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The drawing version of the pictorial representation of illness and self measure

Zita Sándor[a,b], Melinda Látos[c], Petra Pócza-Véger[d], Rózsa Havancsák[e†] and Márta Csabai[f]

[a]Faculty of Health and Social Sciences, Gál Ferenc College, Gyula, Hungary; [b]Faculty of Medicine Clinical Medicine Doctoral School, University of Szeged, Szeged, Hungary; [c]Faculty of Medicine, Department of Surgery, University of Szeged, Szeged, Hungary; [d]Faculty of Medicine Department of Neurosurgery, University of Szeged, Szeged, Hungary; [e]Student Counselling Centre, University of Szeged, Szeged, Hungary; [f]Institute of Psychology, University of Szeged, Szeged, Hungary

ABSTRACT

Objective: We developed and validated a drawing test version of the Pictorial Representation of Illness and Self Measure (PRISM), a visual method to assess the perceived burden of illness and illness perception. Our aim was to test whether the drawing version would allow patients more freedom to deliberately vary both the size and position of circles symbolizing illness and individual coping resources, as well as gain more information about illness representations and available resources. **Design and Main Outcome Measures:** We applied the PRISM-D test to 500 patients with severe somatic diseases under active hospital treatment. We used Spielberger's State and Trait Anxiety Inventory and Beck's Depression Inventory to assess convergent validity. **Results:** The PRISM-D test is applicable for inpatients and it can be used to explore their subjective representations. The modifications did not cause any loss in convergent validity as the Self-Illness Separation and the Illness Perception Measure are significantly correlated with levels of depression and anxiety. **Conclusion:** The drawing test enables more detailed measurement of suffering caused by illness, illness perception and more complex assessment of important factors in a patient's life. The test is adequate for clinical use as well as research among a wide range of somatic inpatients.

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Burden of illness; illness perception; coping; chronic illness; psychological test

Introduction

Illness is an individual, subjective experience for everyone, and the reactions to illness may also be greatly different. The subjective perception and burden of illness are important factors in recovery because they affect the psychological, social, and

CONTACT Zita Sándor sandorzita89@gmail.com Faculty of Health and Social Sciences, Gál Ferenc College, Szent István út 19-19, Gyula 5700, Hungary.
†Deceased.

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somatic outcomes (Petrie, Jago, & Devcich, 2007). The subjective interpretation of illness is associated with an individual's coping mechanisms and adaptation to stressors, influencing subjective wellbeing and satisfaction with life (Krikorian, Limonero, Vargas, & Palacio, 2013; Petrie & Weinman, 2012).

Thus, to encourage positive outcomes, it is important to explore patients' subjective illness perceptions, beliefs and impact of the illness (Cameron & Leventhal, 2003; Petrie & Weinman, 2012). The effects of illness on the patient's life need to be explored as well, because the illness is not isolated in a person's life but becomes an organic part of it. Examining how illness affects a person's life and the extent to which illness is embedded in the patient's social environment, physical environment, and life history in a way which is economical and complex at the same time is also important. For example, even though social support is typically viewed as a stable factor in one's life, it can be changed or even eroded by illness (Alferi, Carver, Antoni, Weiss, & Durán, 2001).

The exploration of resources supporting recovery that are present in one's environment is extremely important—factors such as social support, physical or mental health-protecting habits, and activities that are sources of experiencing joy or success. The presence of these factors indicates a more positive prognosis of the recovery process, and they can serve as resources. A lack of these factors may predict negative outcomes, along with the presence of factors that aggravate recovery, such as relational conflicts, experiences of loss, and strong negative emotions. For this reason, during psychological support for patients with serious medical conditions, there is high priority in the application of methods that enable the exploration of the subjective effects of illness on an individual's personality and life, the factors supporting or aggravating recovery, and the associations between them.

