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# Stressors in anaesthetists - development and validation of a new questionnaire  Cross-sectional study

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| **Abstract:** | Background: Stress in anaesthetists is a common problem due to multiple factors related to patients, colleagues and organizations. This can lead to serious consequences such as depression, work-home conflicts and burnout.<br>Decrease anaesthetists stress and its consequences can be reached by reducing the number and magnitude of stressors or by increasing resilience strategies.<br>Evaluating stressors in the day-to-day life of anaesthetists is complex, and the existing tools are not sufficiently accurate.<br>Objective: We have created the Stressors Questionnaire in Anaesthetists (SQA), in order to qualify the sources of stress in anaesthetists` professional lives, and to measure the level of stress associated to these factors.<br>Design: A questionnaire-based cross-sectional design.<br>Settings: The study was conducted between 1st January 2014 and 30th December 2014, throughout different anaesthesia departments in Portuguese hospitals, in which 710 participants responded the questionnaires.<br>Method: We performed an exploratory analysis and two confirmatory analyses. The construct validity of the SQA was assessed via correlation with other stress measures, burnout and satisfaction with life, across these samples. Internal consistency reliability was assessed by Cronbach α.<br>Results: The exploratory analysis showed the SQA is a tri-dimensional instrument and confirmatory analysis showed the tri-dimensional structure presented good model fit. The three dimensions of SQA correlated positively with other stress measures and burnout and negatively with satisfaction with life.<br>Conclusions: SQA is a well-adjusted measure for assessing stressors in anaesthetists and includes clinical, organizational and team stress factors. Results showed that SQA is a robust and reliable instrument. SQA contributes for a better understanding of the |

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| | stress induction factors, which can lead to better stress management and anaesthetists' wellbeing. |
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**Article Title**

Stressors in anaesthetists – development and validation of a new questionnaire

*Cross-sectional study*



**Running head**

Stress evaluation in anaesthetists

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**ABSTRACT**

**Background.** Stress in anaesthetists is a common problem due to multiple factors related to patients, colleagues and organizations. This can lead to serious consequences such as depression, work-home conflicts and burnout.

Decrease anaesthetists stress and its consequences can be reached by reducing the number and magnitude of stressors or by increasing resilience strategies.

Evaluating stressors in the day-to-day life of anaesthetists is complex, and the existing tools are not sufficiently accurate.

**Objective**: We have created the *Stressors Questionnaire in Anaesthetists* (SQA), in order to qualify the sources of stress in anaesthetists` professional lives, and to measure the level of stress associated to these factors.

**Design:** A questionnaire-based cross-sectional design.

**Settings**: The study was conducted between 1st January 2014 and 30th December 2014, throughout different anaesthesia departments in Portuguese hospitals, in which 710 participants responded the questionnaires.

**Method**: We performed an exploratory analysis and two confirmatory analyses. The construct validity of the SQA was assessed via correlation with other stress measures, burnout and satisfaction with life, across these samples. Internal consistency reliability was assessed by Cronbach α.

**Results.** The exploratory analysis showed the SQA is a tri-dimensional instrument and confirmatory analysis showed the tri-dimensional structure presented good model fit.

The three dimensions of SQA correlated positively with other stress measures and burnout and negatively with satisfaction with life.

**Conclusions.** SQA is a well-adjusted measure for assessing stressors in anaesthetists and includes clinical, organizational and team stress factors. Results showed that SQA is a robust and reliable instrument. SQA contributes for a better understanding of the stress induction factors, which can lead to better stress management and anaesthetists' wellbeing.



Key words: Stress, anxiety, burnout.

## INTRODUCTION

Professional stress is a well-described problem in clinical anaesthesia that can lead to burnout [1-3] and may have a negative impact on physical and mental well-being, life situation and even patient care and health care system[3,4].

