THE ASSESSMENT OF PATIENT SAFETY CULTURE – THE PSYCHOMETRIC STUDY OF THE SERBIAN VERSION OF THE QUESTIONNAIRE HOSPITAL SURVEY ON PATIENT SAFETY CULTURE

PROCENA KULTURE BEZBEDNOSTI PACIJENATA – PSIHOMETRIJSKA EVALUACIJA SRPSKE VERZIJE UPITNIKA O KULTURI BEZBEDNOSTI PACIJENATA

Branislava BRESTOPAVČKI SVITLICA1, Dragana MILUTINOVIĆ1, Andrea BOŽIĆ1, Srdan MALETIN2 and Ivica LALIĆ3

Summary

Introduction. The advancement of patient safety culture within a health institution is the basic component of reduction of errors and the improvement of the general quality of healthcare. The aim of this study was to assess the patient safety culture by means of Hospital Survey on Patient Safety Culture in the Serbian setting.

Material and Methods. The survey was conducted in five health institutions in the form of cross section study, which included 1,435 health care workers. Results. Nine dimensions have been selected out of 37 items by explorative factor analysis. The total percentage of positive response was 51%. The highest (70%) and the lowest (33%) percentage of positive responses were obtained in the dimensions “Overall perceptions of safety” and “Nonpunitive response to errors”, respectively. More than half of the respondents assessed the patient safety as excellent/very good. In the last 12 months, more than half of the respondents have not reported an adverse event.

Conclusions. The survey results indicate that changes are necessary in all domains of patient safety culture. Healthcare policy makers have to take responsibility for the implementation of safety culture in every health institution. Patient safety culture can be observed and advanced by full commitment of all those involved in the health care system, understanding both the causes of adverse events and errors, as well as by applying efficient methods to reduce them to the minimum.

Key words: Patient Safety; Safety Management; Quality of Health Care; Quality Assurance, Health Care; Hospitals; Medical Errors; Psychometrics; Serbia

Sažetak

Uvod. Unapređenje kulture bezbednosti u zdravstvenoj ustanovi osnovna je komponenta smanjenja grešaka i unapređenja opšte kvaliteta zdravstvene zaštite. Cilj ovog istraživanja je procena kulture bezbednosti pacijenata u Srbiji.

Materijal i metode. Istraživanje je provedeno u pet zdravstvenih ustanova u obliku studije preseka, anketiranjem 1.435 zdravstvenih radnika.

Rezultati. Eksplozivnom faktorskom analizom izdvojeno je devet dimenzija sa 37 ajtema. Ukupan procenat pozitivnih odgovora je 51%. Najveći procenat pozitivnih odgovora (70%) je u dimenziji Ukupna percepcija bezbednosti, a najmanji (33%) u dimenziji Nekažnjavajuće reakcije uprave na grešku. Više od polovine ispitanika ocenilo je bezbednost pacijenata kao odličnu/vrlo dobru.

Ključne reči: bezbednost pacijenta; upravljanje bezbednošću; kvalitet zdravstvene nege; obezbeđenje kvaliteta zdravstvene nege; bolnice; medicinske greške; psihometrija; Srbija
patient safety [1]. The questionnaire Hospital Survey on Patient Safety Culture (HSOPS) is a good choice for a comprehensive assessment of patient safety culture. It is well-structured and it has passed through a large number of confirmations of validity and reliability, with certain modifications when applied in different cultural context and different health systems. The results obtained by this questionnaire provide important information about the attitudes of health care workers, which can be used for planning the measures for the advancement of patient safety culture [4].

The assessment of patient safety culture can be conducted in all health institutions – it is simple, easily accessible and it provides significant data about the work methods of health care workers in the existing working conditions [5] and identifies areas for improvement and raises the awareness about patient safety.