There are many disease-specific and generic methods to study illness impact, perceptions and beliefs (Horne, Weinman, & Hankins, 1999; Shumaker & Naughton, 1995; Weinman, Petrie, Moss-Morris, & Horne, 1996), but for the most part, these measures are too complex and time-consuming for ordinary application in clinical practice. These quantitative methods can be restricted, as patients' beliefs, experiences and feelings are very subjective and often need deeper and more personalized understanding (Cheung, Saini, & Smith, 2016). These tests are often inappropriate for the exploration of the way illness is embedded in the patient's social environment. Moreover, the validity of these measures greatly depends on the verbal skills of the patients (Büchi & Sensky, 1999).

Although conventional interview techniques enable the measurement of illness beliefs and suffering and support individual assessment, this method is very time-consuming and it also assumes that patients have good verbal capacity. This is not the case in many medical situations due to either the type of disease or its method of treatment.

Published data prove that nonverbal methods have better applicability for working with patients with serious medical conditions, as these methods require less energy input from patients and enable a more successful exploration of partially subconscious representations (Broadbent, Ellis, Gamble, & Petrie, 2006). The conventional drawing tests (e.g. draw their body before or after disease or currently after treatment, draw their illness or the damaged organ) are easy novel methods to assess individual illness

perceptions and the experiences about their illness and treatment (Tiemensma et al., 2015). According to studies, drawings show associations with clinical and psychological markers of health status in several type of somatic inpatients, e.g. health failure (Reynolds, Broadbent, Ellis, Gamble, & Petrie, 2007), myocardial infarction (Broadbent, Petrie, Ellis, Ying, & Gamble, 2004), emergency embolization in postpartum hemorrhage (van Stralen et al., 2010), and vestibular schwannoma (Kaptein et al., 2011). Results show that the drawings could facilitate patients to share their illness experiences, beliefs and feelings, moreover, it had potential benefits for the patients by helping them better understand themselves (Cheung et al., 2016). However, it is hard to assess the role of differences in the drawing ability of the patients in the interpretation. (Tiemensma et al., 2015).

A novel nonverbal test, the PRISM test (Büchi & Sensky, 1999) is a tool for measuring the subjective suffering caused by illness. The tool uses a visual metaphor that can be applied to measure a patient's perceived somatic burden of suffering due to their illness and the association between the self and the illness. In this nonverbal test, a person puts a red magnetic disk on a white, A4-sized metal board. The white metal board symbolizes the patient's current life situation, while the red disk symbolizes their illness. In the lower right corner of the board, there is a yellow circle that symbolizes the patient's self, and the distance between the self and illness (Self-Illness Separation, SIS) reflects the suffering of the illness burden. A modified version of the test called the PRISM-R1 test enables the examination of illness perception (Reimus, Vingerhoets, Soons, & Korstanje, 2007). In this version, patients can choose from three different sizes of disks that symbolize their illness, where the size reflects the Illness Perception Measure (IPM).

The PRISM test has been successfully validated, and its reliability has been proven in cases of patients diagnosed with various chronic diseases, such as breast cancer, rheumatoid arthritis, chronic obstructive pulmonary disease, diabetes mellitus, systematic lupus erythematosus, orofacial pain disorder, dermatologic diseases, and long-term cancer survivors (Büchi & Sensky, 1999; Büchi et al., 2000; 2002; Kassardjian, Gardner-Nix, Dupak, Barbati, & Lam-McCullock, 2008; Lehmann, Oerlemans, van de Poll-Franse, Vingerhoets, & Mols, 2011; Mühleisen et al., 2009; Streffer, Büchi, Mörgeli, Galli, & Ettlin, 2009; Wouters, Reimus, van Nunen, Blokhorst, & Vingerhoets, 2008). There is a consistently negative correlation between SIS and depression (e.g. Büchi, Sensky, Sharpe, & Timberlake, 1998; Büchi et al., 2002; Lima-Verde, Pozza, Rodrigues, Velly, & Guimaraes, 2013), as well as between SIS and experienced pain (e.g. Kassardjian et al., 2008; Streffer et al., 2009) and between SIS and disease-specific and general quality of life (e.g. Meyer, Luethi, Neff, Langer, & Büchi, 2014; Rumpf, Lontz, & Uesseler, 2004). The IPM is significantly correlated with health status and wellbeing (Reimus et al., 2007). The PRISM test is also applicable to measuring beliefs and attitudes and can also support therapeutic decision making (Sensky & Büchi, 2016).