Managing the effects of stress in professional environments can occur through two pathways[5,6]. One is by limiting the exposure to work-related stressors, including the improvement of organizational factors[7,8]. A recent Cochrane review [9] concluded that the interventions need better focus on the reduction of specific stressors. However, the reduction of stressors in anaesthetic practice is limited by ineluctable characteristics of this speciality such as loss of control over practice and unpredictability. A logical alternative is the development of emotional-regulation strategies with potential to increase personal resilience to adverse conditions [8,10] and reduce pervasive psychological processes, which maintains psychopathological symptoms, such as rumination [11].

A significant number of tools are available for measuring the effects of stress in healthcare providers´ well-being [4], burnout [12,13], mental distress [14] and professional performance [15,16]. These tools are broadly used in studies evaluating these conditions in medical doctors of different specialities, including anaesthesia, and also in studies to measure the value of interventions to increase resilience against stress. Nevertheless, in order to accurately assess the efficacy and efficiency of an intervention in stress effects, we need to quantify not only the effects (the consequences of stress) but also the number and amplitude of stressors (the causes of effects).

To our knowledge, no appropriate instrument exists at the moment specifically for stressors evaluation in anaesthetists.

This paper describes the development of the Stress Questionnaire in Anaesthetists (SQA), the examination of its factor structure in an anaesthetist's sample, followed by item reduction. It further examines its factor structure in two other samples, and examines the concurrent, divergent and incremental validity through its correlation with a wide range of other measures of psychological processes and functioning.

## MATERIALS AND METHODS

An anonymous questionnaire-based survey was conducted across different Portuguese hospitals' anaesthesia departments. It included anaesthesia specialists and residents and was conducted between 1st January 2014 and 30th December 2014. Data was collected through self-reported questionnaires formed by demographic information, work experience, and measures of stress, anxiety, depression, burnout, emotional regulation psychological indicators and life satisfaction.

This study was approved by ethic commission of University. All questionnaires were completed anonymously and all participants gave informed consent, in a separate page.

### *Construction of the scale / Item development*

In order to qualify the sources of stress in anaesthetists' professional lives and to measure the level of stress associated with these factors, a questionnaire with 10 items was developed. Items in SQA were based on the items often reported as stressors[2,7,14,17], on expert knowledge and practice, and on definitions from autobiographical reports or descriptions made by anaesthetists suffering from stress disorders.

A panel of 12 experts, including anaesthetists, psychiatrists and experienced psychotherapists, agreed that items reflected pertinence and theoretical relevance and its terminology was accurate. This panel came up with a set of the following 10 items considered as inductors of stress in anaesthetists´ professional life:

- Patients in the highest degree of ASA classification;
- Complex surgical interventions;
- Anticipation of difficulty in intubation;
- Work off-site, with different team and equipment;
- Relationships with surgeons;
- Relationships with remaining anaesthetic team;
- Lack of working conditions;
- Inability to keep up to date (theoretical knowledge and new technologies);
- Organization of the anaesthesiology department;
- Lack of time or difficulty in organizing it.

Each SQA item contains a 0-10 visual analogue scale (VAS), a continuous measurement device [18], with higher values reflecting more severe stress induction. This type of scale allows reliable detection of small changes and is especially used in the fields of pain and fatigue research [19].

SQA was originally written in Portuguese, translated into English by a native English professional translator and then back translated into Portuguese by a bilingual Portuguese psychologist. The similarity of these Portuguese versions was judged to be satisfactory. Subsequent testing has been performed with the original Portuguese version (see SQA appendix).

***Participants***

The total sample was composed by 710 Portuguese anaesthetists (599 specialists and 111 residents) enrolled in public and private hospital anaesthesia departments, in total of 1254 portuguese specialists and 291 residents.

The specialists were randomly assigned into two different samples. In sample 1 (n=209) an exploratory factorial analysis was conducted. In sample 2 (n=390), we conducted a confirmatory factorial analysis. A second confirmatory factorial analysis was performed in a third sample composed of residents (n=111). The main characteristics of these samples are described in table 1.

