The Multidimensional Scale of Perceived Social Support (MSPSS): Reliability and Validity of Russian Version

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The Multidimensional Scale of Perceived Social Support (MSPSS): Reliability and Validity of Russian Version

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ABSTRACT

Objective: To assess factorial and construct validity along with reliability of the Russian version of the Multidimensional Scale of Perceived Social Support (MSPSS) in cardiac patients.
Methods: The study included 1018 patients with coronary artery disease. All patients were offered the opportunity to complete a questionnaire to detect psychosocial risk and protective factors, including the MSPSS.
Results: Internal consistency of the Russian version of the MSPSS was high: Cronbach's alpha coefficient in the group of patients with stable angina was .91 vs. .90 in the group with acute coronary syndrome. The three-factor structure of the MSPSS was proved with exploratory and confirmatory factor analyses. As expected, the Russian version of the MSPSS was negatively correlated with measures of anxiety and depression, and positively correlated with curiosity.
Conclusions: The Russian version of MSPSS corresponds closely with the English version in reliability, consistency, and internal structure. Test–retest reliability was satisfactorily high and construct validity was supported with the results of the correlation analysis.
Clinical Implications: Our study confirms that MSPSS questionnaire is a high valid tool to estimate social support and it can be successfully applied to define social support in patients with cardiac pathology.

Introduction

A number of studies have demonstrated that social support works as a barrier or a buffer against the harmful pathogenic effects of stress (Gariepy, Jonkaniemi, & Quesnel-Valee, 2016; Rueger, Malecki, Pyun, Aycock, & Coyle, 2016). In cardiology practices, low social support is associated with a high level of emotional stress, difficulties in initiating and maintaining modifications of behavioral risk factors, significant progression of coronary artery disease (CAD) symptoms and with worse prognosis in patients with cardiovascular disease (CVD) (Burg et al., 2005; Wang, Mittleman, Leineweber, & Orth-Gomer, 2006). A recent meta-analysis by Holt-Lunstad, Smith, and Layton (2010), which included 148 studies (308,849 participants), showed that individuals with adequate social support had a 50% greater likelihood of survival compared to those with poor or insufficient social support. Furthermore, a systematic review by Mookadam and Arthur (2004) showed that social isolation increased the risk of death by nearly two-thirds among patients after myocardial infarction (MI). Considering the proven relationship between low social support and unfavorable prognosis in patients with CVD, determination and measuring the level of social support in such patients may be useful in clinical practice (Krumholz et al., 2005).

The Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet, Dahlem, Zimet, and Farley (1988) is frequently used to assess social support levels in clinical and sociological studies. The MSPSS is concise, convenient and easy to complete. It contains 12 questions, each with a 7-point response option (from "very strongly disagree" to "very strongly agree"), and is designed to measure the individual's perception of social support. The MSPSS

has been proven effective and reliable across studies (Frasure-Smith et al., 2000; Pedersen, Spinder, Erdman, & Denollet, 2009) and studies across multiple countries have demonstrated good reliability for the MSPSS, with Cronbach's alpha values ranging from .84 to .93 (Tonsing, Zimet, & Tse, 2012; Wongpakaran, Wongpakaran, & Ruktrakul, 2011; Zimet, Powell, Farley, Werkman, & Berkoff, 1990). A number of studies showed that among patients with CAD a low level of social support, as defined according to the MSPSS, was associated with the progression of the disease, and as a consequence, with a worse prognosis (Frasure-Smith et al., 2000; Lett et al., 2005).

Thus, the MSPSS may be a useful method for social support assessment in cardiac patients in order to identify high-risk groups. However, the MSPSS has not previously been translated into Russian. Secondly, in order to use a Russian-language version of the MSPSS, it is necessary to assess the reliability and validity of the Russian translation (Zarochentsev & Khudyakov, 2005). The main purpose of this study, therefore, was to evaluate factorial and construct validity, along with reliability, of a Russian translation of the MSPSS in cardiac patients.

Methods

Sample

The study included 1018 patients with CAD who underwent coronary stenting in Tyumen Cardiology Research Center. The patients were divided into two groups: Group 1 included 359 patients with acute coronary syndrome (ACS) (range, 33–90 years; mean age, 60.5 ± 10.9 years; 68.0% men); and Group 2 included 659 patients with stable angina (SA) (range, 33–85 years; mean age, 58.0 ± 8.8 years; 78.9% men). All patients were asked to complete a questionnaire to detect psychosocial risk factors including assessment of perceived social support using the MSPSS. The response rate to the questionnaire was 91.4% in patients with ACS and 97.1% in SA patients. We analyzed psychometric indices of the MSPSS in both groups separately in order to show that this scale can be successfully used in the case of life threatening conditions such as ACS and in the case of stable CAD.

