Validation of a patient-reported measure of social support provided by nurses in breast cancer care (SuPP-N): based on a cross-sectional patient survey in 83 German hospitals

Johanna Sophie Lubasch, Susan Lee, Markus Antonius Wirtz, Holger Pfaff, Lena Ansmann

ABSTRACT

Objectives To validate the patient-reported measure of Social Support Perceived by Patients Scale-Nurses (SuPP-N).

Design/setting A secondary data analysis based on a cross-sectional breast cancer patient survey in 83 German hospitals. Patients were asked to give written informed consent before they were discharged. If they agreed to participate, the questionnaire was sent via mail to their home address after discharge.

Participants Of 5583 eligible patients, 4814 consented to participate in the study and 4217 returned completed questionnaires (response rate: 75.5 %). For the data analysis n=3954 respondents were included. On average, participants were 60 years old and mostly in cancer stages I and II.

Primary and secondary outcome measures Perceived social support was assessed with a three-item patient-reported scale (SuPP-N). Convergent validity and criterion-related validity were tested using the following constructs: trust in nurses, trust in the treatment team (Wake Forest Physician Trust Scale, adapted), quality of life (European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire), processes organisation, availability of nurses.

Results The structural equation model (SEM) assuming a one-dimensional structure of the instrument showed acceptable goodness of fit (root mean square error of approximation=0.04, Comparative Fit Index=0.96 and Tucker-Lewis Index=0.96; factor loadings ≥0.83). Hypothesis-consistent correlations with trust in nurses (β=0.615; p<0.01) and trust in the treatment team (β=0.264; p<0.01) proved convergent validity. Criterion-related validity was proved by its association with patients’ quality of life (β=−0.138; p<0.01), processes organisation (β=−0.107; p<0.01) and the availability of nurses (β=0.654; p<0.01).

Conclusion The results of the SEM identify potential important factors to foster social support by nurses in cancer care. In patient surveys, the SuPP-N can be used efficiently to measure patient-reported social support provided by nurses. The use of the scale can contribute to gain a better understanding of the relevance of social support provided by nurses for patients and to detect possible deficits and derive measures with the aim of improving the patient–nurse interaction.

BACKGROUND

Among women, breast cancer is the most frequent cancer worldwide, with 2.1 million women affected each year.¹ For many patients, a cancer diagnosis entails emotional distress, concerns about the therapy and feelings of uncertainty,² which in turn was found to increase the risk of mortality and physical symptoms.³ Possible mechanisms explaining the relationship between distress and health outcomes are not fully clarified. On the one hand, the direct impact of distress on...
the immune system may affect health outcomes (eg, cancer survival) and on the other hand, distress may impact health outcomes through self-care behaviours. To handle stressors, patients with breast cancer need to be supported emotionally and socially. In cancer care, nurses play a key role in providing social support since they are often accompanying patients throughout the time from diagnosis to treatment, or during palliative care. However, evidence on factors affecting the provision of social support by nurses and the underlying mechanisms is lacking. Furthermore, no validated instrument measuring the provision of social support by nurses exists which could undermine the possibility of research to address the relevance of social support provided by nurses for patients as well as possible measures to foster the provision of social support.

**Social support in patient care**

Social support has an impact on various health outcomes, for example, in terms of reduced depressive symptoms and higher quality of life. It plays an important role in health maintenance as well as disease management. The provision of social support by family and friends is associated with higher quality of life among patients with lung cancer and better coping with the disease among patients with breast cancer. Social support is defined as emotional, informational and instrumental support that assists a person in a burdensome situation. In a conceptual analysis, Langford et al provide an overview on predominant definitions and types of social support. Emotional support includes showing empathy, providing care and trust. Informational support is defined as assisting people in solving problems, whereas instrumental support is defined as providing tangible goods, services or aid.

In healthcare contexts, patients also need tangible social support from healthcare professionals as part of the patient–professional interaction. In this setting, the patient–professional interaction can be a source of social support by providing encouragement, praise, motivation, reassurance, advice and advocacy. Studies revealed that a positive patient–provider interaction fosters physical and mental health, reduces recovery times, and might increase treatment effectiveness. In addition to this, it was found that the patient–provider interaction has an impact on patients’ evaluation of their care. The provision of social support by healthcare providers was furthermore found to be associated with aspects of quality of life.