---------- (Table 1) ----------

***Reliability and validity tests***

The reliability of SQA was assessed by computing Cronbach's α and composite reliability.

Construct validity was assessed via correlation with different measures, across the three different samples. We used the following measurement instruments:

- The short-form version of the Depression, Anxiety and Stress Scales (DASS-21), was developed by Lovibond and Lovibond [20] and translated and validated to Portuguese by Pais-Ribeiro, Honrado and Leal [21]. This is a self-reported scale composed by 21 items distributed in three subscales developed to measure symptoms of depression, anxiety and stress. In the original version, the authors found that all subscales have an adequate to good internal consistency with alpha's values of .81 for depression .73 for anxiety and .81 for stress subscales.
- The Copenhagen Burnout Inventory (CBI) proposed by Kristensen Borritz, Villadsen and Christensen[22] and translated and validated to Portuguese by Cesaltino Fonte [23]. It considers the fatigue and exhaustion as a central construct. The CBI is a 19-item questionnaire measuring three burnout sub-

dimensions: personal burnout (6 items), work-related burnout (7 items), and client-related burnout (6 items).

- Satisfaction With Life Scale (QWLS) developed by Diener, Emmons, Larsen and Griffin [24] and adapted to Portuguese by Simões [25]. It is a 5-item scale designed to measure global cognitive judgments of one's life satisfaction. The scale shows good convergent validity with other scales and with other types of assessments of subjective well-being.
- The Sheehan Disability Scale (SDS) was described by Sheehan [26] and was translated to Portuguese language by Pinto-Gouveia, Cunha and Salvador [27]. It includes three self-rated items designed to measure how work, social life, and family life are impaired by current psychiatric symptoms (e.g., panic, anxiety, phobia, or depression). Each item includes an 11-point analogue scale that uses visual-spatial, numeric and verbal descriptive anchors simultaneously to represent the degree of disruption. It is a widely used, brief, reliable and valid self-rated measure of impairment in functioning for use in mental health research and clinical practice.
- Ruminative Response Scale (RRS-10) was developed by Treynor, Gonzalez and Nolen-Hoeksema [28] and was translated and validated for Portuguese by Dinis, Pinto-Gouveia, Duarte and Castro [29]. It is a 10-item self-report instrument that assesses rumination, a psychological process that has been described as a self-focused coping style that involves repetitive thinking on personal negative feelings, as well as a pattern of self-reflection on the events that have led to these feelings and/or its consequences [30]. This scale is composed of two-factors: brooding and reflection, even though it might be used as an overall measure of rumination, using the 10 items total score, in which higher scores

mean more levels of rumination. The internal consistency of the original scale was α = 0.85 for the total scale.



It was predicted that the SQA would correlate positively with other stress, anxiety and depression measures such as DASS-21, as well as burnout syndrome evaluated by CBI, rumination. The SQA should also correlate negatively with measures associated with good functioning and well-being, such as SWLS.

***Analytical Plan***

The existence of univariate outliers was determined considering Z-scores (|Z|>3) and multivariate outliers through Mahalanobis distance (D2<0.0010). Normality was also assessed by coefficients of skewness (Sk) and Kurtosis (Ku).

Where individuals missed less than 5% of the items on the SQA, these missing items were prorated based upon their scores for the other SQA items. Where participants had ≥ 5% of items missing on the SQA, they were excluded from further analysis.

In sample 1, an exploratory analysis was performed to identify latent variables underlying the observed ones [31]. Three criteria were considered to determine the number of factors to retain: Kaiser`s criterion, scree-plot and percentage of variance explained ≥ 60% [32].

The adjustment of the model took into account the modification indexes (MI). To test if two different models were significantly different, the chi-square difference test was performed. The items' factor loadings (λ>=0.50) have also been analysed as it supplies information with regard to the amount of observed variables´ variance explained by the underlying latent variable factor.