To avoid the need for special tools in the PRISM test (the metal board and the disks), a self-administered version of the test was created (Rumpf et al., 2004). Their findings suggest that the PRISM can be used in a paper-pencil format. However, this version is only applicable to measuring the effects of the illness and its place in the patient's life. In our opinion, however, applying the test using a paper-and-pencil method would offer more options.

Another modified version of the PRISM test is the PRISM + test, which allows for the representation of other factors besides illness that are also relevant for the patient using various disks. Examples of factors are the patient's family, hobbies, work, and friends (Büchi & Sensky, 1998, 1999). Therefore, the context of illness, the resources of the patient, and the association of illness, and other factors that are relevant for the patient can be explored. The PRISM + test has been used in several studies, but in most cases the disks symbolized pre-defined factors like pain or fatigue (Gielissen, Prins, Knoop, Verhagen, & Bleijenberg, 2013; Kassardjian et al., 2008).

The aim of the study

The aim of the study was to improve the method of the PRISM test by combining the advantages of earlier versions and the drawing tests methods. A new version that was developed for the complex measurement of illness perception and suffering of patients who require active hospital treatment. The new version is called PRISM-D, which is a drawing version of the PRISM + test. The metal disks are replaced with drawing circles, which enables freer visualization of subjective representations compared to earlier tests. Earlier versions of PRISM used a limited number of fixed-size magnetic disks. However, the drawing version allows patients the freedom to vary both the size and the position of the circles more deliberately to symbolize illness and individual coping resources.

This version may also be applicable to exploring the subjective representations of patients under hospital treatment, their current life situations, the important components of their lives, and the associations between them. A further advantage is that it does not measure illness perception in isolation but also explores how it is embedded in the person's life. According to previous studies, drawing can provide richer data collection, elicit patients' beliefs uncensoredly and concentratedly, and reveal patients' previously unknown perceptions and feelings (Cheung et al., 2016; Tiemensma et al., 2015).

Another advantage is that drawings can be preserved, which is essential for follow-up sessions and useful in therapeutic applications. This helps to observe the changes in both patients' representations and the level of their suffering. Drawing is economical, requires few tools, and the testing process is fast, making it beneficial in clinical applications.

This study examines the applicability of PRISM-D among a wide, non-disease-specific population of somatic patients under active hospital treatment. We also examine whether the test can provide additional information compared to earlier versions; whether the patients take advantage of the freedom of visualization offered by the drawing test; and whether the method is applicable for the measurement of patients' current life situation, important components of their lives, the subjective importance of the illness, the extent to which it is embedded in their lives, and the associations between these factors. Additionally, we examine whether the advantages of the earlier PRISM tests are preserved in the complex drawing test version and whether the results fit with earlier results.

Methods

Patient sample and procedure

The PRISM-D test and its post-test protocol were applied to a sample of 500 patients diagnosed with somatic disease under active hospital treatment. The applicability of the test in clinical practice was examined among a broad spectrum of somatic patients. Inculsion criteria were: being older than 18 years old; being diagnosed with one of these illnesses: cancer, gastro-intestinal disease, chronic renal insufficiency, lumbar degenerative disc disease; being under active hospital treatment; being able to participate in a test (due to their illness condition); and a voluntary agreement to participate. The sample was randomly selected from the patients who met all the criteria (convenience sampling method).

The data collection was conducted in three steps: Firstly, in a pilot study, the PRISM-D test was tried on a random sample of 25 hospital in-patients to find out whether the subjects could interpret the instructions and tasks of the test (measured by structured interview). After we had found that all sample members (who belonged to various illness groups) were able to understand the instructions, we used the PRISM-D test with a larger sample (as a target, 300 persons) in the second step of our research. Patients were randomly selected for the sample from the following illness groups: cancer, gastro-intestinal disease, chronic renal insufficiency, and lumbar degenerative disc disease. There were 278 patients in total who met all the criteria during the research period.