Various factors determine the patient–provider interaction. These factors are included in a patient–professional communication framework by Feldman-Stewart et al. The framework includes characteristics of the patient, of the healthcare professional, and of the context in which the communication takes place. The impact of these factors on the patient–professional interaction has already been proven in previous studies. Studies investigating context characteristics have revealed that

**Instruments measuring social support**

To date, there are many different assessment instruments for social support that can be used for different purposes. The Personal Resource Questionnaire and the Supportive Care Needs Survey-SF34, for example, measure the need for social support but not whether it is provided. The Interpersonal Support Evaluation List and the Medical Outcomes Survey-Social Support Survey measure whether a person is supported but do not assess the source of support. The Perceived Social Support Scale, the Multidimensional Scale of Perceived Social Support and the Social Support Questionnaire, which inter alia measures informational support, and a scale measuring psychosocial care provided by physicians were developed. Congruently to the latter scale, the ‘Social Support Perceived by Patients Scale-Nurses’ (SuPP-N) has been developed, but it has not yet been validated. Therefore, the aim of this study was to validate the patient-reported measure of SuPP-N in order to enable the investigation of mechanisms and influencing factors of social support provided by nurses as indicator of the patient–nurse interaction.
The psychometric quality of the SuPP-N scale was analyzed annually and Cronbach’s alpha ranged from 0.91 to 0.93 (table 1). 44

As a next step, in the present secondary data analysis, the measurement model as well as the convergent and the criterion-related validity of the SuPP-N scale was tested. The analysis is based on data collected in 83 hospitals accredited as breast cancer centers in North Rhine-Westphalia since 2009. 44 Each year, data are collected using a breast cancer-specific version of the Cologne Patient Questionnaire (CPQ-BC), which consists of various validated and internationally established instruments and instruments that have been used in the German healthcare context widely and shown good reliability. Internal consistency of the SuPP-N scale was assessed and Cronbach’s alpha ranged from 0.91 to 0.93 (table 1). 44

To confirm the one-dimensional structure of the scale, factor loadings of the three items of the SuPP-N instrument were verified. Loadings above 0.71 were interpreted as excellent, 0.65 as very good, 0.55 as good, 0.45 as fair and 0.32 as poor. 45

To test convergent validity correlations of the SuPP-N instrument were analysed with theoretically related constructs of the provision of social support by nurses: trust in nurses (Cronbach’s alpha=0.92) and trust in the treatment team (Cronbach’s alpha=0.84).

To test criterion-related validity, we used two factors that were found to be predictors of the provision of social support, namely hospital process organisation 24 and nurse availability, 25 and one factor that was found to be affected by the provision of social support, namely patient quality of life. 11 In the SEM, we, therefore, assume that process organisation and the availability of nurses have an impact on social support, and social support in turn affects quality of life (see figure 1).

Table 1  Items of the SuPP-N instrument, frequency of response options, r_s and skewness

<table>
<thead>
<tr>
<th>Item</th>
<th>Item content</th>
<th>Response options: Frequency (%)†</th>
<th>Mean (SD)</th>
<th>Skewness (z-standardised)‡</th>
<th>r_s ‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>suppn1</td>
<td>I could rely on the nurses when I had problems with my illness.</td>
<td>1:24 (0.6) 2:124 (3.1) 3:922 (23.3) 4:2884 (72.9) 5:3.69 (0.561)</td>
<td>–4.66</td>
<td>0.808</td>
<td></td>
</tr>
<tr>
<td>suppn2</td>
<td>The nurses supported me in a way that made it easier for me to deal with my illness.</td>
<td>1:34 (0.9) 2:176 (4.5) 3:1040 (26.3) 4:2704 (68.4) 5:3.62 (0.613)</td>
<td>–4.14</td>
<td>0.857</td>
<td></td>
</tr>
<tr>
<td>suppn3</td>
<td>The nurses were willing to listen to my illness-related problems.</td>
<td>1:58 (1.5) 2:261 (6.6) 3:1128 (28.5) 4:2507 (63.4) 5:3.54 (0.685)</td>
<td>–3.70</td>
<td>0.796</td>
<td></td>
</tr>
</tbody>
</table>

†Threshold ≥0.3 for good selectivity of the item, *normal distribution if smaller than 2.58.
‡r_s=Discrimination (corrected item–total correlation).
SuPP-N, Social Support Perceived by Patients Scale–Nurses.