The study conformed to the Helsinki Declaration; the local ethics committee approved the research protocol and all patients provided written informed consent.

Measures

The MSPSS was used to assess the level of perceived social support. It was translated into Russian following the relevant standard algorithm, which includes redaction and expert assessment of two independent translations made by a professional bilingual linguist and a psychologist experienced with working with psychological tests. At the final stage the equivalence of the translation was checked by back-translation and a final version of the Russian MSPSS was established (Zarochentsev & Khudyakov, 2005).

The MSPSS is composed of 12 items, each with a 7-point Likert-type response option that ranges from "very strongly disagree" (1) to "very strongly agree" (7) (Zimet et al., 1988). Thus, for each question a subject could indicate a score from 1 to 7. A total scale score can be calculated by summing across the responses for all questions, with a potential range from 12 to 84. The higher the score, the higher the level of perceived social support. The MSPSS has three subscales: "Friends" (Questions 6, 7, 9, and 12), "Family" (Questions 3, 4, 8, and 11) and "Significant Others" (Questions 1, 2, 5, and 10).

To evaluate the construct validity of the questionnaire the following additional scales were administered: the Hospital Anxiety and Depression Scale (HADS) and the 8-factor personality questionnaire, the State-Trait Personality Inventory (STPI) of Spielberger-Radyuk.

The HADS consists of a series of 14 questions with two equal subscales to measure the symptoms of anxiety and depression (score range, 0–21) (Bjelland, Dahl, Haug, & Neckelmann, 2002). A 4-point Likert scale (ranging from 0 to 3) is used for each question. The scale has been validated in many countries, including the Russian Federation, and it is established as a valid and reliable questionnaire for identifying anxiety and depression symptoms with Cronbach's alpha

values from .67 to .93 for both subscales (Andrushchenko, Drobizhev, & Dobrovolsky, 2003; Bjelland et al., 2002).

The STPI, which was also used to validate the MSPSS (Spielberger & Reheiser, 2009), is a textual set of 80 stimulus statements characterizing the state and behavior of a person in different life situations (Radyuk, 2009).

The Spielberger-Radyuk 8-factor personality inventory is designed for measuring the levels of situational (reactive) and personality characteristics such as curiosity, aggression, anxiety and depression in adults. The questionnaire consists of two parts with 40 statements in each: the first part with scales assessing the patient's condition at the time of the survey, the second part with scales for personality assessment along with predispositions to experience a certain emotion. Each of the eight scales (both the first and second parts of the questionnaire) includes 10 stimulus statements with each criterion evaluated using a 4-point Likert scale (Radyuk, 2009). In our study we used the second part of the questionnaire, which is used to assess personality characteristics, such as aggression, anxiety, depression and curiosity. The STPI has been translated and validated into Russian. The Russian version has a high level of reliability, where the Cronbach's alpha for the 8-scale questionnaire varies from .86 to .92 (Radyuk, 2009).

Statistical Analysis

The statistical analysis was carried out using IBM SPSS Statistics 21 and IBM SPSS Amos 21 (Armonk, NY: IBM Corp) according to the variation statistics rules (Medik & Tokmachev, 2007).

The correspondence between the distribution of test results and the law of normal distribution was evaluated using the Kolmogorov-Smirnov test. Comparison of sampled mean ranks between two independent groups was performed using the nonparametric Mann-Whitney test. The categorical variables were compared by means of the chi-square test (χ^2).

To assess the reliability and validity of the Russian version of the MSPSS methods previously described in the literature were used (Clark & Watson, 1995; Gessmann & Sheronov, 2013).

Reliability, as indicated by stability over time, was determined by repeated testing using the intragroup correlation coefficient. For this purpose, 55 patients from both groups were re-tested with the MSPSS 3–4 months after baseline. Cronbach's alpha, corrected item-total correlations (CITC) and mean inter-item correlation (MIIC) were used to measure internal consistency of the test. A Cronbach alpha value higher than .8 (Cortina, 1993; Kramer, 2003), a CITC not lower than .4 and an MIIC in the range of .2–.5 indicate acceptable test reliability (Cortina, 1993).

