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Is patient satisfaction a unidimensional construct?
Factor analysis of the Munich Patient Satisfaction Scale (MPSS-24)

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Abstract Although patients' satisfaction with treatment has gained much attention, conceptual and methodological issues are not sufficiently investigated. Consequently, well-validated satisfaction scales are rare. In order to respond to methodological requirements being associated with the measurement of patient satisfaction, the Munich Patient Satisfaction Scale (MPSS-24) was developed for psychiatric in-patients. The scale was validated on the basis of three independent samples (n=85, n=161, n=91), and the effects of moderating variables were controlled. In several steps of item selection the initial pool of 133 items was reduced to 24 items, which were subjected to factor analysis. The MPSS-24 demonstrates one major principal component with two minor factors which indicates that doctor-patient communication is the essential source for patient satisfaction. The instrument is of high internal consistency and reliability, and convergent validity is satisfactory.

Key words Patient satisfaction · questionnaire · factor analysis · unidimensional construct · doctor-patient communication

Introduction

Shortcomings in research on patient satisfaction are related to the theoretical conception of the construct 'satisfaction' as well as to the assessment of satisfaction. There are a great number of instruments that are not based on the patients' perspective and that are empirically not well validated. Until the beginning of the 1980s the dominating tools consisted of a few global questions, then, based on the assumption that patient satisfaction is a multidimensional phenomenon, the questionnaires became more and more comprehensive, in order to assess all possible aspects of treatment. However, it has remained unclear which of these aspects of treatment constitute the major sources of patient satisfaction (Ruggeri 1994).

There is no doubt about the question, that psychiatric patients are able to evaluate differential aspects of treatment and that the degrees of satisfaction for these various aspects may differ from their general satisfaction. Nevertheless, these evaluations of single aspects and of general satisfaction are often rather similar; therefore, it is unclear whether the single evaluations are valid, whether they have been produced by a positive response bias or whether they simply reflect the degree of global satisfaction. Similarly, little knowledge exists on the question whether patients evaluate domains of treatment independently from each other.

As a consequence, there is no plain empirical evidence whether patient satisfaction is a unidimensional or multidimensional construct. Multidimensionality can have two origins. On the one hand, it derives a priori from a theoretically defined structure of variables being appointed to distinct domains of care. Numerous questionnaires are based on such a multidimensionality. Using multidimensionality in this non-mathematical way does offer a structure of sense, but without clarifying the relationship between the underlying domains or dimensions. On the other hand, multidimensionality is a posteriori the result of a factor analysis, if a multifactorial structure of the variables is indicated. This would be the only empirical evidence of patients evaluating different aspects of care without being influenced by their general satisfaction.

Factor-analytical studies with comparable, well-validated questionnaires have been rarely performed, and their findings are inconsistent (Lovet et al. 1979, Larsen et al. 1979, Holcomb et al. 1989, Ruggeri et al. 1996, Nabati et al. 1998, Corrigan 1990). Some authors are of the opinion that most of these studies prove patient satisfaction

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to be a unidimensional construct (Nabati et al. 1998, Priebe et al. 1995), while others conclude patient satisfaction to be multidimensional (Ruggeri et al. 1996). However, these statements often seem to be rather a matter of interpretation than a matter of statistical fact: for example, each of the factors Ruggeri et al. had found in their study showed a moderate internal consistency, which became much higher when the total number of items was considered. Therefore, a unidimensional construct of patient satisfaction could also be concluded from these findings. Other critical points include not taking into account the mathematical requirements for computing a factor analysis, so that a high number of items meet a small sample size (e. g., the studies of Ruggeri et al. 1996, Spießl et al. 1999), and that factors are often not independent and factor interpretations are sometimes arbitrary.