In order to confirm the dimensional structure obtained in the previous step, it was conducted a confirmatory factor analysis across samples 2 and 3. For each sample, covariance matrices were used to analyse the measurement models and the model fit was assessed by maximum likelihood estimation. RMSEA is considered to be one of the most informative fit indices [33], and a reasonable fit if RMSEA lies between 0.05 and 0.08.

The models' overall adjustment was assessed by considering goodness-of-fit indices, namely chi-square ($\chi^2$), normed chi-square ($\chi^2$/df), Comparative Fit Index (CFI), Incremental Fit Index (IFI), root-mean square error of approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR). Normed chi-square values are considered acceptable if between 2 and 5 [34,35].

SPSS v.19 was used to implement all the descriptive and correlational procedures, and AMOS v.21 was used to conduct CFA.

## RESULTS

### *Exploratory Factor Analysis and Item Reduction*

For SQA 10 items, the Keiser-Meier-Olkin test of sampling adequacy (KMO) was 0.836, indicating a good degree of non-unique covariance amongst the set of items [36]. A significant Bartlett's test of sphericity ($\chi^2$ = 758.266, df = 45, p< 0.001) also indicated that the data were suitable for factor analysis.

According to the three criteria described, it was retained three dimensions to define the factors. It was inspected the matrices and no item was eliminated since all loadings were above 0.4 and none had loadings above 0.4 on more than one factor [37]. The final EFA of these 10 items resulted the factors explain 66.2% if the variance and are presented in table 2.

---------- (Table 2) ----------

These factors were, respectively, interpretable as clinical, team and organizational stress factors. The Cronbach's $\alpha$ reliability coefficients associated to these factors are also very good.

### *Confirmatory factor analysis and invariance of factor loadings*

Confirmatory factor analysis was conducted in samples 2 and 3, through which the SQA factor structure was confirmed. In anaesthesia residents (sample 3) the SQA items were the same, except for item 6, which resulted from the mean value of two additional items: relations with anaesthesia specialists and relations with the other anaesthesia residents.

With sample 2, results indicated no severe violation of normality (|Sk|<3 and |Ku|<10). There were no univariate (for each item |Z|<3) and multivariate (D2>0.0010) outliers. Model fit indices showed reasonable global fit (table 3).



---------- (Table 3) ----------

Model 1 presented reasonably model fit, according to its model fit indices. CFI reached the suggested cut-off value 0.90 [32], although IFI did not reach that value. Model 1 presented an RMSEA greater than 0.08. Finally, considering SRMR, it presented a value higher than 0.05, which suggest a poor fit of the model.

A second model (model 2) was also considered, based on the first model's Modification Indices (MI). Considering the MI´s values, it seems appropriate to test a new model in which items' errors (items II9 and II11, II4 and II6, and II5 and II6) are correlated. Since both II9 and II11 loads onto the Organizational Stress factor, and items II4 and II6, and II5 and II6 both loads onto the Team Stress factor, this might indicate that these items share variance, which provides a valid rational for correlating its errors. In fact, this model showed a better fit, as described in Table 3. The normed chi-square was lower than the value observed for model 1, but it was still above 2; CFI and IFI were both higher than 0.90; RMSEA shows a better fit (between 0.05 and 0.08); also SRMR confirms a better model fit, as SRMR is lower than 0.05. In fact, model 2 was significantly better than model 1 (DIFFTEST; $\Delta X^2$=56.998, df=3) (figure 1).

---------- (Figure 1) ----------

These results suggested reasonable composite reliability since Cronbach's $\alpha$ was 0.84 for clinical stress dimension, 0.72 for team stress dimension and 0.68 for organizational stress dimension. The calculated AVE were 0.66 for clinical stress, 0.48 for team stress and 0.33 for organizational stress, and it provides measure of individual item reliability. Discriminant validity was assessed by comparing AVE and the square of correlation ($r^2$) between factors. Good discriminant validity was obtained between clinical stress and team stress ($r^2$=0.31), between clinical stress and organizational stress ($r^2$=0.18), and between team stress and organizational ($r^2$=0.66).

