Patient Saf*. 2018 May 3. doi: 10.1097/PTS.0000000000000497. Epub ahead of print.
- 16-Chen J, Yang Q, Zhao Q et al. Psychometric validation of the Chinese version of the Second Victim Experience and Support Tool (C-SVEST). *J Nurs Manag*. 2019;27: 1416–22.

- 17- Scarpis E, Castriotta L, Ruscio E et al. The Second Victim Experience and Support Tool: A Cross-Cultural Adaptation and Psychometric Evaluation in Italy (IT-SVEST). *J Patient Saf.* 2021 Apr 14. doi: 10.1097/PTS.0000000000000812. Epub ahead of print.
- 18-Knudsen T, Abrahamsen C, Jørgensen JS et al. Validation of the Danish version of the Second Victim Experience and Support Tool. *Scand J Public Health.*2021 Apr 16: 14034948211004801.
- 19-Ajoudani F, Habibzadeh H, Baghaei R. Second Victim Experience and Support Tool: Persian translation and psychometric characteristics evaluation. *International Nurs Rev.*2021; 68:34-40.
- 20-Carrillo I, Ferrús L, Silvestre C, et al. Proposals for the study of the second victim phenomenon in Spanish Primary Care Centres and Hospitals. *Rev Calid Asist.* 2016;31 Suppl 2:3-10.
- 21-Mira JJ, Lorenzo S, Carrillo I, et al; Research Group on Second and Third Victims. Interventions in health organizations to reduce the impact of adverse events in second and third victims. *BMC Health Serv Res.* 2015 22;15: 341.
- 22-Mira JJ, Lorenzo S, Carrillo I et al; Research Group on Second and Third Victims. Lessons learned for reducing the negative impact of adverse events on patients, health professionals and healthcare organisations. *Int J Qual Health Care.* 2017;29:450-460.
- 23-Santana-Domínguez I, González-de la Torre H, Martín-Martínez A. Cross-cultural adaptation to the Spanish context and evaluation of the content validity of the Second Victim Experience and Support Tool (SVEST-E) questionnaire. *Enferm Clin (Engl Ed).* 2021:S1130-8621(21)00030-9.
- 24-Streiner DL, Norman G, Cairney J. *Health Measurement Scales: A Practical Guide to their Development and Use*, 5th Edition. In: Oxford University Press. 2015.
- 25-Eysenbach G. Improving the Quality of Web Surveys: The Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *J Med Internet Res.* 2004;6:e34.
- 26-Lorenzo-Seva, U. Promin: a method for oblique factor rotation. *Multivariate Behavioral Research.* 1999; 34,347-356.
- 27-Lorenzo-Seva U, Ferrando PJ. FACTOR9.2. A comprehensive programme for fitting exploratory and semiconfirmatory FACTOR analysis and IRT models. *Appl Psychol Meas.* 2013;37:497-8.
- 28-Lorenzo-Seva U, Ferrando PJ. FACTOR: a computer programme to fit the exploratory factor analysis model. *Behav Res Methods Instrum Comput.* 2006;38:88–91.
- 29-Ferrando PJ, Lorenzo-Seva U. Programme FACTOR at 10: origins, development and future directions. *Psicothema.* 2017;29: 236-241.
- 30-Ferrando PJ, Lorenzo-Seva U. A note on improving EAP trait estimation in oblique factor-analytic and item response theory models. *Psicologica.* 2016; 37: 235-247.