Because well-validated and reliable questionnaires of patient satisfaction in psychiatry are rare, the authors have developed a scale to measure treatment evaluation in psychiatric in-patients. This scale should fulfill the following methodological requirements:

- Treatment domains should include aspects patients think are relevant for their satisfaction.
- To reduce the effects of social desirability, direct questions relating to satisfaction should be avoided, and items should be scored in a dimensional, not in a categorical way.
- To avoid response bias, the questionnaire should correspond to requirements of questionnaire-construction, e. g., same amount of positive and negative formulations, randomized setting of items.
- Psychometric analysis of the questionnaire should be based on a representative sample of sufficient size.
- The item pool should be reduced to a version suitable for routine use.

Methods and samples

The initial version of the MPSS was developed with the aim to have a comprehensive instrument of patient satisfaction that assesses general as well as differentiated aspects of in-patient treatment which are potentially relevant for treatment satisfaction from the patients' view. The MPSS items result from an extensive review of empirical and theoretical satisfaction studies. To guarantee a high content validity, those aspects of care that patients evaluated as most important for their satisfaction were especially addressed. These were aspects of communication in the interpersonal relationship between psychiatric staff and patients, which had a higher priority for patients than instrumental and material concerns. This finding has again been supported in a recent study by Spießl et al. (1999).

The first version of the MPSS consisted of 133 items covering the following domains: professionals' skills and behavior, information and communication, psychopharmacological therapy, other therapeutic services, autonomy of the patient, relatives' involvement, characteristics of the ward and overall evaluations. To avoid response bias, the questionnaire was designed in accordance with appropriate methodological criteria. In order to minimize the effects of social desirability, the items were designed as statements that have to be rated by the patient on a five-point scale according to his personal experiences during his hospital stay (fully agree, strongly agree, undecided, rather disagree, fully disagree). The items were discussed with psychiatrists and nursing staff on the wards and modified. Then a pilot inquiry with 30 patients was made on two closed wards of the Psychiatric Department of the University of Düsseldorf, which resulted in a reduction to 99 items. This reduction was solely related to items with a similar content, so that all domains remained represented. Additionally, some open questions were integrated into the questionnaire to offer the opportunity to address aspects that are most satisfying and dissatisfying for the patients.

The 99-item version of the MPSS was completed by patients of the two admission wards and of five open wards of the Psychiatric Department of the University of Düsseldorf. Patients were not included if they had been hospitalized for less than 3 days, were suffering from acute psychotic symptoms, were confined to bed, if their cognitive functions were impaired and if they had difficulties with the German language. From a total of 150 patients identified, 24 patients refused to participate. Eighty-five patients met the criteria and were included in the study, their sociodemographic and clinical characteristics can be seen in Table 1. Item selection was conducted with respect to missing response rate (with the limit to 20 %), index of difficulty and item-total correlation, resulting in a reduction to 72 items. Sixty-six of these items are related to single aspects of treatment and 6 items to global treatment evaluation. Because of the discrepancy between the high number of items and the low sample size, a factor analysis was not calculated.

The 72-item version of the MPSS was used in two independent patient samples of the Psychiatric Department of the University of Munich. Both samples, a "discharge sample" and a "key date sample" differ with regard to their study design: Patients of the discharge sample (December 1998 until May 1999) completed the MPSS a few days before they were discharged. From a total of 793 in-patients who were being treated during this time period, questionnaires of only 161 patients could be analyzed. This low response rate is due to the fact that the questionnaires had been handed out by the nursing staff. Because this procedure was not routinely controlled, nurses had often forgotten to hand out the questionnaires to the patients. Nevertheless, a comparison of the responders and non-responders in relation to sociodemographic and clinical variables demonstrated the representativeness of the discharge sample. In the second sample data were obtained from 91 in-patients on a key date in August 1999 by an external researcher (R. Dunkel), this sample consisted of 85 % of all patients who had been in hospital for at least 3 weeks. Due to the methodological implications of the study design, there are some heterogeneities which might have different effects on the patients' evaluation: 1) Patients' evaluations refer to different points during the individual hospital stay, because the point of assessment cannot be standardized in a single-day design; 2) the variation of patients' psychopathology is probably much broader during their hospital stay compared to their psychopathological status at discharge.

Statistical analysis was computed with SPSS for Windows 9.0.