Using sample 3, the confirmatory factor analysis (n= 111), and according to Sk values and Ku values, we assume that is not a severe violation of normality (|Sk|<3 and |Ku|<10). There were no univariate (for each item |Z|<3) and multivariate ($D^2$>0.0010) outliers.

Results from the residents' subgroup showed a poor model fit. However, the MI values suggested to test a model in which some errors were correlated (table 4), in particular errors associated with the following pairs of items: II1 and II2, and II4 and II6.

---------- (Table 4) ----------

Both II1 and II2 loads onto the clinical stress factor, and items II4 and II6 both loads onto the Team Stress factor. For that reason, we conducted a CFA with a model in which we correlated errors. This second model presented significantly better goodness-of-fit indices comparing with first model (DIFFTEST; $\Delta X2$=18.831, df=2) (figure 2).

---------- (Figure 2) ----------

Concerning the construct validity, the results suggest a reasonable composite reliability since Cronbach's $\alpha$ was 0.87 for clinic stress, 0.71 for team stress and 0.67 for organizational stress. The calculated AVE were 0.61 for clinic stress, 0.51 for team stress and 0.36 for organizational stress. Good discriminant validity was obtained between clinic stress and team stress ($r^2$=0.37), between clinic stress and organizational stress ($r^2$=0.13), and between team stress and organizational ($r^2$=0.46).

***Criterion validity***

This study was conducted in the total sample (N= 710). In the present study, the three subscales have shown high internal consistencies (depression subscale Cronbach's α= .90; anxiety subscale Cronbach's α= .88; stress subscale Cronbach's α= .88).

Table 5 shows the correlations between the SQA and other study measures, considering the three samples (n=710).

---------- (Table 5) ----------

The three subscales of SQA (clinical stress, team stress and organizational stress) correlated positively with burnout, the three dimensions of SDS scale, psychological inflexibility, stress, depression and anxiety and rumination. On the other hand, it correlates negatively with life satisfaction. These results indicate that the SQA has good construct validity.

## DISCUSSION



Stressors are characteristics that increase the probability of stress outcomes and have different effects in a variety of medical specialities [38]. It has been stated in literature the necessity to evaluate and explore the main stressors in anaesthetists in order to be able to better reduce negative stress consequences in personal and professional lives[2,14].

We developed the Stressors Questionnaire in Anaesthetists (SQA), a 10-item summated self-rating scale, for the assessment of stress induction factors in anaesthetists. SQA is a questionnaire that measures specific stressors and can be used to identify problems in working conditions of anaesthetists, to contribute to its improvement and encourage the development of wellness. In addition to developing an instrument that measures specific stressors in anaesthesia professionals, this study also sets out to explore its factor structure and psychometric properties, in order to establish its accuracy.

Although stress in anaesthetists has long been recognized as an increasing problem with serious complications, to our knowledge there is not a well-characterized instrument with reliable psychometric properties to quantify specific stressors in anaesthetists. One study measured stressors in anaesthetists, even though not using a well-validated instrument to do so [7]. Other studies used open questions as a way of assessing stress factors [39], and although a few instruments have been used to measure stressors in samples that

includes anaesthetists, they were not developed to grasp specific stressors in this area[38,40,41].



As a consequence of the lack of a suitable measure of stress factors, we are unable to compare our data with other instruments´ psychometrics. We must elucidate, then, the following issue: how are we able to prove that we are presenting a valuable tool for research and clinical purposes?

A first way to deal with this issue is employing standard criteria to scale validation: Results from the internal consistency analysis suggest that SQA is a reliable instrument for measuring stressors in anaesthetists, and confirmatory factor analysis showed that its three-factor structure presents a good fit. As a result, this study shows that the SQA is a robust and reliable measure. Respondents' feedback indicated that the scale was easy to use and that it may support anaesthetists' understanding of different stress factors. As the instrument only contains 10 items, the questionnaire can be integrated into everyday hospital work.