The factor structure of the MSPSS was investigated by exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

The Kaiser-Meyer-Olkin sampling adequacy test was performed to analyze the feasibility of using EFA. Bartlett's test of sphericity was used to verify the null hypothesis of absence of correlations between the variables in general totality.

EFA was performed using principal component analysis with varimax rotation. To define the number of the main components we used the following methods: parallel analysis (Lance, Butts, & Michels, 2006) and Jolliffe criterion excluding all components with the eigenvalue less than .7 (Yong & Pearce, 2013).

For the CFA, estimation of the following values were calculated: comparative fit index (CFI, allowed values ≥ .95), Tucker-Lewis index (TLI, ≥ .9), root mean-square error of approximation (RMSEA, ≤ .06; allowed values .06–.08) and chi-squared test χ^2 and number of degrees of freedom (χ^2/df, allowed value <3) (Browne & Cudeck, 1992, Hu & Bentler, 1999).

Estimation of construct validity between the MSPSS and the HADS and STPI was performed using Spearman correlations.

Results

Participant Characteristics

The participants' characteristics are presented in Table 1. Compared with the patients with SC, those with ACS were older, were more likely to be smokers, and were more likely to be in later stages of congestive heart failure (III-IV FC as per NYHA). At the same time there were more males among patients with SA and they were more likely to be married.

Table 1. Demographic and clinical characteristics of participants.

Characteristic	Patients with ACS (n = 333)	Patients with SA (n = 642)	p Value
Age M (SD)	60.5 ± 10.9	58.1 ± 8.8	.001
Sex (% Male)	67.6	79.5	<.001
Higher education (%)	33.3	27.7	.070
Married (%)	64.9	72.3	.017
Current smokers (%)	45.6%	36.6%	.006
Alcohol abuse (%)	10.5	7.5	.073
Severe CHF (%)	27.4	21.4	.001
Hypertension (%)	87.3	90.5	.124

Note: M – mean value, SD – standard deviation, ACS – Acute coronary syndrome, SA – Stable angina.

Descriptive Statistics

The distributions of the subscales and total score on the MSPSS-R were different from a normal distribution according to the Kolmogorov-Smirnov test ($p < .05$). Mean values of the total scale and subscales were not significantly different between SA patients and ACS patients (Table 2). There were no gender differences on the total scale and subscales in ACS patients. However, the mean scores on the "Family" and "Significant Others" subscales were significantly lower in females with SA and on the total scale of the MSPSS in comparison with males.

Values of intragroup correlation parameters on subscales and the total scale varied from .61 to .71 ($p < .05$).

Reliability

The internal consistency of the MSPSS was high (Table 3). The values of Cronbach's alpha of SA patients were .91 and .94, .90, .87 for the total scale and the "Friends," "Family," and "Significant Others" subscales, respectively. The values of Cronbach's alpha of ACS patients were .90 and

Table 2. Mean values of scores in the subscales and the common MSPSS scale.

Scales	Amount of scores M ± SD	Males M ± SD	Females M ± SD
«Friends»	5.4 ± 1.5	5.5 ± 1.3	5.0 ± 1.9
	(5.2 ± 1.7)§	(5.2 ± 1.7)	(5.3 ± 1.8)
«Family»	6.1 ± 1.1	6.2 ± 1.0	5.9 ± 1.3 *
	(6.0 ± 1.3)	(6.0 ± 1.3)	(6.1 ± 1.4)
«Significant Others»	6.1 ± 1.1	6.2 ± 1.0	5.7 ± 1.4 **
	(6.1 ± 1.2)	(6.1 ± 1.2)	(6.0 ± 1.2)
MSPSS	5.9 ± 1.0	5.9 ± .9	5.5 ± 1.2 **
	(5.8 ± 1.1)	(5.8 ± 1.1)	(5.8 ± 1.1)

Note: M – mean value, SD – standard deviation, § – data in brackets represent ACS patients, * $p < .05$; ** $p < .01$.

Table 3. Matrix of the main components and values of MSPSS scale reliability.