In the third step of data collection, to examine the convergent validity, the PRISM-D test, Spielberger's State and Trait Anxiety Inventory (STAI), and Beck's Depression Inventory (BDI) were used on a sample of 197 other patients. The subjects were grouped in three disease groups: cancer, gastro-intestinal diseases, and chronic renal failure.

Testing was conducted in the hospital departments of university clinical practice venues and national clinical centers. Our permission of research specified the targeted sample sizes in each period of data collection, the size of the final sample (500 persons), the targeted population and the measurement tools used.

Before the specific PRISM-D instructions were given, we obtained informed consent from the participants and recorded their demographic (age, sex) and illness specific data (illness type). Each test recording lasted approximately 10–15 minutes and was followed by a post-test to let the participants define the meanings of the circles (5 min). After completing the PRISM-D test, patients completed the questionnaires (STAI, BDI) on their own.

Measures

PRISM-D test

In the PRISM-D drawing test, participants are given a pre-printed A4-size sheet of paper with a yellow circle that is 7 cm in diameter in the lower right corner. The circle symbolizes the patient's self, exactly as in the original PRISM test (Büchi & Sensky,

1999) (Supplementary material, Figure 1). The test leaders give standard instructions to the participants and note the answers (Supplementary material, Figure 2).

Firstly, the participants are asked to draw their illness with a red felt marker in a location where they would place it in their current life situation. SIS can be defined as the distance measured between the circles drawn on the test sheet. The distance must be measured between the centers of the two circles according to the original test (Büchi & Sensky, 1999). The size of the visualized illness can also be measured and is interpreted as the IPM according to the PRISM-R1 version (Reimus et al., 2007). However, because the PRISM-D test is a drawing test, the size of the drawn circles can vary. We calculated the area of the drawn circles by measuring their radius, thus getting the values of IPM.

In the second part of the test, participants can draw other circles that symbolize actual important factors in their lives with felt markers of various colors (yellow, orange, pink, purple, blue, green, brown, and black). Participants were not given any instructions or suggestions for what factors they should draw. They could freely decide on this so that only their chosen factors were represented in the test. There are no limitations to how many factors can be drawn.

In the post-test, the patients gave the meanings associated to the circles. The researchers kept verbatim record of the meanings patients attributed to the circles and the order in which they were drawn. Responses were categorized by their meanings.

As in the case of PRISM + tests (Büchi & Sensky, 1998, 1999), the distance of factors drawn can also be measured (the self-family, self-work, and self-hobby distances), although these factors are only present on the drawing test if the patients consider them relevant. Besides the distances, the sizes of the factors can be examined as well (by calculating their area).

STAI

The anxiety level of the patients was measured by the Spielberger STAI (Spielberger, Gorsuch, & Lushene, 1970). The Trait Anxiety Scale (STAI-T) assesses the general state (how one feels in general), and the State Anxiety Scale (STAI-S) measures the patients' anxiety level about an event (how one feels right now at this very moment). Each scale includes 20 items, and the answers range from 1 (not at all) to 4 (very much so). The total scores range from 20 to 80. The reliability of the scale (Cronbach alpha) was 0.77 in this sample.

BDI

The severity of depression was measured by the 21-question BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Richter, Werner, Heerlein, Kraus, & Sauer, 1998). The questions of this tool list four statements that describe feelings in the past days and weeks. The scores range from 0 to 3. The lowest total score is 0, and the highest is 84. The internal consistency of the scale was sufficient for our sample.

Data analysis

In the pilot study, we carried out the qualitative analysis of the structured interviews regarding the applicability of the test. Analysis of the circles (other than the one

symbolizing the illness) drawn on the PRISM-D test started with the categorization of responses by their meanings. The encoding of responses was done by two independent encoders (in cases where they differed, a third encoder was included).

The statistical analysis was performed with SPSS Version 21. The parameters measured were the distance between the self and the factors drawn on the PRISM-D test (in centimeters), as well as the area of these factors (in square centimeters). Descriptive statistics were calculated from the data, such as percentages, means, standard deviations, and medians.