The three dimensions that resulted from the exploratory and confirmatory factor analyses characterize the different widely described stressors in anaesthesia [2,7,13,17,42]. Some inducers of stress that have been pointed out in anaesthetists are related to the organizational environment. In fact, these factors are the best documented inducers of stress in this population[2], and the result of the factor analyses confirmed it. The clinical dimension obtained through the factor analyses also confirms that anaesthetists endure stressful situations such as difficult airway prevision and more difficult, frail, vulnerable and demanding patients. Surgeries are getting more and more complex and this translates into a greater responsibility regarding patient`s life, which also

constitutes a source of stress. With respect to team dimension, anaesthesia is a service profession which demands that one adapts to team work, as different medical specialities request anaesthetists collaboration. Problems amongst team members are common and this atmosphere can lead to tension and conflicts [1].

Additionally, SQA showed to be a good measure of stressors in anaesthetists, which might be a valuable asset for the study of the impact of stress in this professional group. In fact, correlational analysis showed that SQA was positively associated with burnout, anxiety, depression, stress symptomatology and overall impairment in functioning. Additionally, SQA showed positive associated with rumination, which has been pointed out to be an important psychological factor in the development and maintenance of depression symptoms [43]. On the other hand, SQA was shown to be negatively correlated with satisfaction with life, which corroborates its validity. These correlations confirm that SQA seems to be a valuable instrument for studying stressors in anaesthetists and contribute for a better understanding of its impact in this group.

Bearing in mind the low number of items, the internal consistencies must be regarded as favourable. Moreover, the good results for the factor loadings in the CFA emphasize the (statistical) interrelatedness of the items in the scales.

SQA could be useful for research into stressors in other countries as well, although this remains to be shown. However, taking into consideration that at least within the western world, stressors are likely to be similar, SQA will be an important and valuable tool.

A second and definitive way to prove the usefulness of our tool will be achieved by future studies using it for two different aims:

One is in screening for signs of stress at work. It has been shown that chronic stress among health care personnel may be preventable, if cases at risk are identified at an early stage [44]. The authors consider that SQA could be an important tool in the identification of anaesthetists in risk of developing stress-related difficulties.

Another will be the evaluation of preventive strategies to increase stress resilience in professionals where interventions on stressors are anticipated as restricted and/or limited. If we want to prove the efficacy of these psychological approaches, we need to prove that intervention and control groups are submitted to similar stressors and, as far as we know, our tool is the first one for that purpose. Longitudinal studies are necessary to make conclusions with regard to the predictive validity of the questionnaire. Also, it would be desirable to collect additional data with the sample for the present study.

Some limitations should be taken into consideration, such as the cross-sectional nature of the current design, which does not allow us to establish causal relations, namely between the different variables correlated. When considering specifically the SQA, one limitation that can be pointed out is its paper-based format. In fact, when scoring the SQA, it is required a fair amount of time for reading the data: the exact position of each marking has to be determined by hand, which might also be a downside of it. It is worth considering that the situation changed considerably with computerization. The rise of Internet-based research led to the reduction of practical drawbacks associated with VASs, which have become a measurement device that could be used widely [45]. Future research should consider validating SQA using a VAS generator.

In conclusion, we have developed and validated a stress factor questionnaire in anaesthetists. The SQA, as presented here, is a reliable and valid questionnaire, which contributes to a more accurate assessment of different stressors in anaesthetists. SQA is a short, practical and thus economically effective instrument that might inform health services´ management of which factors should be taken into account in order to make the hospital work place a more appealing one. SQA adds to current research in contributing to a better understanding of the relationship between differences in demands in context and individual self-regulatory strategies. SQA contributes to improvement in anaesthetists' wellbeing and to the promotion of change towards a safety climate in healthcare.

**Conflict of Interest Statement**

The authors declare that there are no conflicts of interest.