Question	Components (factors) I	II	III	Internal Consistency[†]
6	**.90 (.88)** §	.09 (.07)	.20 (.19)	.86 (.83)
7	**.90 (.93)**	.14 (.04)	.14 (.14)	.86 (.89)
9	**.92 (.91)**	.12 (.17)	.09 (.04)	.88 (.86)
12	**.89 (.91)**	.11 (.16)	.05 (.02)	.83 (.86)
3	.09 (.10)	**.74 (.71)**	.49 (.39)	.80 (.74)
4	.14 (.10)	**.78 (.88)**	.42 (.26)	.82 (.87)
8	.16 (.08)	**.81 (.89)**	.25 (.11)	.71 (.78)
11	.13 (.10)	**.84 (.89)**	.31(.14)	.80 (.83)
1	.09 (.11)	027 (.34)	**.82 (.85)**	.72 (.65)
2	.11 (.10)	.51 (.55)	**.71 (.61)**	.76 (.76)
5	.15 (.23)	.33 (.45)	**.79 (.67)**	.75 (.74)
10	.18 (.16)	.32 (.49)	**.72 (.61)**	.67 (.74)
MIIC	–	–	–	.45 (.44)
Eigenvalue	6.06 (6.00)	2.64 (2.80)	.75 (070)	–
Dispersion %	50.5 (50.0)	22.0 (23.3)	6.2 (5.8)	–
Cronbach's alpha	.94 (.94)	.90 (.91)	.87 (.86)	–

Note: † – corrected item–total correlations, MIIC – mean inter-item correlation, § – data in brackets is for ACS patients.

.94, .91, .86 for the total scale and "Friends," "Family," and "Significant Others" subscales, respectively. In both groups the CITC value was high for all questions and varied from .65 to .86. The MIIC value for the MSPSS in SA patients was .45 and in ACS patients .44. Test-retest correlations of separate questions also varied in the positive ranges from .33 to .72 ($p < .05$). In other words, both total and subscales were relatively stable over time.

Factor Analysis

The Kaiser-Meyer-Olkin sampling adequacy test (.90 for the SA group and .88 for the ACS group) and Bartlett's test of sphericity ($p < .001$ for both groups) show that the correlation matrix for both groups of patients can be used for the further factor analysis.

Evaluation of Figure 1, which graphically shows parallel analyses (PA) for the two patient groups, detected the necessity to select two main components. However, the crossing of two lines on the diagram is very close to the third factor. At the same time, using Jolliffe criterion (26), it is possible to define three main components (factors). Thus, the CFA supports a three-factor structure. Results of the main components analysis based on the three-factor structure of MSPSS are presented in Table 3. In the
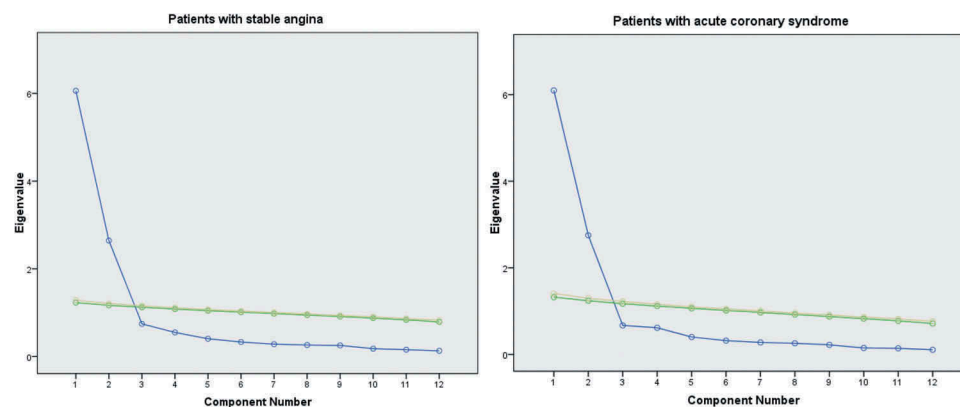
Figure 1. Diagram of the parallel analysis for SA and ACS patients.

SA patient group three factors were extracted which correspond to the "Friends," "Family," and "Significant Others" subscales, with eigenvalues 6.06, 2.64, and .75, explaining 50.5%, 22.0% and 6.2% of the total variance, respectively. Eigenvalues for the same three factors in the ACS group were 6.00, 2.80, .70, which explain 50.0%, 23.3%, and 5.8% of the total variance, respectively. Thus, in the model for SA patients three selected factors explain 78.7% of the total variance and in the model for ACS patients, 79.1% of the total variance.

