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Assessing Health Care Needs and Clinical Outcome With Urological Case Complexity: A Study Using INTERMED

ALIDA M.R. DI GANGI HERMS, M.Sc., GERMAR M. PINGGERA, M.D.

PETER DE JONGE, Ph.D., HANNES STRASSER, M.D.

WOLFGANG SÖLLNER, M.D.

Urinary tract symptoms and, particularly, urinary incontinence are often chronic and complex conditions that cause diagnosis, treatment, and management problems. In many cases, psychosocial factors contribute to the development of a chronic condition. The authors investigated whether INTERMED, an instrument for assessing case complexity and health care needs, was able to identify such complex cases, to estimate the amount of comorbidity, and to predict clinical outcome for 31 consecutive patients suffering from urinary tract symptoms. To assess clinical outcome, the authors used the American Urologic Association Symptom Score, the Brief Symptom Inventory, and the Hospital Anxiety and Depression Scale. On the basis of the patients' INTERMED scores, the authors distinguished between low-complexity patients (INTERMED score <21, N=25, 80.6%) and high-complexity patients (INTERMED score ≥21, N=6; 19.4%). Low-complexity patients had fewer depressive and anxiety symptoms, less distress, and better clinical outcome at their 3-month follow-up than high-complexity patients. The data confirmed the ability of the instrument to detect patients at risk of complex urinary tract symptoms and to predict clinical outcome.

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Clinical conditions such as urinary incontinence can represent a transient problem—for example, after radical prostatectomy in men^{1,2} or childbirth in women^{3,4}—but they can also become a chronic condition. For these reasons, such patients can comprise a heterogeneous population with different health care needs and clinical outcomes. Urinary tract symptoms and, particularly, urinary incontinence often cause diagnosis, treatment, and management problems. In many cases, the illness is compli-

cated by coexisting symptoms; its etiology is multifactorial. Psychosocial factors like stress or depression often contribute to the development of a chronic condition, as described in some studies.^{5,6} A link has been postulated to join the serotonergic neural systems implicated in anxiety and depression and the descending serotonin pathways inhibiting bladder contraction.⁷

For patients with interacting psychological problems, an interdisciplinary therapeutic approach that includes case management is indicated and, consequently, a method capable of identifying such complex cases. Several checklists have been developed in the past 30 years to evaluate illness severity and comorbidity. The main goal of these instruments is to objectively quantify the burden of illness⁸ suffered by a patient at a certain moment in time.

Different aspects of the disease—e.g., number of symptoms, related impairment, duration of the disease—

Received Feb. 7, 2002; revision received Aug. 6, 2002; accepted Sept. 11, 2002. From the Department of Medical Psychology and Psychotherapy and the Department of Urology, University Hospital, Innsbruck, Austria; and the Department of Social Psychiatry, University of Groningen, Groningen, the Netherlands. Address reprint requests to Dr. Di Gangi-Herms, Institut für Medizinische Psychologie und Verhaltensneurobiologie, Gartenstrasse 29, D-72074 Tübingen, Germany; alida.digangi@med.uni-tuebingen.de (e-mail).

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and the number of the diseases suffered by a patient at a certain moment in time are evaluated, and each is assigned a numerical score. The sum of all of these aspects results in one or more numerical indices that result in a description of the seriousness or complexity of the diseases.

Generally, these instruments are physician rated and focus exclusively on organic diseases. Three examples are the Cumulative Illness Rating Scale,^{9,10} the Duke Severity of Illness Checklist,^{11,12} and the Seriousness of Illness Rating Scale.¹³⁻¹⁵ The Cumulative Illness Rating Scale was among the first instruments to attempt to summarize overall severity of illness on the basis of clinical information. The instrument consists of a checklist of 14 physician-rated items. With the checklist, three different scores are calculated: 1) the total pathology score, which is calculated by adding the scores for all 13 items, 2) the illness severity composite, which is determined by adding the scores for all items except psychiatric ones, and 3) the comorbidity composite, which is calculated by adding only the number of items with moderate to extremely severe ratings, excluding psychiatric ones.

The objective of the Duke Severity of Illness Checklist is to measure the severity of all listed health problems present in a patient at the time of a particular consultation. The assessment could be made by a health professional at the time of consultation or by a reviewer working retrospectively from patient records. The instrument comprises four parameters of health problems within a given diagnosis: symptoms, complications, 6-month prognosis without treatment, and treatability. With numerical ratings for each parameter of every diagnosis, the following three types of severity score can be calculated: 1) the diagnosis score for each diagnosis stated, 2) the overall score for the set of all health problems stated, and 3) the comorbidity score, comprising all health problems except the problem of principal interest.