METHODS  
Setting and design

The SuPP-N is being used in annual cross-sectional patient surveys in German breast cancer centers in North Rhine-Westphalia since 2009. 44 Each year, data are collected using a breast cancer-specific version of the Cologne Patient Questionnaire (CPQ-BC), which consists of various validated and internationally established instruments and instruments that have been used in the German healthcare context widely and shown good reliability. Internal consistency of the SuPP-N scale was analyzed annually and Cronbach’s alpha ranged from 0.91 to 0.93 (table 1). 44

As a next step, in the present secondary data analysis, the measurement model as well as the convergent and the criterion-related validity of the SuPP-N scale was tested. The analysis is based on data collected in 83 hospitals accredited as breast cancer in the year 2013. Since the survey is conducted annually for evaluation purposes of the hospitals in the first place, the questionnaire is regularly revised together with the hospitals. As part of a realignment, scales suitable for validating the SuPP-N were no longer included in the questionnaire after 2013. The psychometric quality of the SuPP-N was evaluated following Kline’s 45 procedure. One structural equation model (SEM) was used to test the one-dimensional structure of the scale as well as construct validity in terms of convergent validity and criterion-related validity. The clustered structure was accommodated by adjusting standard errors (type=complex in Mplus), assuming invariant factor structures between the levels. For descriptive statistics, SPSS V.25 was used. To develop and test the SEM, the maximum likelihood estimation procedure 45 of the Mplus V.8 software was used. To assess whether constructs can be reliably estimated from their indicators’ local fit indices, the following parameters were estimated: average variance extracted (AVE) ≥0.5, factor reliability ≥0.6, reliability (Cronbach’s alpha)≥0.7, residual correlations ≤0.3 and discrimination of the items (r_s) >0.5. The recommended thresholds were used to determine a good model fit of the SEM: root mean square error of approximation as well as standardized root mean square residual ≤0.08 (acceptable), ≤0.05 (good) and Incremental Fit Indexes (Comparative Fit Index and Tucker-Lewis Index ≥0.95: acceptable; ≥0.97: good).

To test criterion-related validity, we used two factors that were found to be predictors of the provision of social support, namely hospital process organisation 24 and nurse availability, 25 and one factor that was found to be affected by the provision of social support, namely patient quality of life. 11 In the SEM, we, therefore, assume that process organisation and the availability of nurses have an impact on social support, and social support in turn affects quality of life (see figure 1).

Participants

Patients were included in the survey if they (1) were older than 18 years, (2) had undergone inpatient surgery between 1 February 2013 and 31 July 2013, for newly diagnosed breast cancer, (3) had at least one malignancy and (4) had at least one postoperative histological evaluation. To participate in the study, patients were asked to give written informed consent before they were discharged. If they agreed to participate, the questionnaire was sent via mail to their home address 1 week after discharge. Of 5583 patients being care for in the defined period, 4841 consented to participate in the study and 4217 returned completed questionnaires (response rate: 75.5 %). On
average questionnaires were returned 20 days after they were sent to the patients, subsequently on average 27 days after discharge. Data from participants who answered fewer than 30% of the items of the total questionnaire was deleted, resulting in an analysis sample of 4146. The number of analysed respondents in this study was only 3954 because 28 male participants were deleted from the dataset and 164 of the remaining respondents had missing values on at least one of the SuPP-N items. Male participants were excluded from the analyses because the number of men in the dataset was too small for a gender-stratified analysis.