**Patient Safety Culture in the Republic of Serbia**

The Republic of Serbia joined the programme of the World Health Organization (WHO) for the global patient safety in 2008. The Ministry of Health defined the Strategy for the continuous advancement of the quality of health care and patient safety in 2009 [6], and in 2010, the Ministry modified the Rulebook on the indicators of quality of health care from 2007 [6], where the indicators on patient safety were defined and the obligation about reporting adverse events was introduced. The agency for the accreditation of health institutions started to apply the procedure for the accreditation of health institutions on all levels of health care in 2011. The accreditation is voluntary and it includes the assessment of the quality of work according to the previously defined standards with the aim of continuous advancement of the quality of work and patient safety. Although in Serbia, which is a developing country, there are previously stated documents, the knowledge about the importance of patient safety culture is still insufficient.

According to the previously mentioned, the objectives of this paper are: to assess the validity and reliability of Hospital Survey on Patient Safety Culture on the surveyed population and to assess the dimensions of patient safety culture.

**Material and Methods**

**Sample**

The survey was conducted in the form of cross-sectional study, by surveying health care workers on the territory of the Province of Vojvodina in the Republic of Serbia. Two institutions are general hospitals of the secondary level of health care. Three institutions are of tertiary level, being the teaching bases of the Faculty of Medicine in Novi Sad at the same time.

The survey was conducted in the second half of the year of 2013. The target group included the health care workers who were directly or indirectly involved in the treatment and healthcare of patients (physicians and nurses, and those working in pharmacy, laboratory, radiological diagnostics).

Taking into consideration the probability of the low level of responses [7], the questionnaires were distributed to all health care workers who met the criteria for the study participation, which finally came to 2,750 questionnaires. The response rate to the survey was 52% (N=1435).

**The Study Instrument**

Hospital Survey on Patient Safety Culture (HSOPS) was developed by the Agency for Healthcare Research and Quality, AHRQ in 2003/04. The questionnaire was translated from English into Serbian by an expert for the English language, using the instructions of AHRQ for the translation of the questionnaire. The questionnaire was then translated back into English by another independent expert, who had not seen the original one. The questionnaire consists of 42 questions and the five-graded Likert scale is used to respond to most of the questions by giving the answers either "completely agree (5)" or "never (1)" and two questions that ask respondents to provide an overall grade on patient safety for their unit and the number of events they have reported over the past 12 months. According to the authors, and based on the psychometric analysis, the questionnaire contains three measuring categories: ward-level, hospital-level aspects of patient culture, and patient safety outcome variables, distributed in 12 dimensions [7].

**Statistical Analysis**

The authors used the following descriptive statistics for describing the sample on the studied variables; Kaiser-Meyer-Olkin Measure of Sampling Adequacy, Bartlett’s Test of Sphericity; Pearson coefficients of correlation for determining the correlation degree of two numeric variances; Exploratory factor analysis with principal component analysis (PCA) with Varimax rotation for the construct validity of the questionnaire; Cronbach alpha coefficients and inter-item correlations for testing the questionnaire reliability.

For Hospital Survey on Patient Safety Culture the percentage of positive replies is calculated, so that the five-degree scale is turned into the three-degree Likert scale. The total score of replies "I completely agree/1 agree" or "always/often" is calculated for positive items, depending on the category of the reply. The questionnaire contains 18 items whose negative replies "I completely disagree/1 disagree" or "never/rarely", or "sometimes". The percentage is calculated in total for the whole questionnaire, for each item separately (in order to avoid the items which greatly deviate or only few respondents replied to them), as well as for each dimension of the safety culture (each dimension has three to four items). According to the authors of this questionnaire, the percentage of positive responses being ≥75% is arbitrarily determined as
‘strong/high level’ of safety culture, and in the percentage of positive replies ranging from 66 to 74%, it is of medium strength, with the room for improvement; whereas in the items where the percentage of positive replies is ≤50%, there is a need for change and the advancement of safety culture [6].

Results

Most of the respondents (N=965, i.e. 68%) were nurses; the number of technicians (pharmacy, laboratory, radiological) and physicians was N=248 (17%) and N=222 (15%), respectively. One-third of the survey participants had work experience of 11–20 years (N= 488, i.e. 34%) and they were mostly non-managerial staff (N= 1270, i.e. 89%).