The Seriousness of Illness Rating Scale is currently used in psychosomatic research as an index of illness seriousness. It consists of a self-report checklist of 137 commonly recognized physical symptoms and diseases, and it provides a measure of current and recent physical health problems. Each item is associated with a severity level. A total illness score is obtained by adding the severity ratings of endorsed items (symptoms experienced in the last few months).

In contrast to the previous instruments, according to Engel's biopsychosocial model of disease,^{16,17} understanding the whole needs of a patient can help offer them a more comprehensive intervention, which could eventually result

in a better clinical outcome. On the basis of this concept, the INTERMED was developed. The INTERMED is an instrument for assessing a patient's case complexity.¹⁸⁻²⁰ It integrates information from four domains: biological, psychological, social, and health care. The domains are assessed in the context of time and contain variables that influence the degree of case complexity. Each domain consists of five variables, resulting in a total of 20. In the last few years, studies of the INTERMED have shown that this instrument can help predict health care needs and clinical outcome for low back pain,²¹ palliative care,²² diabetes mellitus,²³ and general internal medicine.²⁴

We investigated the validity of the INTERMED to identify complex cases in a consecutive group of patients suffering from urinary incontinence and hypothesized that patients with high INTERMED scores would have more psychological distress and worse clinical outcome.

METHOD

Subjects

Thirty-four women suffering from urinary tract symptoms with or without urinary incontinence and consecutively coming to the Urological Outpatient Clinic of Innsbruck University Hospital were considered for study inclusion. Two patients were not included in the study because of their lack of German language skills, which could have eventually biased the interview results. Another patient refused to participate in the study; thus, a total of 31 patients took part in the study. The patients were recruited between October 2000 and May 2001 and observed until August 2001. The patients did not receive any form of economical compensation and were included in the study with their written informed consent.

Symptoms were classified as involving the urinary tract, such as burning at micturition, a sense of urgency, and nonbacterial urinary tract infections with or without urinary incontinence, including both stress and urgency incontinence. In 58.1% of the patients, urological symptoms were associated with urge or stress incontinence, while 41.9% of the patients suffered from other urological symptoms without urinary incontinence. The average duration of urological symptoms was 3.7 years (SD = 1.3); 22.6% of the patients had a history of cancer, while 45.2% had associated diseases. The average age of the participants was 57 years (SD = 17.2).

Concerning sociodemographic variables, the patients were classified according to the following dichotomous

Treatment of Complex Urological Cases

categories, referred to as "A" or "B." The "A" category included all patients who were unemployed, while the "B" category consisted of patients who had a job or were students. Retired patients were included in "B" category. Moreover, since virtually all patients were also housewives, we did not include this variable in either of the categories. The "A" category contained patients who had not graduated from high school, while the "B" category contained all patients who had at least graduated from high school or had furthered their education. The "A" category contained all patients who did not have a partner at the time of the interview. Married patients and patients who had a partner were included in the "B" category. Childless patients were included in category "A," while the patients who had children were included in category "B."

All of the patients received a urological examination and evaluation by the same urologists, who were blind to the research hypotheses. The visit included a clinical examination, urinalysis, control of renal function parameters, and a cystoscopy, when indicated. A comparative cystometry with an isotonic saline solution in the first run, followed by 0.2 M of potassium chloride at a medium filling velocity of 50 ml/min, was carried out for diagnosis. Furthermore, a urography or nephrosonography was obtained from all patients, and a gynecological examination was performed when indicated. All patients were treated with topical doses of 10,000 IU of heparin three times per week over 5 to 6 weeks. Intermittent catheterization was performed to instill the heparin into the urinary bladder.

At the beginning of medical therapy, the patients underwent the INTERMED interview.¹⁸⁻²⁰ The INTERMED enables a quick assessment of psychosocial aspects as well as aspects of the patients' health care. The INTERMED is an observer-rated instrument that includes interview and ratings sections. The basis for the rating is a 20-30-minute interview with the patient, which can be part of the normal history taking. The INTERMED rating scale synthesizes information from four different domains: biological, psychological, social, and health care. These domains are scored within the context of time: history, present, and prognosis. That results in the possibility of assessing four different domains at three different time periods. Within each of the four domains, two variables for the patient's history and present state and one variable for prognosis are scored, with scores ranging from 0 to 3. A high score means a high degree of case complexity. The scoring system allows a maximum of 15 points for every domain, which means a maximum of 60 points. The first author conducted the INTERMED interviews and performed the

scoring procedure immediately after the interviews. She went through intensive training in the interviewing and scoring method with the third author, who codeveloped the INTERMED. We used the German version of the INTERMED, which was translated from the original English version following a procedure that included a retranslation by a blinded translator and subsequent comparison with the original.