A comparison between the statistical correspondence of the experimental data to the two-factor and three-factor models with correlating factors was completed by CFA, using the maximum likelihood estimation method. The results of this analysis are presented in Table 4. As presented in the table, it can be concluded that the three-factor model fits the data better than the two-factor model both for SA patients and ACS patients (difference of χ^2 for SA group model was 74.9, difference of df = 2, $p < .01$, for ACS group model, 34.7, difference of df = 2, $p < .01$), which corresponds with the results of the factor analysis of the English version of questionnaire.

Validity

All subscales in the Russian version of the MSPSS were negatively correlated with the HADS-anxiety and HADS-depression subscales and also with the STPI questionnaire subscales, determining aggression, anxiety and depression (Table 5). At the same time, there was a positive

Table 4. Comparative characteristics of two-factor and three-factor models of the MSPSS questionnaire in patients with SA and ACS.

Value	SA patients		ACS patients	
	Two-factor model	Three-factor model	Two-factor model	Three-factor model
TLI	.96	.98	.95	.96
CFI	.97	.99	.96	.97
RMSEA	.071	.053	.087	.075
(90% CI)	(.061– .081)	(.042– .064)	(- .072– .101)	(.061– .090)
χ^2	205.6	130.7 **	168.9	134.2 **
df	49	47	49	47
χ^2/df	4.2	2.8	3.4	2.9

Note: TLI – Tucker-Lewis index, CFI – comparative fit index, RMSEA (90% CI) – root mean-square error of approximation and 90% confidence interval, χ^2 – chi-square, *df* – number of degrees of freedom, χ^2/*df* – value of particular chi-square and number of degrees of freedom, ** $p < .01$.

correlation of social support with curiosity as a personality feature.

Discussion

This is the first study to evaluate the reliability and validity of the Russian version of the MSPSS. The research was carried out with cardiology patients with the chronic (SA) and acute (ACS) forms of CAD. Study findings confirmed the structural and constructive validity of the Russian MSPSS as well as its stability and internal reliability. The study showed that patients clearly distinguish three sources of social support, confirming the three-factor structure of the MSPSS. These data are consistent with findings reported in the original study by Zimet and colleagues (1990). Some research, particularly from Asian countries, has found a two-factor model of the

Table 5. Correlation of subscales of the MSPSS questionnaire and scales HADS, STPI in SA and ACS patients.

	SA Patients			ACS Patients		
Scales	«Friends»	«Family»	«Significant Others»	«Friends»	«Family»	«Significant Others»
«Friends»	1			1		
«Family»	.39**	1		.37**	1	
«Significant Others»	.37**	.78**	1	.38**	.80**	1
HADS – anxiety	−.12**	−.12**	−.12**	−.12*	−.20**	−.12*
HADS – depression	−.24**	−.14**	−.21**	−.24**	−.01	−.10
STPI – curiosity	.20**	.10*	.12**	.13*	.12*	.14*
STPI – aggression	−.10*	−.11**	−.10*	.05	−.05	−.03
STPI – anxiety	−.19**	−.18**	−.20**	−.05	−.13*	−.06
STPI – depression	−.22**	−.16**	−.20**	−.19**	−.22**	−.18**

Note: * $p < .05$; ** $p < .01$.

MSPSS. For instance, a study in Hong Kong revealed that the "Friends" and "Significant Others" subscales formed a single factor. The authors hypothesized that this finding might reflect cultural factors or might have resulted from an inaccurate translation of the questionnaire. At the same time, in our study, a high correlation between the "Family" and "Significant Others" subscales was observed. It is possible that this finding reflects an increasing difficulty with distinguishing these concepts at older ages. Similar data were obtained in the study of Wongpakaran and colleagues (2011), based in Thailand. The authors in that case highlighted the strong correlation between the "Friends" and "Significant Others" subscales in younger respondents (Wongpakaran et al., 2011). However, after modifying the instructions to the MSPSS to help respondents distinguish between the different sources of the support, the authors subsequently found confirmation of a strong three-factor model (Wongpakaran, Wongpakaran, Sirirak, Arunpongpaisal, & Zimet, 2017).