Instruments
The SuPP-N scale
The SuPP-N has been adapted from the scale measuring psychosocial care provided by physicians by the same authors. The SuPP-N scale consists of three items (table 1), which have been extensively pretested in cognitive interviews with patients before using the scale in patient surveys. Respondents are asked to rate the items on a four-point Likert scale ranging from ‘strongly agree’ to ‘strongly disagree.’ In the years 2009–2016, mean scale values ranged from 3.60 to 3.63 (with 4 being the highest achievable value, meaning high perceived support). The patients are not asked to answer the items regarding a particular nurse during their hospital stay, but to give a general assessment of the support they received by the nursing staff. Therefore, the assessment refers to registered nurses as well as nursing students and nursing assistants.

Patients’ trust in nurses
Adapted from a validated instrument measuring patients’ trust in physicians, the same authors developed a scale measuring patients’ trust in nurses within the CPQ-BC. In previous studies, it showed good psychometric properties (Cronbach’s alpha=0.92). The scale consists of five items, for example, ‘I completely trusted in the nurses on the ward.’ Respondents are asked to answer on a four-point Likert scale ranging from (1) ‘I strongly disagree’ to (4) ‘I strongly agree.’

Patients’ trust in the treatment team
The scale measuring patients’ trust in their treatment team is based on the Wake Forest Physician Trust Scale, which was developed by Hall et al. It has been translated and transferred into different contexts and has shown good reliability and validity (Cronbach’s alpha ≥0.84). For the purpose of this study, the scale has been professionally translated into German and was adapted to measure trust in the treatment team by simply replacing the term ‘physician’ by ‘treatment team.’ Moreover, for the retrospective patient survey after discharge, the items were rephrased using past tense (Cronbach’s alpha 0.88) (sample item ‘The treatment team did whatever it took to get me all the care I needed.’). The scale consists of ten items being answered on a five-point Likert scale ranging from 1 to 5.
from 1 ‘strongly agree’ to 5 ‘strongly disagree’. Prior to the analysis, the items were recoded so that higher values indicated higher levels of trust.

Process organisation

The scale measuring the patient’s experience with the process organisation of the hospital showed good psychometric measures in previous studies (Cronbach’s alpha=0.82). The six items measure how patients experience dynamic work processes during their hospital stay in terms of communication processes between healthcare professionals, waiting times or the coordination between healthcare professionals. The items (eg, ‘I got the impression that there were communication problems between the physicians and the nursing staff’) were answered on a four-point Likert scale ranging from (1) ‘strongly disagree’ to (4) ‘strongly agree.’ Higher values indicate higher deficits in the process organisation.

Patients’ perception of nurses’ availability

The availability of nurses was measured by four items (sample item ‘The nurses were always available.’). The items measure whether patients and their relatives had a contact person among the nurses and whether the nurses were available when the patients had questions. The items showed good psychometric measures (Cronbach’s alpha=0.87) in previous analyses. Participants were asked to rate the items on a four-point Likert scale ranging from (1) ‘strongly disagree’ to (4) ‘strongly agree.’ Higher values indicate higher availability of nurses.

Cancer-specific quality of life

Cancer-specific quality of life was measured using the EORTC QLQC30 (European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire). The QLQ-C30 consists of 30 items and includes inter alia four functioning scales (physical, role, emotional, cognitive and social functioning), three cancer-specific symptom scales as well as one global health scale. For our validation study, we used only the four-item emotional functioning subscale because social support provided by nurses can be assumed to show the highest association with this subscale. Participants were asked to answer on a four-point Likert scale ranging from (1) ‘not at all’ to (4) ‘very much’ (sample item ‘Did you feel irritable?’). The instrument is widely used and demonstrated good psychometric properties and clinical validity in earlier studies (Cronbach’s alpha=0.84). Higher values indicate more problems concerning the emotional functioning.

From the three items of the SuPP-N instrument, the first step was to analyse the one-dimensional structure of the SuPP-N instrument by verifying the factor loadings of the three items (see figure 1). The mean SuPP-N score for all respondents was 3.62.