In the case of the BDI and STAI tests, the mean values of total scores and their standard deviations were calculated.

Gender differences in illness-circle characteristics represented on the PRISM test were analyzed with Student's t-test. Associations with age were analyzed with Pearson's correlation.

The convergent validity of the PRISM-D test was examined by Pearson's correlation coefficients between SIS and BDI, STAI-S, STAI-T scales, as well as between the IPM and the BDI, STAI-S, and STAI-T scales. In addition, comparative analysis was conducted using a student's t-test and chi-squared test between the total scores of the BDI, STAI-S, and STAI-T scales and the factors drawn on the PRISM-D test. For each statistical procedure, the assumptions were tested and they were met in case of the results presented in the paper.

Results

Participants' characteristics

The participants comprised 44.4% men (N = 222) and 55.6% women (N = 278). Their mean age was 51.9 years (SD = 16.06) with a range of 14 to 86 years. The distributions of the sample by disease were 36% cancer, 31% lumbar degenerative disc disease or other locomotor problems, 19% chronic renal failure, 7% gastrointestinal diseases, and 7% hospital in-patients with other diseases. There were no gender differences in either the SIS or the IPM (Student's t-test, $p > 0.05$). There were no significant correlations between either the SIS score and age or the IPM score and age (Pearson's correlation coefficients, $p > 0.05$).

PRISM-D task's characteristics

In the pilot stage of the study, the PRISM-D test and structured interviews were used with 25 hospital in-patients to test the applicability of the new method. Results suggested that all patients could comprehend and execute the tasks.

Illness

The SIS showed heterogeneous results. The mean distance was 11.19 cm, which implies considerable suffering from the illness burden, as a smaller distance from the self on the PRISM test indicates a higher level of suffering (Büchi & Sensky, 1999; Büchi et al., 1998). The standard deviation is high (7.53 cm), which implies large individual variation. The measured minimum value was 0 cm (self in the illness,

overlapping circle centers), and the maximum value was 29.9 cm (Supplementary material, Figures 3 and 4).

Furthermore, 16.06% of the participants represented the illness either within the self (Supplementary material, Figure 5) or completely overlapping with the self (if the circle of the illness was bigger than the circle of the self), which implies a large illness burden. In 4.34% of the sample, the illness was represented as partially overlapping with the self (Supplementary material, Figure 6). In 79.60% of the sample, the circles were separated. In 4.19% of the cases where the illness was separated from the self, the two circles were touching.

The sizes of the circles drawn were very diverse. Importantly, the circles were drawn by freehand and did not have a regular shape in many cases. Thus, the mean value of the diameters was used to calculate the area values. The mean area of the drawn illness circles was 23.09 cm^2, which is smaller than the area of the preformed self-circle. The standard deviation of the area of illness was 43.64 cm^2, which implies high heterogeneity in the answers. The area of the smallest circle was 0.1 cm^2, which is practically a tiny point. The area of the largest circle was 415.27 cm^2, which nearly occupied the entire sheet of paper. Furthermore, 78.4% of all drawn circles had an area smaller than the self; 10.3% had a similar size to the self; and 11.3% were larger than the self. Finally, 92.05% of the drawn circles were not filled with color, and 7.95% were colored.

Other drawn circles

After they drew the illness circle, in the second part of the test, patients could freely draw the important things in their lives. The participants drew various numbers of circles with various meanings. On average, they drew 4.81 circles besides the illness circle. The standard deviation was relatively high (2.86), which implies high diversity in the number of circles drawn. Only 1% of the participants were unable to draw any factors other than their illness. The highest number of circles drawn in a test setting was 23. The number of factors drawn can imply either the complexity or emptiness of life. However, it could also mean a narrowed focus on the illness, its treatment, and the current life situation.

The participants could freely associate an interpretation to the circles, and the test leader recorded their meanings according to the explanations that the patients gave word for word. During the analysis, these contents were categorized by meaning categories.