The Kaiser-Meyer-Olkin coefficient = 0.876, indicating common variance among the items and the Bartlett test of sphericity ($\chi^2$ =19604.42, df =1128, p=0.000) demonstrating inter-item correlation, are sufficient for conducting the factor analysis. By means of the techniques of PCA with Varimax rotation, totally 9 factors/subscales with 37 items were extracted (plus two more with additional questions E and G). These factors account for 52.17% of the total variance. The dimension Staff with its items (A2; A5.r; A7.r) was excluded from the analysis due to unacceptable values. The item A11, which belonged to the dimension Team work in a ward, was also excluded from the questionnaire; the item F9.r, within the dimension Hospital management support for patient safety, was excluded, as well.

Outcome dimensions remained the same as in the original model, and the dimensions on the level of hospital: Hospital management support for patient safety and Teamwork across hospital wards were grouped into one; Hospital handover and transfer remained the same, with added items F2r and F6r. The ward dimension: Organizational learning – Continuous improvement & Teamwork within ward were grouped into one dimension; Communication openness and Feedback and communication about error were also grouped into one dimension, with an added item A13; Manager expectations and actions promoting patient safety was divided into two dimensions, with the added item C6, and the dimension Non-punitive response to errors remained the same, with the added item A14 (Table 1).

Cronbach alpha for the whole questionnaire (including items E1 – Patient safety grade and G1- Number of events reported) was 0.87, and without the items E1 and G1 it was 0.88. Cronbach alpha values by dimensions are shown in Table 1.

The total percentage of positive responses was 51%. The highest (70%) and the lowest (33%) percentage of positive responses were in the dimension Overall perceptions of safety, and Non-punitive response to error, respectively (Table 1).

There was a significant positive correlation among almost all dimensions of the questionnaire, (Table 2). The lowest correlation was 0.06 between the dimensions Frequency of reported events and Non-punitive response to errors. The highest correlation was 0.56 between the dimensions Organizational learning – Continuous improvement & Teamwork within a ward and Manager’s expectations.

Patient safety was assessed as very good, excellent and bad by N=564 (40%), N=363 (25%) and N=18 (1%) respondents, respectively. Seven hundred and twenty-one (52%) respondents did not report a single adverse event for the previous 12 months.

Discussion

Hospital Survey on Patient Safety Culture was first used in the USA, where it was created, and since then it has been widely used in about 30 countries around the world and translated into 18 languages [7–9]. By means of Exploratory factor analysis in this study, 9 factors with 37 items were separated, and it can be noticed that there is a certain grouping of some dimensions with a few items which changed the original layout, which is acceptable for further analysis. Most authors who did the assessment of safety culture with the questionnaire HSOPS obtained similar result, with 8 [10], 9 [11], 10 [12, 13] and 11 factors [14–16], where there were also some items in the questionnaire which changed the original layout, and some dimensions were grouped. In this survey, the dimension Staff was excluded from further analysis because Cronbach alpha coefficient is lower than it is acceptable, if it is present in the analysis. Blegen (2009 also excluded this dimension from the analysis, although it represents an important perception of health workers about the organization of staff, which definitely influences patient safety [14]. Taking into consideration the fact that this dimension has the lowest Cronbach alpha coefficient in several other studies [17, 18], it is recommended to modify the items in this dimension, in order to obtain more relevant data about staff [15, 16].

Outcome dimensions with the item Number of reported events and Patient safety grade are in a negative correlation with other dimensions of patient safety culture. The reason for the negative correlation could be the fact that this dimension has one item, while others have more items in their structure. Similarly to this study, neither has Ito (2011) found a strong relationship between these two dimensions and other dimensions of patient safety culture, which is explained by the fact that a large number of respondents has reported ‘none’ or ‘1-2 adverse events’ for the previous 12 months [8]. Most authors have a similar explanation for a weak relationship with other dimensions. This item could be taken more as a descriptive variable than the outcome dimension [9, 10, 16, 18, 19].