Results

Patients' evaluations with the MPSS-72

The two Munich samples are different from the Düsseldorf sample with respect to the percentage of patients being treated on closed wards, the mean age and the distribution of diagnoses. There are only small differences between the two Munich samples concerning sociodemographic and clinical characteristics (Table 1).

The percentage of patients expressing global satisfaction with treatment is much smaller in the Düsseldorf sample compared to the Munich samples (59 % vs. 81 % and 72 %, MPSS item: "I am generally satisfied with treatment"). The same is true for most of the single aspects of treatment, which can be explained by the effect of the closed wards when analyzing data in more detail.

Table 1 Sociodemographic and clinical charateristics of three independent patient samples of the Psychiatric Department of the University of Düsseldorf (PDD) and of the University of Munich (PDM I, II)

	Sample PDD n = 85	Sample PDM I n = 161	Sample PDM II n = 91
Male, %	45	48	58
Female, %	55	52	42
Mean age	35	43	47
Diagnosis (ICD 10), %			
F 10–19	9	14	21
F 20–29	54	27	17
F 30–39	9	37	47
Other	29	17	14
Mean number of stays in PDD or PDM	2.7	1.8	2.1
Mean number of stays in other hospitals	–	2.3	1.8
Mean duration of stay in PDD or PDM I, days	63.2	60.8	–
Patients on closed wards, %	52	22	17

However, items referring to the socioemotional qualities of the doctors and nursing staff, such as communication and empathy, are equally evaluated positively by the Düsseldorf and Munich patients. In the two Munich samples, patients evaluate distinct aspects of care very similarly, but some global items significantly differently: Patients of the discharge sample are generally more satisfied with treatment compared with patients of the key date sample (1.75 vs. 2.11; p=0.005), they have profited more from treatment (1.85 vs. 2.39; p=0.000) and consequently are more satisfied with success of treatment (1.95 vs. 2.48; p=0.001).

Psychosocial aspects of the relationship between psychiatric staff and patients are the most positively evaluated aspects in each sample. Nevertheless, patients' needs are obviously not satisfied with respect to the time the doctor takes to talk to the patient, with the duration and clarity of the doctor's visit as well as the amount of information about medication (20 % to 50 % negative evaluations). Nearly 30 % of the Munich patients (and 41 % of the Düsseldorf patients) think that they do not have enough privacy on the ward and 26 % (45 % of the Düsseldorf patients) are of the opinion that the doctors do not have enough time to listen to their needs and problems. Although there are additional negative ratings with respect to the accomodations functions, 77 % of the Munich patients (and 65 % of the Düsseldorf patients) would like to be treated again in their hospital and only 7 % (19 %) would refuse to be treated again.

In order to assess the influence of potentially intervening variables, in the two Munich samples treatment evaluation was correlated with sociodemographic and clinical variables, subjective concept of the illness and quality of life (Möller-Leimkühler et al., subm).

Data did not indicate a significant effect of gender, age, level of education, diagnosis, psychopathology and former hospitalizations. On the other hand, treatment evaluation was significantly associated with the kind of ward and with the patient's general trust in the medication and physician and was related to global assessment (r=0.383 and r=0.377, p=0.01) as well as to single assessments of treatment components.

Factor analysis of the MPSS

In order to fulfill the statistical requirements for further validation, data of all three samples were put together (n=337). In doing so, the different compositions of the Düsseldorf and the Munich samples rather offer a widening of the range of validity and do not represent a problem. First, items were selected by computing the intercorrelations of all 66 items of the MPSS-72 referring to single assessments, the 6 items referring to global assessment were excluded. Only items with an item-total correlation of r > 0.50 were retained so that the number of items was reduced from 66 to 24 (Table 2).

To examine construct validity, the remaining 24 items were submitted to a principal-components factor analysis with varimax-rotation. When considering the degree of the Eigenvalues the screeplot (Fig. 1) supports a 3-factor solution but with a dominant major factor accounting for 37.8 % of the total variance. The other two minor factors explain together only 16.1 % (Table 3).