The measures of global fit (table 4) reveal that the SEM appears to have an appropriate model fit. Local fit indices verified that the social capital construct is reliably measured by its indicators. All standardised factor loadings were significant (p<0.01) and higher than 0.830 (critical value ≥0.5) (see figure 1). More than 50% of the indicator variance is associated with the underlying latent construct on average (AVE=0.83). Furthermore, Cronbach’s alpha (0.91), factor reliability (0.91) and residual correlations (|max|=−0.048; critical value ≤0.25 (not displayed)) indicate that the item information can be explained to a large extent by a single underlying construct.

We analysed correlations with patient’s trust in nurses and patient’s trust in the treatment team in the SEM (see figure 1) to test convergent validity. The SuPP-N instrument correlated significantly (p≤0.01) with the theoretically related constructs in both the bivariate analyses and in the full model: patient’s trust in nurses (beta=0.615; p<0.01) and patient’s trust in the treatment team (beta=0.264; p<0.01).

Concerning criterion-related validity the estimations of the SEM (figure 1) showed significant paths from SuPP-N to the patients’ quality of life (beta=−0.138; p<0.01), processes organisation (beta=−0.107; p<0.01) and the availability of nurses (beta=0.654; p<0.01).

DISCUSSION

Validity of the SuPP-N scale

The aim of this validation study was to examine the reliability and validity of an instrument to measure social support provided by nurses in a sample of patients with breast cancer.

The results show that the three items of the SuPP-N instrument can be adequately modelled as indicators of a single underlying latent construct. Convergent validity of the SuPP-N instrument was indicated by correlations found with instruments measuring similar constructs (trust in nurses (beta=0.615; p<0.01) and trust in the treatment team (beta=0.264; p<0.01)). Nevertheless, it was shown that the construct can be differentiated from these similar constructs. Finally, criterion-based validity show correlations between the social support construct and the patients’ quality of life (beta=−0.138; p<0.01), process organisation (beta=−0.107; p<0.01) as well as the availability of nurses (beta=0.654; p<0.01).
Discussion of SEM results

The results of our study supplement findings from Ansmann et al showing associations between social support provided by physicians and the hospital’s process organisation. Ansmann et al presume that in hospitals having deficits concerning their process organisation, physicians may have less time for their patients. It is furthermore assumed that physicians are distracted by work organisation problems which may in turn affect patient–physician interaction. Congruently to this, based

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Age and cancer stage of the participants with mean values of the SuPP-N scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency (n)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>18–39 years</td>
<td>141</td>
</tr>
<tr>
<td>40–49 years</td>
<td>639</td>
</tr>
<tr>
<td>50–59 years</td>
<td>1136</td>
</tr>
<tr>
<td>60–69 years</td>
<td>1081</td>
</tr>
<tr>
<td>70–79 years</td>
<td>749</td>
</tr>
<tr>
<td>80 years and older</td>
<td>186</td>
</tr>
<tr>
<td>Missing</td>
<td>22</td>
</tr>
<tr>
<td>Education</td>
<td></td>
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<tr>
<td>No lower secondary school certificate</td>
<td>73</td>
</tr>
<tr>
<td>Lower secondary school certificate</td>
<td>1666</td>
</tr>
<tr>
<td>Intermediate secondary school certificate</td>
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</tr>
<tr>
<td>Entrance qualification for university of applied science or university</td>
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<tr>
<td>Missing</td>
<td>108</td>
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<tr>
<td>Employment status</td>
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<tr>
<td>Full-time</td>
<td>833</td>
</tr>
<tr>
<td>Part-time</td>
<td>729</td>
</tr>
<tr>
<td>Housewife</td>
<td>559</td>
</tr>
<tr>
<td>Unemployed</td>
<td>124</td>
</tr>
<tr>
<td>Pensioner</td>
<td>1487</td>
</tr>
<tr>
<td>Unemployed due to other reasons</td>
<td>106</td>
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<tr>
<td>Missing</td>
<td>116</td>
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<tr>
<td>Health insurance status</td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>2838</td>
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<tr>
<td>Public with additional private insurance</td>
<td>608</td>
</tr>
<tr>
<td>Private</td>
<td>434</td>
</tr>
<tr>
<td>Missing</td>
<td>104</td>
</tr>
<tr>
<td>Cancer stage (UICC staging)†</td>
<td></td>
</tr>
<tr>
<td>Stage 0</td>
<td>420</td>
</tr>
<tr>
<td>Stage I</td>
<td>1530</td>
</tr>
<tr>
<td>Stage II</td>
<td>1052</td>
</tr>
<tr>
<td>Stage III</td>
<td>316</td>
</tr>
<tr>
<td>Stage IV</td>
<td>140</td>
</tr>
<tr>
<td>Missing</td>
<td>488</td>
</tr>
<tr>
<td>Type of surgery</td>
<td></td>
</tr>
<tr>
<td>Mastectomy without reconstruction during the same surgery</td>
<td>693</td>
</tr>
<tr>
<td>Mastectomy with reconstruction during the same surgery</td>
<td>255</td>
</tr>
<tr>
<td>Breast-conserving therapy</td>
<td>2862</td>
</tr>
<tr>
<td>Missing</td>
<td>144</td>
</tr>
<tr>
<td>Total</td>
<td>3954</td>
</tr>
</tbody>
</table>