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table

Table 1 – Samples' characteristics

| | | Sample 1 | Sample 2 | Sample 3 |
|---|---|---|---|---|
| Size | | 209 | 390 | 111 |
| Gender | Female | 146 (70.2%) | 270 (69.2%) | 75 (67.6%) |
| | Male | 62 (29.8%) | 120 (30.8%) | 36 (32.4%) |
| Age | < 40 years | 63 (30.1%) | 124 (31.8%) | 110 (99.1%) |
| | 40 – 49 years | 57 (27.3%) | 88 (22.6%) | 1 (0.9%) |
| | ≥ 50 years | 89 (42.6%) | 178 (45.6%) | 0 (0%) |
| | Mean ± Sd | 46.98 ± 9.95 | 46.64 ± 10.20 | 28.48 ± 2.2 |
| | Min - max | 30 - 72 | 29 - 69 | 25 - 40 |

Sd = Standard deviation; min = minimum; max = maximum

table

Table 2 –Initial exploratory factor analysis among anaesthetists (n= 209)

| Item | Factor 1 | Factor 2 | Factor 3 |
|---|---|---|---|
| ▪ Patients in the highest degree of ASA classification | **0.868** | -0.029 | 0.005 |
| ▪ Complex surgical interventions | **0.788** | -0.114 | 0,010 |
| ▪ Anticipation of difficulty in intubation | **0.446** | -0.137 | 0.353 |
| ▪ Work off-site, with different team and equipment | 0.199 | **-0.492** | 0.117 |
| ▪ Relationships with surgeons | 0.068 | **-0.743** | -0.068 |
| ▪ Relationships with remaining anaesthetic team | -0.027 | **-0,667** | 0.101 |
| ▪ Lack of working conditions | 0.152 | 0.113 | **0.731** |
| ▪ Inability to keep up to date | 0.189 | -0.041 | **0.516** |
| ▪ Organization of the anaesthesiology department; | -0.186 | -0.268 | **0.527** |
| ▪ Lack of time or difficulty in organizing it. | -0.108 | -0.110 | **0.494** |
| Eigenvalue | 4.219 | 1.471 | 0,930 |
| % variance explained | 42.2% | 14.7% | 9.3% |
| Cronbach's $\alpha$ | 0.818 | 0.717 | 0.735 |

table

Table 3 – Confirmatory Factor Analyses in anaesthetists sample (n=390)

| | χ2 | df | p value | NC | CFI | IFI | RMSEA | SRMR |
|---|---|---|---|---|---|---|---|---|
| Model 1. 3-factor SQA | 147.778 | 32 | <0.001 | 4.618 | 0.913 | 0.878 | 0.096 | 0.065 |
| Model 2. Correlated errors | 90,780 | 29 | < 0,001 | 3,13 | 0,954 | 0,954 | 0,074 | 0,049 |

NC=Normed chi-square (χ2/df**)**; CFI=Comparative Fit Index; IFI=Iterative Fit Index;
RMSEA=Root Mean Square Error of Approximation; SRMR=Standardised Root Mean Residual; df=degrees of freedom

Figure

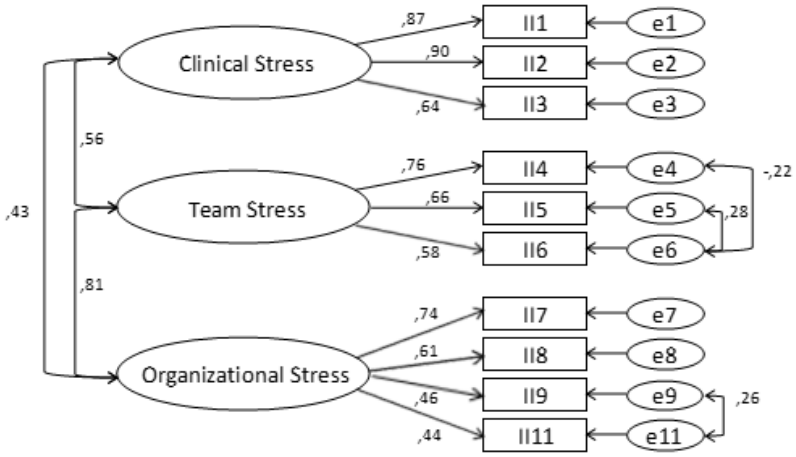


Figure 1. Item loading of the SQA in anaesthetists population (n=390)