- 31-Ferrando PJ, Lorenzo-Seva U. Assessing the quality and appropriateness of factor solutions and factor score estimates in exploratory item factor analysis. *Educ Psychol Meas.* 2018; 78: 762-780.
- 32-Lorenzo-Seva U, ten Berge JMF. Tucker's Congruence Coefficient as a Meaningful Index of Factor Similarity. *Methodology.* 2006; 2: 57-64.
- 33-Strametz R, Koch P, Vogelgesang A et al. Prevalence of second victims, risk factors and support strategies among young German physicians in internal medicine (SeViD-I survey). *J Occup Med Toxicol.*2021;16:11.
- 34-Mok WQ, Chin GF, Yap SF et al. A cross-sectional survey on nurses' second victim experience and quality of support resources in Singapore. *J Nurs Manag.*2020; 28:286-293.
- 35-Winning AM, Merandi J, Rausch JR et al. Validation of the Second Victim Experience and Support Tool-Revised in the Neonatal Intensive Care Unit. *J Patient Saf.* 2020 Mar 13. doi: 10.1097/PTS.0000000000000659. Epub ahead of print.
- 36-Rivera-Chiauzzi E, Finney RE, Riggan KA et al. Understanding the Second Victim Experience Among Multidisciplinary Providers in Obstetrics and Gynaecology. *J Patient Safety.* 2021 Apr 16. doi: 10.1097/PTS.0000000000000850. Epub ahead of print.
- 37-Finney RE, Torbenson VE, Riggan KA et al. Second victim experiences of nurses in obstetrics and gynaecology: A Second Victim Experience and Support Tool Survey. *J Nurs Manag.*2021;29:642-652.
- 38-Pieretti A, Bastiani L, Bellandi T et al. Second Victim Experience and Support Tool: An Assessment of Psychometric Properties of Italian Version. *J Patient Saf.* 2021 Feb 2. doi: 10.1097/PTS.0000000000000825. Epub ahead of print.
- 39-Yan L, Tan J, Chen H et al. Experience and support of Chinese healthcare professionals as second victims of patient safety incidents: A cross-sectional study. *Perspect Psychiatr Care.* 2021 May 16. doi: 10.1111/ppc.12843. Epub ahead of print.
- 40-Kerkman T, Dijkman LM, Baas MAM et al. Traumatic Experiences and the Midwifery Profession: A Cross-Sectional Study Among Dutch Midwives. *J Midwifery Womens Health.* 2019;64:435-442.
- 41-van Steijn ME, Scheepstra KWF, Yasar G et al. Occupational well-being in pediatricians-a survey about work-related posttraumatic stress, depression, and anxiety. *Eur J Pediatr.* 2019;178:681-693.
- 42-Ruscio J, Roche B. Determining the number of factors to retain in an exploratory factor analysis using comparison data of known factorial structure. *Psychol Assess.* 2012; 24:282-92.
- 43-Ortega-Cejas CM, Roldán-Merino J, Lluch-Canut T et al. Reliability and validity study of the Spanish adaptation of the "Wijma Delivery Expectancy/Experience Questionnaire" (W-DEQ-A). *PLoS One.* 2021;16:e0248595.
- 44-Ferrando, Lorenzo-Seva U. Unrestricted item factor analysis and some relations with item response theory [Internet]. Department of Psychology, Universitat Rovira i Virgili, Tarragona; 2013. Available from:

<https://psico.fcep.urv.cat/utilitats/factor/documentation/technicalreport.pdf>. Accessed May 26, 2021.

45-Coughlan B, Powell D, Higgins MF. The Second Victim: a Review. *Eur J Obstet Gynaecol Reprod Biol.* 2017. 213:11-16.

46-Pettker CM. Systematic approaches to adverse events in obstetrics, Part I: Event identification and classification. *Semin Perinatol.* 2017;41:151-155.

47-Sheen K, Spiby H, Slade P. Exposure to traumatic perinatal experiences and posttraumatic stress symptoms in midwives: prevalence and association with burnout. *Int J Nurs Stud.* 2015;52:578-87.

48-Torbenson VE, Riggan KA, Weaver AL et al. Second Victim Experience among OBGYN Trainees: What Is Their Desired Form of Support?. *South Med J.* 2021; 114: 218-222.

Table 1. Sociodemographic characteristics of the sample, variables and SVEST scores

Variable	Feeling of second victim after being involved in an adverse event		
	Yes 436	No 253	
	M(SD)	M(SD)	
Age	45.73 (10.65)	39.49(9.16)	p= \leq 0.001*
Years of Professional Experience	17.34(10.54)	11.04(8.92)	p= \leq 0.001*
SVEST Total Score	3.27(0.48)	2.79(0.38)	p= \leq 0.001*
Dimension 1 - Psychological distress	4.14(0.79)	2.92(0.85)	p= \leq 0.001*
Dimension 2 - Physical Suffering	3.58(1.01)	2.50(0.90)	p= \leq 0.001*
Dimension 3 - Support from co-workers.	2.75(0.53)	2.70(0.58)	p=0.303
Dimension 4 - Supervisor support	2.85(0.96)	3.04(0.86)	p=0.007*
Dimension 5 - Institutional support	3.60(1.05)	3.60(0.86)	p=0.989
Dimension 6 - Non-work-related support	1.46(0.75)	1.99(0.75)	p= \leq 0.001*
Dimension 7 - Professional self-efficacy	3.88(0.85)	3.05(0.76)	p= \leq 0.001*
Dimension 8- Outcome variable 1 - Intention to change jobs	3.41(1.25)	2.40(1.14)	p= \leq 0.001*
Dimension 9- Outcome Variable 2 - Absenteeism	2.70(1.33)	2.15(0.96)	p= \leq 0.001*
	N (%)	N (%)	
Sex			p=0.374
Female	292 (67.0%)	161 (63.6%)	
Male	144 (33.0%)	92 (36.4%)	
Professional category			p=0.950
Obstetricians	204 (46.8%)	119 (47.0%)	
Midwives	232 (53.2%)	134 (53.0%)	
Marital status			p= \leq 0.001**
Married	198 (45.4%)	84 (33.2%)	
Single	121 (27.8%)	121 (47.8%)	
Divorced	49 (11.2%)	14 (5.5%)	