*Due to rounding, percentages might not add up to exactly 100%.
†Staging classified according to the UICC.
SuPP-N, Social Support Perceived by Patients Scale-Nurses; UICC, Union for International Cancer Control.
of nurses and the perception of social support are in line with previous results. Cook et al found out, that for patients with gynaecological cancer it is of great importance to have a nurse available at all times and to have the certainty of being able to contact a nurse with problems at any time. It may be discussed that patients with cancer therefore should have access to specialist nurses at key points of their disease process.

Strengths and limitations

The presented findings must be considered in light of methodological limitations. The screening instrument SuPP-N consists of only three items, which might limit the degree of differentiation, for example, when comparing groups. On the other side, the SuPP-N instrument is a short instrument that can be efficiently included in patient surveys. Due to the cross-sectional study design, neither causal conclusions nor conclusions about the sensitivity of change of the SuPP-N instrument can be drawn. Moreover, the instruments measuring trust in nurses, process organisation and the availability of nurses, which have been used for convergent and criterion-related validity, have previously been validated by exploratory factor analysis and reliability analysis, but not by confirmatory factor analysis. However, the instruments’ psychometric quality was confirmed by the validity and reliability analyses presented. Given that all investigated scales originate from the same survey, the explanation of variance might possibly be overestimated due to common method bias. Additionally, it must be noted that the SuPP-N measure showed ceiling effects (mean value 3.62 with a maximum possible value of 4.0) which is often observed in similar scales, such as trust in physicians. Furthermore, we are aware that the secondary data from 2013 might not reflect recent trends in healthcare. However, we believe that the relationships we found vary only in terms of their strength and tend to be fundamental and stable. A strength of our study is that the hierarchical data structure of patients clustered in hospitals was considered within the SEM by a multilevel approach. This was made possible by the good response rate and the large dataset of 3945 patients nested in 83 hospitals. In addition to this, the sample is largely representative of patients with breast cancer in the German state of North Rhine-Westphalia, which is the most populous German federal state (with about 20% of all patients with breast cancer in Germany). In order not to overload our model, we did not adjust our

Table 3 Characteristics of the hospital sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Response trait</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching status</td>
<td>Non-teaching</td>
<td>14 (16.9)</td>
</tr>
<tr>
<td></td>
<td>Academic teaching</td>
<td>64 (77.1)</td>
</tr>
<tr>
<td></td>
<td>University hospital</td>
<td>5 (6.0)</td>
</tr>
<tr>
<td>Hospital ownership status</td>
<td>For-profit ownership</td>
<td>6 (7.2)</td>
</tr>
<tr>
<td></td>
<td>Public ownership</td>
<td>17 (20.5)</td>
</tr>
<tr>
<td></td>
<td>Charitable ownership</td>
<td>60 (72.3)</td>
</tr>
<tr>
<td>Hospital size (no of beds)</td>
<td>Minimum/maximum</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td></td>
<td>43/1422</td>
<td>526 (284)</td>
</tr>
</tbody>
</table>