As measures of clinical outcome, we used the validated German versions of the American Urologic Association Symptom Score, the Brief Symptom Inventory, and the Hospital Anxiety and Depression Scale. In order not to let the INTERMED and other questionnaire scoring procedures interfere with one another, the patients were asked to fill in these questionnaires at home after the first visit to the clinic. These questionnaires were returned at the next therapy session. The outcome data of all questionnaires were collected and scored by research assistants at the Medical Psychology Institute of the Innsbruck University Hospital who were blind to the INTERMED scores and to the research hypotheses.

At the end of the medical treatment 5-6 weeks later, every patient was administered the American Urologic Association Symptom Score, the Brief Symptom Inventory, and the Hospital Anxiety and Depression Scale again. The measurements were repeated at a 3-month follow-up in order to provide a measure of possible change with regard to psychological condition, quality of life, and urological symptoms, which we considered related to clinical outcome. The patients received the questionnaires at a follow-up examination and were asked to return them.

The American Urologic Association Symptom Score²⁵ offers a measure of quality of life impairment caused by urological symptoms. This questionnaire was initially developed in 1992 to quantify symptom severity in men with prostatic enlargement and was validated and proved reliable in this field. The instrument is not disease-²⁶⁻²⁸ or gender-^{29,30} specific. It was chosen because it has been extensively researched and validated and has gained a high reputation among urologists. It has also been translated into and validated in different languages, which has provided an assessment of conceptual and linguistic equivalence. We considered a clinical improvement to be present if a severe or moderate impairment had become moderate or mild by the next study phase.

The Brief Symptom Inventory^{31,32} is a short form of the SCL-90-R. It offers a measure of psychological distress, which is summarized by three different indexes: 1) the global severity index, which detects the presence of a

psychological disturbance, 2) the positive symptom total, which measures the intensity of positive symptoms, and 3) the positive symptom distress index, which measures for how many symptoms a positive answer was given. We considered the global severity index to be the most significant measure of the goals of our study.

The Hospital Anxiety and Depression Scale^{33,34} is a screening instrument that is focused on patients who suffer principally from nonpsychiatric medical diseases. It offers a measure of disease-related psychological distress by means of a depression and anxiety index. We used the Hospital Anxiety and Depression Scale because a link between urinary incontinence and depression has been observed in some studies.⁵⁻⁷

For threshold values, we referred to the original versions of the questionnaires. For the American Urologic Association Symptom Score, values range from 0 to 35 points; scores of 0 to 7 and 8 to 19 refer to a mild or moderate impairment, respectively, while a score of 20 to 35 points describes a severe impairment. For the Brief Symptom Inventory, increased values are those that exceed a score of 60. For the Hospital Anxiety and Depression Scale subscales of anxiety and depression, values not greater than 7 are considered normal, values in the 8–10 range are moderately increased, and values greater than 11 are considered significantly increased. In this respect, we considered as increased all values that exceeded 7. Compliance with medical treatment and psychiatric consultations during the study period were assessed by use of patient charts.

Statistical Analysis

Spearman's correlations among INTERMED total and subscale scores and the American Urologic Association Symptom Score and scores on the Brief Symptom Inventory and the Hospital Anxiety and Depression Scale were carried out. In order to highlight different subgroups of patients based on their INTERMED scores, hierarchical cluster analysis was used. This nonparametric method allows for identification of subjects that are similar on the basis of Euclidean distances for all specific variables. Referring to previous studies,^{21,23} we included all 20 INTERMED variables in cluster analysis. Finally, the differences between the low-complexity and the high-complexity patients were tested by using chi-square analysis for categorical data and adjusting for group differences. For all statistical analysis, we used SPSS version 9.0 (SPSS, Chicago).

RESULTS

Spearman's correlations among INTERMED total and subscale scores and the American Urologic Association Symptom Score and scores on the Brief Symptom Inventory and the Hospital Anxiety and Depression Scale at the initial assessment were calculated. The results are shown in Table 1. When we performed hierarchical cluster analysis, including all 20 variables of the INTERMED, two clusters emerged that we referred to as the low-complexity cluster and the high-complexity cluster. Low-complexity patients' scores ranged from 3 to 19 points, while high-complexity patients' scores ranged from 22 to 41 points. This subdivision reflects previous findings³⁵ and confirms the fact that a cutoff score for identifying high-complexity cases is 20–21 points.

The low-complexity patients comprised 80.6% of the group (N = 25) and had low scores on the INTERMED, Brief Symptom Inventory, and Hospital Anxiety and Depression Scale and low American Urologic Association Symptom Scores. For patients in this cluster, the quality of life was improved at the 3-month follow-up. Those patients had no psychiatric admissions and a very low therapy interruption rate (3.4%); 64.0% of them (N = 16) had six normal questionnaire scores out of six.