The Assessment of Patient Safety Culture

The total percentage of positive responses of the surveyed sample is 51%. Similar results can be found in several studies as well, regardless of the differently organized health care system and cultural differences [12, 19–21]. In this research there is no dimension with a percentage of positive re-
Table 1. Factor analysis of “Hospital Survey on Patient Safety Culture” (HSOPSC)

| Item                                                                 | F1   | F2   | F3   | F4   | F5   | F6   | F7   | F8   | F9   | Cronbach α | Average % of positive responses/prosečan % pozitivnih odgovora |
|----------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------------|-------------------------------------------------------------------|
| **Organizational learning – Continuous improvement & Teamwork within ward** |      |      |      |      |      |      |      |      |      |            |                                                                   |
| Učenje u organizaciji/kontinuirano upravljanje i timski rad na odeljenju |      |      |      |      |      |      |      |      |      | 0.76       | 63                                                                 |
| A1. People support each other in a ward./Na odeljenju ljudi podržavaju jedni druge. |      |      |      |      |      |      |      |      |      | 0.70       |                                                                    |
| A3. When a lot of work has to be done quickly, we work as a team to do the work./Kada mnogo posla treba da se uradi brzo, mi radimo kao tim da bi se završio posao. |      |      |      |      |      |      |      |      |      | 0.64       |                                                                    |
| A4. In this ward, people treat each other with respect./Na odeljenju ljudi se međusobno ophode sa poštovanjem. |      |      |      |      |      |      |      |      |      | 0.74       |                                                                    |
| A6. We are actively doing things to improve patient safety./Mi aktivno radimo na poboljšanju bezbednosti pacijenata. |      |      |      |      |      |      |      |      |      | 0.39       |                                                                    |
| A9. Noticed errors lead to positive changes in the ward./Uočene greške su dovele do pozitivne promene na odeljenju. |      |      |      |      |      |      |      |      |      | 0.31       |                                                                    |
| **Hospital handover and transfer/Primopredaja i premeštaž pacijenata na jednog odeljenja na drugo** |      |      |      |      |      |      |      |      |      | 0.78       | 51                                                                 |
| F2. r Hospital wards do not cooperate well among each other./Bolnička odeljenja međusobno ne saraduju dobro. |      |      |      |      |      |      |      |      |      | 0.50       |                                                                    |
| F3. r Things “fall between the cracks” when transferring patients from one ward to another./Kada se pacijenti premeštaju sa jednog odeljenja na drugo, dolazi do propusta. |      |      |      |      |      |      |      |      |      | 0.67       |                                                                    |
| F5. r Important patient care information is often lost during shift changes./Važne informacije o pacijentu se često gube u primopredaji smene. |      |      |      |      |      |      |      |      |      | 0.71       |                                                                    |
| F6. r It is often unpleasant to work with the staff from another ward of the hospital./Često je neprijatno raditi sa osobljem sa drugog odeljenja bolnice. |      |      |      |      |      |      |      |      |      | 0.64       |                                                                    |
| F7. r Problems often occur in the exchange of information across hospital wards./Problemi se često javljaju u razmeni informacija između odeljenja. |      |      |      |      |      |      |      |      |      | 0.75       |                                                                    |
| F11 r Shift changes are problematic for patients in this hospital./Promena smene je često problem za pacijentu. |      |      |      |      |      |      |      |      |      | 0.51       |                                                                    |
| **Frequency of events reported/Učestalost izveštavanja o neželjenom događaju** |      |      |      |      |      |      |      |      |      | 0.91       | 53                                                                 |
| D1 When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?/Kada se napravi greška, ali je uočena i ispravljena pre nego što je naškodila pacijentu, koliko često ju prijavite? |      |      |      |      |      |      |      |      |      | 0.92       |                                                                    |
| D2 When a mistake is made, but has no potential to harm the patient, how often is this reported?/Kada se napravi greška, ali ne postoji nikakva potencijalna šteta po pacijentu, koliko često prijavite? |      |      |      |      |      |      |      |      |      | 0.93       |                                                                    |
| D3 When a mistake is made that could harm the patient, but does not, how often is this reported?/Kada se napravi greška koja bi mogla da nanese štetu pacijentu, ali nije, koliko često prijavite? |      |      |      |      |      |      |      |      |      | 0.88       |                                                                    |
**Non-punitive response to error/Nekažnjavajuće reakcije uprave na grešku**

| A8.r | Staff feel like their mistakes are held against them./Osnovlje oseća da im se njihove greške prispisu kao njihov nedostatak. | 0.53 |
| A12.r | When ‘an event’ is reported, the emphasis is on the person, not on the problem./Kada se „događaj“ pravi, akcent je na osobi a ne na problemu. | 0.46 |
| A14.r | We work in “crisis mode” trying to do too much, too quickly./Mi radimo u „kriznom režimu”, pokušavajući da uradimo previše i isuviše brzo. | 0.58 |
| A16. r | Staff worry that mistakes they make are kept in their personnel file./Osnovlje brine da će greške koje su napravili biti sačuvane u dosjeđima u kadrovskoj službi. | 0.59 |