Separated	43 (9.9%)	22 (8.7%)	
Widower	16 (3.7%)	2 (0.8%)	
Other	9 (2.1%)	10 (4.0%)	
Highest level of education obtained			p= \leq 0.001**
University studies	130 (29.8%)	124 (49.0%)	
Expert degree	80 (18.3%)	49 (19.4%)	
Master's degree	135 (31.0%)	54 (21.3%)	
PhD's degree	77 (17.7%)	17 (6.7%)	
Other	14 (3.2%)	9 (3.6%)	
Type of centre			p= \leq 0.001**
Public Centre	372 (85.3%)	180 (74.1%)	
Private Centre	60 (13.8%)	68 (26.9%)	
Other centre types	4 (0.9%)	5 (2.0%)	
Department			p=0.002**
Hospital	290 (66.5%)	197 (77.9%)	
Primary Health Centre	146 (33.5%)	56 (22.1%)	
Knowledge of term "Second Victim" ^A			p=0.001**
Null	186 (42.7%)	140 (55.3%)	
Medium	189 (43.3%)	97 (38.3%)	
High	61 (14.0%)	16 (6.3%)	
Existence of second victim support programmes in the centre			p= \leq 0.001**
Yes	69 (18.8%)	22 (8.7%)	
No	256 (58.7%)	124 (49.0%)	
Does not know	111 (25.5%)	107 (42.3%)	
<p>A: Null = I have never heard of the term "second victim"/Medium = I have heard of the term "second victim" and know its meaning previously/High = I have extensive knowledge on the term "second victim"</p> <p>*= Statistically significant t student</p> <p>**= Statistically significant Pearson X²</p>			

Table 2. Factor loading (after rotation) of the obtained model (five factors F1 to F5) on the first sample (n = 360)

	F1 Desired forms of support	F2 Outcome variable (Intention to change Jobs/ Absenteeism)	F3 Physical distress	F4 Psychological distress, Colleague support, Non- work-related support and Professional self- efficacy	F5 Supervisor support and Institutional support
item1.1	0.031	0.033	0.289	0.378	0.118
item1.2	-0.089	0.019	0.512	0.429	0.076
item1.3	0.023	-0.296	0.651	0.333	0.042
item1.4	0.019	0.172	0.388	0.323	0.065
item2.1	0.115	-0.053	0.729	-0.011	-0.013
item2.2	-0.004	-0.091	0.980	-0.149	0.035
item2.3	0.022	0.288	0.858	-0.266	-0.014
item2.4	0.007	0.132	0.939	-0.247	-0.020
item3.1	-0.008	0.367	0.042	0.329	-0.045
item3.2	-0.021	0.007	-0.168	-0.555	0.105
item3.3	-0.041	0.423	0.072	0.344	-0.017
item3.4	-0.078	0.049	-0.084	-0.559	0.142
item4.1	0.004	0.109	-0.027	-0.065	0.824
item4.2	0.017	0.164	0.040	-0.133	0.872
item4.3	-0.164	-0.054	0.264	-0.020	0.160
item4.4	0.021	0.173	-0.081	-0.007	0.790
item5.1	0.046	-0.202	0.106	0.022	0.787
item5.2	-0.036	-0.291	0.109	0.113	0.815
item5.3	0.013	-0.187	-0.014	0.220	0.311
item6.1	-0.285	-0.081	0.105	-0.566	0.067
item6.2	-0.353	-0.129	0.086	-0.451	0.093
item7.1	-0.077	0.108	0.074	0.563	-0.049
item7.2	-0.165	0.141	0.123	0.646	0.001
item7.3	0.007	0.365	0.061	0.497	0.037
item7.4	0.027	-0.062	-0.219	0.492	0.043
item8.1	-0.021	0.503	0.321	0.072	0.061
item8.2	-0.082	0.574	0.352	0.044	0.036
item9.1	0.051	0.894	0.100	-0.252	-0.069
item9.2	0.043	0.976	0.077	-0.297	-0.123
item10.1	0.490	0.543	-0.200	0.044	0.192
item10.2	0.604	0.296	-0.183	0.165	0.203
item10.3	0.485	-0.149	0.053	0.238	0.112
item10.4	0.836	-0.165	0.078	-0.043	0.004
item10.5	0.774	-0.133	-0.008	-0.064	-0.193
item10.6	0.852	-0.006	0.132	-0.120	-0.001
item10.7	0.829	0.113	0.108	-0.240	-0.054