We set up separate categories for *'family members'* (family, partner, relatives) and *'friends'* (friends, colleagues, acquaintances, neighbors). These sub-categories were further categorized under the main category of *'social support'*. There were separate categories for *'work'* (job and work activities) and for *'hobbies'* (any recreational activity was classified as a hobby). In addition, there were categories for *'health'* (health and related meanings), *'recovery'* (healing, recovery and related meanings), and *'treatement-related factors'* (meanings related to the treatment of illness and hospital environment). Using the latter three categories, we created a new category called 'illness-related factors'. There was another category for *'negative stressors',* which

comprised factors affecting the person unpleasantly or negatively, such as negative emotions, experiences of loss, and relationship conflicts.

Some of the circles on the test (26.93%) could not be categorized due to their uniqueness and low occurrence. The following responses occurred frequently (less than 5% prevalence each): financial security, home, nature, religion/God, deceased loved ones, former spouses, a variety of feelings, love, and freedom. Detecting these factors can make an important contribution to individual case management and effective intervention work. The uniqueness of the tests and the subjective meanings of the circles are demonstrated in Figures 7 and 8 (Supplementary material).

After analyzing the distribution of meaning categories presented above, it can be concluded that *'family'* was the most frequent factor, which was drawn by 92.3% of participants. However, only 24.1% drew *'friends'*. On the whole, 6.6% did not draw any social support, while 65.7% of participants drew more than one circle to represent significant others.

Only 27.9% of the participants drew the *'work'*, and 22.5% drew *'hobbies'*. A significant proportion of participants drew circles with meanings related to their health condition: *'health'* (15%), *'recovery'* (9.1%), and *'treatement-related factors'* (7.5%). An additional 5.9% of participants represented *'negative stressors'* in their life (relational conflicts, experiences of loss, financial problems, earlier illnesses, fears, and thoughts on passing). This suggests the presence of factors that are potentially aggravating recovery, which need to be explored and treated if necessary, which is an important task of psychological support (Supplementary material, Table 1).

Validity

Self-Illness separation (SIS)

SIS had a significant negative correlation with the total score on the BDI (Pearson's correlation coefficients, $r = -0.317$, $p < 0.001$), which means that the greater depression a participant had experienced, the closer they drew their illness to the self. The participants' STAI-S scores had a significant negative correlation with SIS ($R = -0.309$, $p < 0.001$). These results imply that test participants with a higher state anxiety level represented their illness as being closer to the self. There was also a significant but weak correlation between the SIS and STAI-T score ($R = -0.195$, $p = 0.028$), which implies that people with a higher trait anxiety level represented their illness as being closer to the self (Supplementary material, Table 2).

Illness perception measure

The area measured in square centimeters of the represented illness and the participants' total BDI scores had a weak but significant positive correlation (Pearson's correlation coefficients, $R = 0.183$, $p = 0.36$). This result suggests that test subjects experiencing higher levels of depression drew a larger circle to represent their illness. The size of the circle symbolizing illness had a weak but significant correlation with STAI-T ($R = 0.214$, $p = 0.013$), which implies that people experiencing higher levels of enduring anxiety drew a larger circle for their illness (Supplementary material, Table 2).

Associations between illness circle position and anxiety and depression level

Illness circle inside vs. outside the self

According to the results, SIS was associated with clinical variables, and there was also a significant association between patients' mood and their representation of their illness either within the self or separated from it. Patients representing their illness within or overlapping with the self (in cases of circles larger than the self) scored significantly higher on the depression (BDI) scale than those who represented their illness as being separated from the self (student's t-test, $p = 0.004$, $df = 131$).

The STAI-S score had a marginally significant association with illness position (illness circle inside vs. outside of the Self) ($p = 0.059$, $df = 185$). People who drew their illness within or overlapping with the self had higher STAI-S scores than those who drew their illness as separated from the self. Trait anxiety had no significant effect on the position of the illness circle (Student's t-test, $p > 0.05$) (Supplementary material, Table 3).