**Overall perception of safety/Ukupna percepcija bezbednosti**

| A10.r | It is just by chance that more serious mistakes don’t happen around here./Samo je slučajnost što se ovde ne dešavaju ozbiljne greške. | 0.39 |
| A15. | Patient safety is never sacrificed so as to do more work./Bezbednost pacijenata nikad nije žrtovana da bi se obavilo više posla. | 0.53 |
| A17.r | We have patient safety problems in this ward./Pacijentova bezbednost je problem na ovom odeljenju. | 0.50 |
| A18. | Our procedures and systems are good at preventing errors from happening./Naše procedure i sistem rada su dobru u sprečavanju grešaka. | 0.36 |

**Feedback and communication about error/Otvorena komunikacija o greškama i povratan odgovor**

| C1. | We are given feedback about changes put into place based on event reports./Dobijamo povratne informacije o promenama na osnovu izveštaja o neželjenim događajima. | 0.59 |
| C2. | Staff will freely speak up if they see something that may negatively affect patient care./Osnovlje će slobodno reći ako vide da nešto može negativno uticati na negu pacijenata. | 0.64 |
| C3. | We are informed about errors that happen in this ward./Svi smo informisani o greškama koje se dešavaju na ovom odeljenju. | 0.69 |
| C4. | Staff feel free to question the decisions or actions of those with more authority./Osnovlje slobodno preispituju odluke i postupke onih sa više ovlašćenja. | 0.56 |
| C5. | In this ward, we discuss ways to prevent errors from happening again./Na ovom odeljenju razgovaramo o načinima da sprečimo ponavljanje grešaka. | 0.59 |
| A13. | After we make changes to improve patient safety, we evaluate their effectiveness./Nakon što uvedemo promene da bismo poboljšali bezbednost pacijenata, mi procenimo njihovu delotvornost. | 0.41 |

**Hospital management support for patient safety and Teamwork across hospital wards Podrška bolničkog rukovodstva bezbednosti pacijenata i timski rad između odeljenja**

| F1. | Hospital management provides a work climate that promotes patient safety./Menadžment bolnice omogućava radnu klimu koja potpomaže bezbednost pacijenata. | 0.65 |
| F4 | There is good cooperation among hospital wards that need to work together./Postoji dobra saradnja između odeljenja koja treba da rade zajedno. | 0.46 |
responses ≥75% which is arbitrarily determined as a high level of safety culture.

The value of the dimensions which are related to the managing staff and open communication implies that there is a need for changes and that there should be a traditional concept of management. Managers of health institutions in Serbia are doctors with years of experience in healthcare, but without experience in the field of management. Similar results, in the sense of inadequate support of the management, were obtained by a few other researchers [19, 22, 23]. Low values of positive responses in the dimensions Frequency of reported events and Non-punitive response to error have also been obtained by other researchers [12, 14, 19, 22]. The system of reporting adverse events and errors is not sufficiently developed in health institutions where the survey was conducted. The readiness of health workers to report an adverse event depends on their belief that those events will be analyzed and that appropriate changes will be conducted, which could prevent adverse events and errors [24]. In most studies staff expresses justified concern that they would be punished, so they rarely report adverse events [22–25].

The outcome dimension Overall perception of safety has the highest values of positive responses. This domain has been identified in several studies as a problematic one [12, 22]. Differences in culture may be the reason why the attitude of our respondents is more positive; and another reason could be the unwillingness of the staff to express a negative opinion about their workplace, which can be confirmed by the fact that more than one half of the respondents assess patient safety as excellent/very good.

 Responses ≥ 75% which is arbitrarily determined as a high level of safety culture.