Factor loadings greater than 0.30 in bold

Table 3. Correlations (and 95% confidence intervals) between the factors of the model obtained by EFA

Factor	Factor	Correlation	95% CI
1	2	0.276*	(0.202 0.394)
1	3	0.487*	(0.460 0.558)
1	4	0.415*	(0.371 0.500)
1	5	0.008	(-0.060 0.125)
2	3	0.444*	(0.399 0.540)
2	4	0.520*	(0.500 0.599)
2	5	0.054	(-0.024 0.203)
3	4	0.623*	(0.629 0.635)
3	5	-0.086*	(-0.236 -0.021)
4	5	-0.095*	(-0.228 -0.026)

(*) Correlation significantly different from 0 ($p < 0.05$)

Table 4. Factor loadings (after rotation) of the obtained model (five factors F1 to F5) on the second sample (n = 329)

	F1 Desired forms of support	F2 Outcome variable (Intention to change Jobs/ Absenteeism)	F3 Physical distress	F4 Psychological distress, Colleague support, Non- work-related support and Professional self- efficacy	F5 Supervisor support and Institutional support
item1.1	-0,050	-0,155	0,133	0,687	0,085
item1.2	-0,010	-0,242	0,157	0,818	0,069
item1.3	0,037	-0,460	0,527	0,520	-0,052
item1.4	-0,055	0,033	0,232	0,680	0,094
item2.1	0,076	-0,079	0,672	0,193	0,032
item2.2	0,016	-0,153	0,825	0,069	-0,007
item2.3	-0,080	0,143	0,848	0,025	0,020
item2.4	-0,030	0,061	0,884	-0,024	0,005
item3.1	-0,145	0,294	0,017	0,516	0,024
item3.2	0,072	0,132	-0,037	-0,706	0,132
item3.3	-0,109	0,370	-0,010	0,500	0,070
item3.4	0,055	0,028	-0,036	-0,633	0,169
item4.1	-0,085	0,113	-0,039	-0,056	0,824
item4.2	-0,061	0,131	-0,028	-0,048	0,842
item4.3	-0,062	-0,100	0,063	0,115	0,063
item4.4	-0,079	0,156	0,004	-0,055	0,813
item5.1	0,087	-0,257	0,033	0,091	0,800
item5.2	0,101	-0,340	0,038	0,100	0,771
item5.3	0,136	-0,138	0,006	0,106	0,295
item6.1	-0,345	0,001	0,047	-0,413	0,145
item6.2	-0,304	0,044	0,040	-0,366	0,243
item7.1	0,064	-0,144	-0,032	0,767	-0,004
item7.2	0,044	-0,145	-0,087	0,863	0,040
item7.3	0,192	0,073	-0,007	0,710	0,037
item7.4	0,024	-0,047	-0,067	0,282	0,039
item8.1	-0,061	0,264	0,004	0,604	0,073
item8.2	-0,143	0,339	-0,017	0,620	0,088
item9.1	-0,066	0,835	0,030	0,073	-0,140
item9.2	-0,131	0,856	0,058	0,067	-0,163
item10.1	0,292	0,505	-0,143	0,231	0,125
item10.2	0,438	0,293	-0,103	0,198	0,097
item10.3	0,512	-0,170	-0,215	0,355	0,005
item10.4	0,719	-0,051	0,040	-0,068	0,021
item10.5	0,664	-0,105	0,088	-0,180	-0,169
item10.6	0,824	0,122	0,092	-0,169	0,077
item10.7	0,698	0,348	0,130	-0,256	0,076