It should be noted that in our study, defining the contributions of the main components, we did not use the most common method—the Kaiser method—which proposes that eigenvalues less than one should not be considered (Kramer, 2003). However, there can be difficulties connected with incomplete correspondence of the factor model and observational data. In addition, the Kaiser method can overestimate or underestimate the correct number of factors; the majority of simulation researchers point out that it normally overestimates the correct number of factors (Lance et al., 2006). So, we applied alternative criteria: parallel analysis and Joliffe criterion, which suggested a three-factor model. Further, this factor structure was completely confirmed by CFA.

Along with the factorial validity, the Russian version of the MSPSS shows high reliability, as evidenced by the high intra-group correlation coefficient. Construct validity is proved by the negative correlations between the MSPSS subscales and the HADS scale as well as the STPI questionnaire subscales defining anxiety and depression. These findings correspond closely with the results reported by the authors of the original MSPSS questionnaire (Canty-Mitchell & Zimet, 2000) and from other researchers (Wongpakaran et al., 2011).

Convergent validity of the Russian MSPSS is also supported by the positive correlation of social support with curiosity. Curiosity involves an active interest in the world, events and people. A curious person is capable of productive communication, establishing contacts with other people; this person is typically friendly and attentive to his social environment. At the same time social support reflects the amount of interpersonal connections at the level of friends, relatives and intimate relationships and also at the level of social contacts, i.e., participation in social, professional, political and other organizations. Thus, curiosity as a personality feature would be expected to be positively connected with social support. This connection was demonstrated in our study for the first time.

A subscale of the STPI questionnaire, aggression, was chosen as the discriminant test. A study by Puskar and colleagues (Puskar, Ren, Bernardo, Haley, & Stark, 2008) showed that aggression as

a personality feature and aggression demonstration is not connected with perceived social support from friends and is only modestly connected with family support. We found similar patterns in our study.

Thus, the Russian version of the MSPSS questionnaire closely corresponds to the English version, based on its internal reliability. It is also characterized by acceptable test-retest reliability. The construct validity of the questionnaire is demonstrated by the results showing correlations in the expected directions of social support with the symptoms of anxiety and depression and also with curiosity, anxiety, depression and aggression as personality features. Overall, the results of this study indicate that the MSPSS can be used to define the level of social support in Russian patients, particularly in those with acute life threatening cardiovascular pathology such as ACS and in those with stable forms of CAD. It is also possible that the Russian version of the MSPSS can be used more widely with populations across Russia, but this will need to be established with additional research.

Limitations

There were a few limitations to our study. Firstly, our sample consisted of cardiac patients that were admitted to a cardiology inpatient department; therefore, these findings may not generalize to the broader population of patients with other diseases or to the Russian-speaking population in general. Secondly, for a measure of curiosity was used to evaluate convergent validity. Although the results were in the expected direction and leant support for convergent validity, we did not entirely achieve the level of convergent and discriminant validity needed to establish strong construct validity. Thirdly, not all the patients included into the study completed the questionnaire. A very high percentage of stable patients (97%) completed the questionnaire, which confirms that they understood the questions quite well. However, a lower percentage of patients with ACS (91%) completed the questionnaire. It is possible that such patients would complete the questionnaire at a higher rate prior to their discharge, after stabilization.

Clinical implications

- The MSPSS has strong psychometric indices across several different languages.
- The MSPSS is a simple and convenient tool to estimate social support, not only in patients from Russia, but also from various countries of the world, including the United States.
- Application of the MSPSS as a screening tool can identify patients with low social support, and therefore, with potentially high risk of non-compliance and cardiovascular complications. Targeting such patients with psychosocial interventions to improve social support may help to optimize programs of secondary prevention and cardio rehabilitation, thereby decreasing the risk of unfavorable cardiovascular complications.
- Administration of the MSPSS can be readily and successfully applied in health care settings; it does not require specialized conditions for implementation and it is time saving and easy to use.

Ethical Statement

The collective of authors explicitly declare that:

(1) All authors are meeting the criteria of authorship.
(2) The submitted manuscript was not simultaneously sent to another journal or it is not presently being evaluated by another journal
(3) The study is not split up into several parts to increase the quantity of submissions and submitted to various journals or to one journal over time
(4) No data have been fabricated or manipulated
(5) No data, text, or theories by others are presented as if they were the author's own
(6) No part of the content of the manuscript has been previously published elsewhere.
(7) The manuscript has been read, and approved by all authors.

The study conformed to the Helsinki Declaration; the local ethics committee approved the research protocol. Informed consent: "Informed consent was obtained from all individual participants included in the study.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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