Associations between other circle characteristics with anxiety and depression level

Representation of family

People not representing the *'family'* category (e.g. whole family, family members, partner) on the PRISM-D test had a significantly higher state anxiety value than those who represented at least one family member (student's t-test, $p = 0.028$, $df = 170$). Participants who did not represent any family member scored an average of 53.14 points on the STAI-S scale ($SD = 15.11$). Those who represented at least one family member scored only 41.57 on average ($SD = 13.41$). The number, size, and distance of family-category circles were not associated with the scales of depression or anxiety.

Illness-related factors

People who represented *'illness-related factors'* had significantly lower state anxiety levels ($M = 36.82$, $SD = 11.15$) compared to those who did not represent such factors ($M = 43.60$, $SD = 13.93$) (Student's t-test, $p = 0.004$, $df = 168$). The factors most frequently represented were health, recovery, surgery or other treatment and expected improvement, attitude and quality of service provided by physicians and health care personnel, and general hospital experience.

Representations of negative stressors

People who drew any circle with a negative meaning (e.g. relational conflicts, experiences of loss, financial problems, earlier illnesses, fears, and thoughts on passing) had a higher rate of depression measured by BDI (chi-squared test, $p = 0.032$, $df = 1$). Furthermore, 75% of people who represented *'negative stressors'* had high BDI scores, as opposed to 36.7% for those who did not represent any negative factors.

There were not any significant associations between anxiety or level of depression and the other circles drawn on the test (work, hobby, health, recovery – $p > 0{,}05$ in all cases).

Discussion

Our results suggest that the PRISM-D test is widely applicable among patients under active hospital treatment. The upgraded drawing version of the test can adequately integrate the advantages of earlier versions and conventional drawing tests. The elimination of the metal disks and thus the application of the test as a drawing test not only reduce the number of tools necessary but also enable easier and more economical application in clinical practice, giving the patients the opportunity of free visualization. Rumpf et al. (2004) previously called attention to the advantages of drawing in the self-administered version of the PRISM test. However, the advantages of free visualization are especially notable when participants can represent other factors present in their life beyond their illness.

The PRISM-D test enables patients to represent factors in their lives without restricting them to a fixed order, size, or relative placement. The PRISM-D test operates without predefined categories of meaning. Participants may freely connect meanings to the circles drawn, allowing the exploration of subjective representations. In this way, the test can be adapted to measure patients' visualizations of their illness, as well as explore the extent to which their illness affects their lives. Furthermore, it allows the exploration of factors that could potentially assist recovery, aspects of support that are relevant to individual patients, and even factors that are aggravating recovery and other difficulties in the individual's life. This process helps to understand the subjective importance of these factors and the connections between them.

After finishing the test (similarly to earlier PRISM + tests), patients can make a visual summary, which in itself may have therapeutic effects. In addition, during the course of clinical work, the test could help to collect more accurate information for the screening of problem behaviors or the design of therapy, and it may even be applied as a therapeutic tool on its own. In contrast to the metal board version, drawing tests are retainable, which is an important advantage. Participants may even take their tests with them, or the test leaders could keep them at hand during therapy. The retained tests could be used for follow-ups and the detection of any changes in illness perception, as well as changes or in the subjective importance and connections of factors in the lives of patients.

Another great advantage of the PRISM-D test is that it is a suitable tool for exploring individual representations, which could make it applicable for clinical use in the course of therapy. At the same time, it allows for quantitative analysis that could be used for screening, quantitative follow-up of changes, and research. The convergent validity of the PRISM-D test was not lost during its development since the SIS is significantly correlated with the total score on the BDI. This result is consistent with the earlier studies conducted with the original PRISM test (Büchi et al., 1998; Gielissen et al., 2013; Rumpf et al., 2004). In addition, a significant correlation was measured between the SIS and the scales of the STAI, which is consistent with earlier studies using the original PRISM test that found significant connection between anxiety or perceived stress and the SIS (Klis, Vingerhoets, de Wit, Zandbelt, & Snoek, 2008; Krikorian et al., 2013).