.Factor loadings greater than 0.30 in bold

Table 5. Congruence indices of the data with the semi-specified factor model of 5 factors from the results of the EFA of the first sample

	Congruence index	95% CI
item1.1	0.974	(0.942, 0.997)
item1.2	0.978	(0.944, 0.998)
item1.3	0.754	(0.647, 0.882)
item1.4	0.922	(0.812, 0.981)
item2.1	0.908	(0.808, 0.986)
item2.2	0.965	(0.878, 0.995)
item2.3	0.966	(0.912, 0.992)
item2.4	0.990	(0.979, 0.998)
item3.1	0.698	(0.325, 0.918)
item3.2	0.968	(0.918, 0.996)
item3.3	0.614	(0.342, 0.865)
item3.4	0.948	(0.760, 0.994)
item4.1	0.975	(0.902, 0.995)
item4.2	0.975	(0.859, 0.994)
item4.3	0.351	(0.048, 0.997)
item4.4	0.966	(0.905, 0.988)
item5.1	0.940	(0.829, 0.986)
item5.2	0.899	(0.792, 0.974)
item5.3	0.794	(0.361, 0.989)
item6.1	0.773	(0.474, 0.977)
item6.2	0.739	(0.324, 0.956)
item7.1	0.994	(0.986, 1.000)
item7.2	0.986	(0.958, 0.999)
item7.3	0.939	(0.871, 0.990)
item7.4	0.951	(0.951, 0.995)
item8.1	0.592	(0.309, 0.836)
item8.2	0.676	(0.387, 0.873)
item9.1	0.967	(0.862, 0.994)
item9.2	0.965	(0.867, 0.995)
item10.1	0.592	(0.409, 0.822)
item10.2	0.836	(0.628, 0.963)
item10.3	0.657	(0.022, 0.918)
item10.4	0.969	(0.901, 0.995)
item10.5	0.904	(0.739, 0.979)
item10.6	0.985	(0.943, 0.998)
item10.7	0.913	(0.069, 0.973)

		95% confidence interval	
Individual measurements	Intraclass correlation	Lower limit	Upper limit
SVEST-E Total Score	0.97	0.94	0.99
Factor 2	0.98	0.95	0.99
Factor 3	0.95	0.89	0.98
Factor 4	0.98	0.96	0.99
Factor 5	0.97	0.94	0.99
<i>Two-factor mixed effect model in which the effects of people are random and the effects of the measures are fixed.</i>			

Table 6. Test-retest results

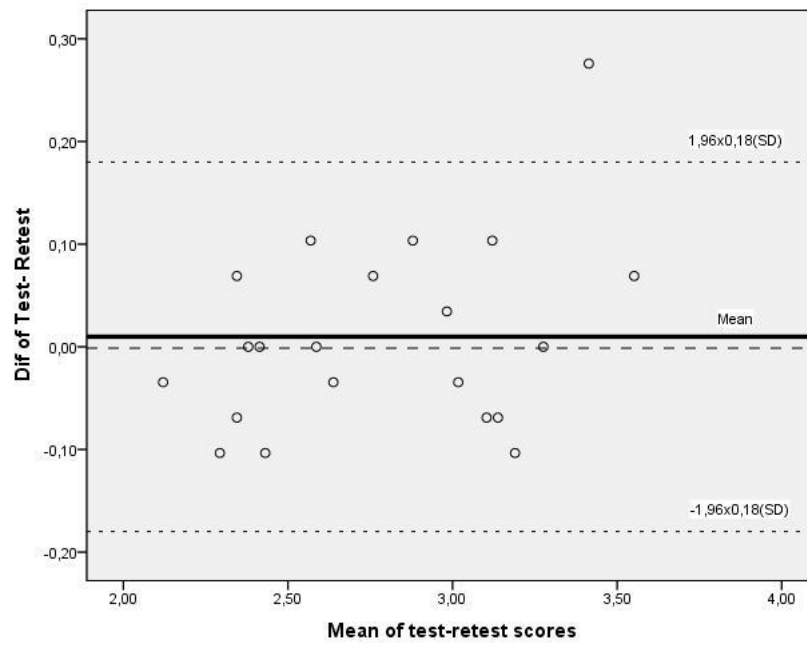


Figure 1. Bland-Altman plot for instrument stability