This main factor consists of items relating to the interpersonal relationship between doctor and patient (communication, empathy), including the subjective ef-

Table 2 Item-total correlations of MPSS items with r > 0.50

MPSS items	Item-total correlation (r > 0.50)
Good relationship between patients and nurses	0.50
Patient joining in decision-making of doctors	0.51
Patient having no questions after doctor's visit*	0.52
Patient not feeling left alone with his social problems*	0.52
Enough time to talk with doctors	0.53
Nurses keeping calm in critical situations	0.53
Patient understanding nurses' explanations*	0.53
Medications helping patient feel better	0.54
Nurses doing more than is necessary*	0.54
Patient feeling understood by nurses	0.54
Dosage of medications being right	0.55
Patients having no complaints about nurses*	0.55
If patient needs nurses they are there	0.55
Patients complaining seldomly about doctors*	0.57
Doctors being well educated	0.59
Good relationship between doctor and patient	0.59
Doctors talking comprehensively about patient's disease	0.60
Patient having no complaints about doctor	0.61
Doctors having enough time to listen to patient's problems and needs*	0.61
Doctors doing more than is necessary*	0.61
Cooperation between doctors and other professionals is good*	0.61
Doctors talking with patient, not about him at doctors'visit*	0.62
Doctors being interested in patient's problems	0.67
Patient feeling understood by doctors	0.67

* items inverted

ficacy of pharmacological therapy. The second factor includes items referring to aspects of cooperation and ward atmosphere; however, it cannot be excluded that this factor may be affected by the directionality of the item scoring (anchoring effect). The third factor, like the former a minor factor, with clustering of items concerning patients' evaluation of nurses' behavior indicates that patients appraise nurses' behavior separately from that of psychiatrists and that these aspects of treatment are also relevant for patients' general satisfaction. Although a 3-factor solution could be accepted, the considerable decrease of the Eigen value of factor 1 (9.075) compared to factor 2 (2.020) supports a one-factor solution.

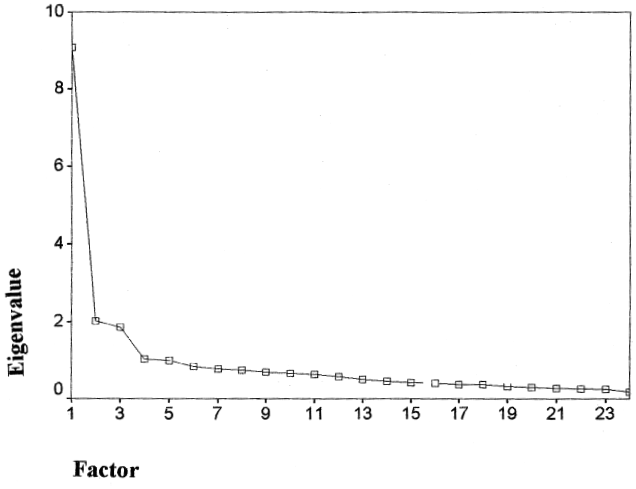

Fig. 1 Factor analysis of the MPSS-24 – Screeplot

The internal consistency for the total of 24 items is high, with a Cronbach's alpha of 0.92.

In order to validate the MPSS-24, the total score was correlated with the total score of the 6 items of the 72-item version referring to global satisfaction assessment (treatment success, choice to be treated again in the hospital, therapy offering problem solutions etc) showing a significant correlation of r=0.71 ($p < 0.001$).

Furthermore, a global satisfaction questionnaire with 3 items (ZUF 3, Spießl et al. 1996, which is the validated short form of ZUF 8, which itself is a short form of the original version with 17 items and a German adaptation of the Client Satisfaction Questionnaire from Attkinsson and Zwick 1982) was used as an additional external measure in the two Munich studies. Convergent validity was calculated correlating the sum score of ZUF 3 and the sum score of MPSS-24; the result is a significant medium correlation of r=0.65 (p=0.001).

Discussion

The MPSS could be reduced to 24 items of high internal consistency and reliability. These items mainly address socioemotional and communicative aspects of the staff-patient relationship. Especially the doctor-patient relationship has proven to be the essential source for patient satisfaction by descriptive analysis, factor analysis and content analysis of the open questions of the long version of the MPSS (Möller-Leimkühler, Dunkel, in press).