Our results suggest that patients who drew an illness circle close to the self showed higher level of depression and anxiety. According to previous studies (Büchi & Sensky,

1999) the distance between the self and the illness indicates the patient's perceived illness burden and suffering. By analyzing the position of the illness circle, we could distinguish two main categories: (1) the illness circle is inside the self circle, or overlapping with the self (in cases where the illness circle is larger than the self circle), (2) illness is outside, separated from the self circle. Our results suggest that the two types of illness position are significantly associated with different levels of depression and state anxiety. Similar findings were detected by Peter et al. (2016) as well. This association implies that patients who felt that the illness is 'inside' of their self, had more negative mood than patients who perceived a distance from the illness.

PRISM-D enables a more differentiated measurement of illness perception as well. Our results show that the participants take advantage of this and draw widely different sizes of circles for illness, from as small as one millimeter in diameter to a large red circle nearly covering the whole sheet of paper. According to our results, the IPM had a significant negative correlation with the BDI and the total STAI-T score. These findings suggest that a bigger size of drawn illness is associated with a more depressive mood and higher anxiety level.

These findings are associated with previous studies results of PRISM-R1 (Reimus et al., 2007), where participants could choose from only three sizes of circles. They found that the size of the illness circle (IPM) was negatively associated with health status, life satisfaction and psychological well-being of psoriasis patients. Another previous study (Klis et al., 2008) found significant negative correlation between well-being index (WHO-5) and IPM (a version where the illness circle can have three different sizes). The association between the size of the illness and a worse illness perception has been revealed by conventional drawing tests as well (Broadbent, Schoones, Tiemensma, & Kaptein, 2018).

The results suggest that it is practical to allow participants the freedom of visualization regarding the size of illness representation. The results of our quantitative analysis of other circles drawn on the test emphasize the importance of examining these factors, as connections were found between patients' mood and the visualized social support, illness-related factors, and visualized negative factors. The representation of the family on the test was correlated with a lower level of anxiety. Patients who did not represent family among the actual important aspects in their live perhaps could have done so because of either a perceived or actual lack of family, or perhaps a narrowed focus on illness. Such patients experienced a higher level of anxiety than the patients who represented at least one family member in the test.

The results showed that 31.6% of the patients represented factors related to health, illness, and recovery. People who represented their current treatment and its expected effects or health care personnel as important sources of short-term recovery ('*illness-related factors*') experienced lower levels of anxiety than those who did not represent such factors. There was no such connection between anxiety and the '*health*' or '*recovery*' categories. A possible explanation is that the '*illness-related factors*' category consists of specific recovery-related factors, while the '*health*' and the '*recovery*' categories may instead symbolize patients' wishes with regard to their actual health status. The importance of this result lies in its usability in clinical practice.

The representation of the *'negative stressors'* category on the test was associated with the level of depression. While this result is not surprising, it is important because it further shows the usability of the PRISM-D test. It can be concluded that the representations of negative factors in one's life on the PRISM-D test may be interpreted as potential complication factors or obstacles that make recovery more difficult, and they also imply the increased presence of depressive symptoms. The PRISM-D test could contribute to the quick and easy exploration of these negative factors and to the screening of patients who have factors in their life that may aggravate physical and psychological recovery. Nevertheless, the qualitative aspects of the individual meaning of contents need to be analyzed by further studies.

The study has a number of limitations that should be mentioned. Firstly, the convenience sampling methodology raises questions regarding the representativeness of our results. Moreover, our sample consisted of a heterogeneous patient population. The study was based on only one measurement. No test-retest reliability assessment has been conducted.

Conclusion

Our results show that the PRISM-D test keeps or improves upon the virtues of the earlier PRISM tests. Furthermore, it is a more economical method that provides more complex information. By combining the advantages of earlier versions, the proposed tool could be applied for measuring the suffering caused by illness, illness perception, the extent to which illness is embedded in one's life, and the connections between these factors. It is a simple, quick, and economical yet complex tool. Given its ability to provide both quantitative and qualitative data, the tool is adequate for clinical use as well as research among a wide range of somatic patients under hospital treatment.

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ORCID

Márta Csabai http://orcid.org/0000-0002-3194-6208

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