The value of the dimensions which are related to the managing staff and open communication implies that there is a need for changes and that there should be a traditional concept of management. Managers of health institutions in Serbia are doctors with years of experience in healthcare, but without experience in the field of management. Similar results, in the sense of inadequate support of the management, were obtained by a few other researchers [19, 22, 23]. Low values of positive responses in the dimensions Frequency of reported events and Non-punitive response to error have also been obtained by other researchers [12, 14, 19, 22]. The system of reporting adverse events and errors is not sufficiently developed in health institutions where the survey was conducted. The readiness of health workers to report an adverse event depends on their belief that those events will be analyzed and that appropriate changes will be conducted, which could prevent adverse events and errors [24]. In most studies staff expresses justified concern that they would be punished, so they rarely report adverse events [22–25].

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"how and why the error happened" [27]. One of the problems is that certain errors are really such that those who have made them should be blamed for them and held responsible.

Limitations of the study
Since this is the first survey on the topic of safety culture in Serbia, it can be a starting point for raising the consciousness about the importance of patient safety culture. In this study, there is a remarkably larger number of nurses who participated in this survey, which can be noticed in other surveys as well. Apart from the fact that nurses make the majority of the employees in health institutions, there is a dilemma in the survey results interpretation whether the obtained results are attitudes of health workers or attitudes of nurses and a small number of physicians.

Conclusion
The study results suggest that safety culture is yet to be developed, as there are several areas for improvement including error reporting, non-punitive response to error, communication, activities and support of the hospital manager and teamwork across hospital units. Survey results indicate that those who are responsible for the creation of health policy in Serbia have to take responsibility for the implementation of safety culture in every health institution. Further research is needed to study the association between patient safety culture and clinical outcomes, financial indicators, quality, patient satisfaction and job satisfaction. The advancement of patient safety culture has to be a priority strategic goal of a health institution.

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Table 2. Correlation matrix by dimensions

| Dimension/Dimenzija | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|---------------------|----|----|----|----|----|----|----|----|----|----|
| Organizational learning – Continuous improvement & Teamwork within a ward/Uslovljenost napredovanja i timski rad na odjeljku |  |  |  |  |  |  |  |  |  | 0.26* |
| Hospital handover and transfer/Primopredaja i premeštaj pacijenta sa jednog odjeljka na drugo |  |  |  |  |  |  |  |  |  | 0.26* |
| Frequency of reported events/Učestalost izveštavanja o neželjenom događaju | 0.17* | 0.10* |  |  |  |  |  |  |  |  |
| Non-punitive response to error/Nekažnjavajuće reakcije uprave na grešku | 0.20* | 0.31* | 0.06* |  |  |  |  |  |  |  |
| Overall perception of safety/Ukupna percepcija bezbednosti | 0.44* | 0.37* | 0.15* | 0.29* |  |  |  |  |  |  |
| Feedback and communication about error/Otvorena komunikacija o greškama i povratan odgovor | 0.51* | 0.30* | 0.30* | 0.22* | 0.35* |  |  |  |  |  |
| Hospital management support for patient safety and Teamwork across hospital wards/Podrška bolničkog rukovodstva bezbednosti pacijenata i timski rad između odjeljaka | 0.45* | 0.46* | 0.15* | 0.19* | 0.36* | 0.42* |  |  |  |  |
| Activities of the manager for the promotion of safety/Aktivnosti rukovodilaca na promociji bezbednosti | 0.14* | 0.26* | 0.09* | 0.26* | 0.26* | 0.13* | 0.08* |  |  |  |
| Manager’s expectations/Očekivanja rukovodilaca | 0.56* | 0.32* | 0.12* | 0.26* | 0.35* | 0.52* | 0.42* | 0.15* |  |  |
| Patient safety grade/Ocena bezbednosti pacijenata na odjeljku | -0.37* | -0.33* | -0.17* | -0.19* | -0.42* | -0.37* | -0.39* | -0.13* | -0.31* |  |
| Number of events reported/Broj prijavljenih neželjenih događaja | -0.10* | -0.09* | 0.14* | -0.04 | -0.15* | 0.01 | -0.08* | -0.01 | -0.09* | 0.10* |

*p<0.05
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