Table 3 Factor loadings of the 24 MPSS items (loadings > 0.4 are printed in bold)

MPSS items	Component 1	Component 2	Component 3
Patient feeling understood by doctor	**0.821**	0.193	0.220
Doctors talking about patient's disease	**0.763**	0.218	0.174
Doctors being interested	**0.717**	0.326	0.129
Enough time to talk with doctor	**0.700**	0.078	0.143
Good relationship doctor/patient	**0.645**	0.282	0.221
Patient involved in decision-making	**0.626**	0.232	0.125
Doctors being well educated	**0.619**	0.243	0.239
Dosage of medications being right	**0.597**	0.165	0.223
Medications helping patient feel better	**0.563**	0.160	0.104
Seldom complaints about doctors*	**0.464**	**0.421**	0.264
Good cooperation of professionals*	0.093	**0.696**	0.264
Doctors doing more than is necessary*	0.373	**0.671**	0.130
Talking with patients at doctor's visit*	0.221	**0.662**	0.106
No questions after doctor's visit*	0.253	**0.616**	0.023
Understanding nurses' explanations*	0.130	**0.568**	**0.529**
Doctors having enough time*	**0.492**	**0.554**	0.026
Not feeling alone with social problems*	0.296	**0.501**	0.057
Nurses being available	0.310	0.028	**0.745**
Good relationship patient/nurses	0.377	0.030	**0.706**
No complaints about nurses*	0.010	**0.456**	**0.671**
Nurses keeping calm	0.316	0.071	**0.591**
Nurses doing more than is necessary*	0.096	**0.430**	**0.584**
Patient feeling understood by nurses	**0.540**	0.073	**0.559**
Proportion of explained variance	37.813	8.415	7.734
Eigenvalue	9.075	2.020	1.856

* items inverted

But also two additional dimensions, ward atmosphere and nurses' behavior seem to be meaningful. Thus, our findings are in accordance with studies finding a multidimensional structure but consistently one general factor within this structure that accounts for the largest part of the variance (Holcomb et al. 1989, Ruggeri et al. 1996).

Because the MPSS-24 significantly correlates with short measures of global satisfaction, such short measures would be – from a statistical point of view – sufficient to assess patient satisfaction. However, this correlation is only on a moderate level. Besides this, as global satisfaction scores have been shown to be consistently high, there is nothing gained for questions concerning quality management, because dissatisfaction with some aspects is expressed independently from global satisfaction when patients are asked more differentially.

Conclusions

The advantages of the MPSS-24 compared with short measures of global satisfaction are the following:

- As general satisfaction is not assessed neither by direct questions or by only a few items reliability is increased.
- Items are related to all dimensions of treatment that are important for satisfaction from the patients' point of view.
- Evaluations of distinct aspects of treatment allow identification of dissatisfaction.
- Compared to the total score of a short satisfaction measure (e. g., 3 items, ZUF 3), the total score of the MPSS-24 appears to be more transparent because it is composed of 24 items.

Therefore, it is not astonishing that the degree of the convergent validity is considerably lower compared to the degree of reliability. This is probably due to the fact that patient satisfaction is determined by a lot of factors which cannot be satisfactorily controlled either by study design or by statistical operations. To give an example, patients' actual mood state during assessment correlates with overall-satisfaction being measured with the 3 items of ZUF 3; however, this correlation disappears when looking at patients' evaluation of distinct aspects of treatment (Möller-Leimkühler, Dunkel, subm).

The MPSS-24 is an instrument that measures aspects of treatment that are the main components of satisfaction for psychiatric in-patients. Indeed it is possible to calculate a total score of the scale but a descriptive analysis of each single item seems to be superior when searching for aspects with which the patients are not satisfied. Deficiencies in doctor-patient communication are the main source for dissatisfaction of patients. Thus, in order to identify such deficiencies in more detail, differentiated questionnaires with respect to doctor-patient communication are needed.

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