*Note: Due to rounding, percentages might not add up to exactly 100%.

on the results of the SEM in this study we assume that also nurses working in hospitals with problems in process organisation may be preoccupied by organisational tasks. This in turn might leave less time for communication with patients and may thus impact the nurse–patient relationship. Although data are not sufficient to prove this pathway conclusively, we suggest that investing into a good process organisation may foster the nurse–patient interaction. In addition to this, the results of our SEM supplement previous findings showing that social support provided by healthcare professionals is associated with several aspects of quality of life, inter alia emotional functioning among patients with lung cancer. The results of the SEM in this study indicate that social support provided by nurses is also associated to emotional functioning among patients with breast cancer. One possible explanation for this might be that the provision of social support has the potential to reduce depressive symptoms and to assist patients to cope with their disease, which might in turn improve emotional quality of life. However, our data cannot prove this pathway and neither our survey nor the results of previous studies can make a clear statement as to whether social support improves the patients’ quality of life or whether patients with higher quality of life receive or report more social support. If the former is true interventions fostering social support provided by nurses may be useful to improve the quality of life of patients with breast cancer. Additionally, our results showing an association between the availability of nurses and the perception of social support are in line with previous results.

Table 4 Indicators of global model fit of the SEM

<table>
<thead>
<tr>
<th></th>
<th>χ²</th>
<th>df</th>
<th>Cronbach's alpha</th>
<th>RMSEA</th>
<th>SRMR</th>
<th>TLI</th>
<th>CFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thresholds for acceptable model fit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEM</td>
<td>2610.01</td>
<td>447</td>
<td>0.91</td>
<td>0.04</td>
<td>0.05</td>
<td>0.96</td>
<td>0.96</td>
</tr>
</tbody>
</table>

CFI, Comparative Fit Index; RMSEA, root mean square error of approximation; SEM, structural equation model; SRMR, Standardized Root Mean Square Residual; TLI, Tucker-Lewis Index.
CONCLUSIONS

The SuPP-N instrument represents a short and valid instrument to measure social support provided by nurses. It can be used as a valid instrument to gain a better understanding of the buffering effect of social support provided by nurses for patients. Therefore, studies should be conducted on associations between social support and patient outcomes, and mechanisms behind these associations should be further studied. Moreover, the SuPP-N instrument could be used in future studies in order to test interventions to foster social support provided by nurses as well as to validate the instrument’s sensitivity to change. Since social support provided by nurses showed significant associations to organisational processes in the hospital and furthermore was associated to patients’ quality of life, the SuPP-N scale may be used for quality assessment purposes in hospitals. Therefore, the instrument could be integrated into patient surveys to detect possible deficits and derive measures with the aim of improving the patient–nurse interaction.

Our SEM indicates that the availability of nurses has an impact on the receipt of social support by nurses, which is in line with previous results. We, therefore, assume that for patients, it might be important to have a contact person among nurses and that nurses are available when they have questions. To address this, investing into the professionalisation of nurses may be expedient. Specially trained breast care nurses, for example, coordinate care, are aware of patients’ needs and are accessible for patients. Breast care nurses thus can devote a lot of time to patients and meet unmet needs of social support. We, therefore, assume that breast care nurses have the potential to compensate in communication and interaction with patients for what other nurses cannot achieve in their stressful daily work. In other contexts, further evidence exists that primary nursing enables relationship-building with patients. Primary nurses are responsible for the assessment, planning, organisation and evaluation of a patient’s care throughout the whole hospital stay. Furthermore, our SEM indicated that less organised processes are associated with less social support. To address this, we suggest that interventional approaches should focus on the improvement of process organisation to unburden nurses.

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REFERENCES


21 Kartika IR. Nurses–patients interaction model and outpatients’ satisfaction on nursing care. NCQAI 2018:5.


50 Dugan E, Trachtenberg F, Hall MA. Development of abbreviated measures to assess patient trust in a physician, a health insurer, and a hospital. Med Care 2003;41:1021–39.