table

Table 4 – Confirmatory Factor Analyses in residents sample (n=111)

| | χ2 | df | p value | NC | CFI | IFI | RMSEA | SRMR |
|---|---|---|---|---|---|---|---|---|
| Model 1. 3-factor SQA | 80.609 | 32 | <0.001 | 2.519 | 0.873 | 0.878 | 0.120 | 0.086 |
| Model 2. Correlated errors | 61.778 | 30 | 0.001 | 2.059 | 0.917 | 0.920 | 0.100 | 0.080 |

NC=Normed chi-square (χ2/df); CFI=Comparative Fit Index; IFI=Iterative Fit Index;
RMSEA=Root Mean Square Error of Approximation; SRMR=Standardised Root Mean Residual; df=degrees of freedom

Figure

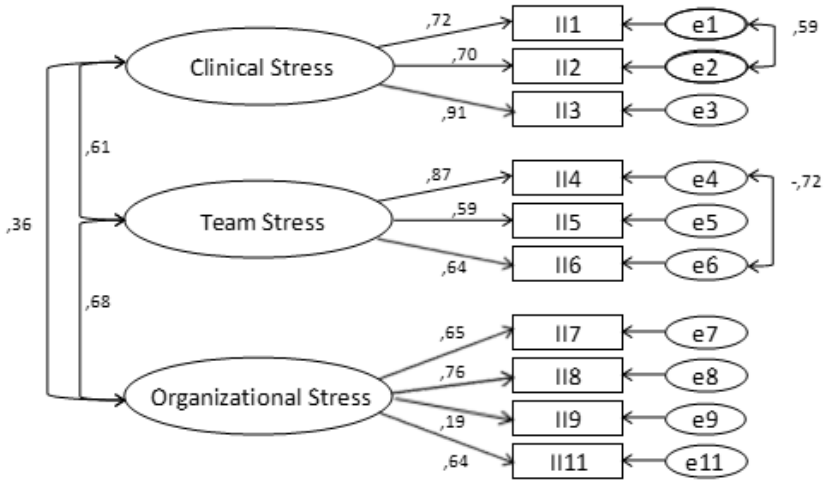


Figure 2. Item loading of SQA in the anaesthesia resident population (n=111)

table

Table 5 – Correlations between SQA and other constructs

| Measure | Clinical stress | | Team stress | | Organizational stress | |
|---|---|---|---|---|---|---|
| DASS21 - Stress | 0,178 | <0,001 | 0,258 | <0,001 | 0,306 | <0,001 |
| - Depression | 0,131 | 0,001 | 0,223 | <0,001 | 0,248 | <0,001 |
| - Anxiety | 0,134 | <0,001 | 0,238 | <0,001 | 0,234 | <0,001 |
| Burnout - personal | 0,238 | <0,001 | 0,356 | <0,001 | 0,462 | <0,001 |
| - work | 0,257 | <0,001 | 0,339 | <0,001 | 0,437 | <0,001 |
| - patient | 0,153 | <0,001 | 0,230 | <0,001 | 0,237 | <0,001 |
| SDS - work | 0,222 | <0,001 | 0,308 | <0,001 | 0,338 | <0,001 |
| - social life | 0,237 | <0,001 | 0,290 | <0,001 | 0,372 | <0,001 |
| - affective life | 0,216 | <0,001 | 0,319 | <0,001 | 0,363 | <0,001 |
| RRS - rumination | 0,219 | <0,001 | 0,236 | <0,001 | 0,249 | <0,001 |
| SWLS | -0,110 | 0,004 | -0,163 | <0,001 | -0,166 | <0,001 |

Supplemental Data File (doc, pdf, etc.)

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appendix1- SQA.docx