On the other hand, the high-complexity patients, who comprised 19.4% of the group (N = 6), had high American Urologic Association Symptom Scores and high scores on the Brief Symptom Inventory and the Hospital Anxiety and Depression Scale. A 3-month follow-up showed only poor clinical improvement: 50.0% of the patients (N = 3) had a history of psychiatric admissions, while 33.3% (N = 2) interrupted the medical therapy they were receiving, and 83.3% (N = 5) had at least one abnormal score of two subscale scores on the Hospital Anxiety and Depression Scale and one abnormal score out of three subscale scores on the Brief Symptom Inventory.

A comparison between high- and low-complexity patients with chi-square analysis showed significant differences between the two groups with regard to baseline American Urologic Association Symptom Scores and scores on the Brief Symptom Inventory positive symptom distress index and the depression subscale of the Hospital Anxiety and Depression Scale and American Urologic Association Symptom Scores at the 3-month follow-up. Odds ratios concerning the risk of having poor clinical outcome or significant illness-related psychosocial distress, given a high INTERMED score, were calculated (Table 2). Significant differences between the two patient groups were found

Treatment of Complex Urological Cases

with regard to sociodemographic variables as well. The results are summarized in Table 2 and Table 3.

DISCUSSION

The first question was whether and to what extent the INTERMED was different from other illness severity measures. Measures such as the Cumulative Illness Rating Scale, the Duke Severity of Illness Checklist, and the Seriousness of Illness Rating Scale are able to quantify the qualitative clinical judgment of illness severity, and in some cases, they can also identify the presence of psychiatric comorbidities. However, their scoring procedures are focused on disease-related characteristics, providing little or no information about the patients' psychological or social situations. Moreover, they provide information about the patients' situations at a certain moment without investigating the patients' histories or formulating any kind of prognosis.

While instruments such as the Cumulative Illness Rating Scale, the Duke Severity of Illness Checklist, and the Seriousness of Illness Rating Scale are able to objectively summarize the overall severity of a disease and may also be integrated into the INTERMED scoring procedure, they do not provide the wide range of psychosocial information that is necessary for case management.

From a biopsychosocial perspective, an intervention should integrate not only clinical and disease-related information but also psychological and social aspects. Therefore, health care professionals need instruments that can gather and systematize this information with respect to the patient's history, current state, and prognosis. That may help to structure an intervention that meets the patient's whole health care needs.

Our data show that the INTERMED has high corre-

lation scores with all of the clinical questionnaires we used. At a minimum, the INTERMED total score correlates with all of the questionnaire indices. This implies that the higher the INTERMED score, the more likely our patients were to experience disease-related anxiety and depression, to have some kind of psychosocial disturbance, and to experience impairment of quality of life as related to urinary tract symptoms. Administering and scoring those three clinical questionnaires took the same amount of time as was needed to use the INTERMED.

The INTERMED provides a larger amount of information than do single clinical questionnaires, and it shows the patients' vulnerability and health care needs. For these reasons, assessing patients with the INTERMED could actually represent a more economic and comprehensive screening procedure. Further studies should demonstrate whether such correlations could also be observed in larger clinical populations and to what extent the different domains of INTERMED preferentially correlate with more domain-specific questionnaires.

Another question is whether and to what extent the use of the INTERMED is meaningful for urological patients. Urological patients may comprise a heterogeneous population that could consequently have very different needs. The INTERMED helped detect two symptom clusters, the features and needs of which were different. Cluster analysis confirmed a threshold value of a score of 20–21, which has been found in previous studies with medical inpatients.³⁵

The low-complexity cluster comprised a large group of patients whose medical condition was not so severe as to seriously impair their quality of life. Moreover, they tended to have a good psychosocial situation, and even if they had experienced some kind of psychological distress, they did not need psychiatric intervention. Finally, the low-

TABLE 1. Spearman's Correlations (r_s) Among INTERMED Total and Subscale Scores and Other Severity of Illness Measures at Baseline for 31 Patients With Urinary Tract Symptoms

Measure	INTERMED Domain Score								INTERMED Total Score	
	Biological		Psychological		Social		Health Care		r_s	p
	r_s	p	r_s	p	r_s	p	r_s	p		
Hospital Anxiety and Depression Scale										
Anxiety	0.33	<0.08	0.64	<0.0001	0.08	<0.68	0.32	<0.08	0.42	<0.02
Depression	0.46	<0.01	0.52	<0.003	0.56	<0.001	0.42	<0.02	0.58	<0.001
Brief Symptom Index										
Global severity index	0.58	<0.001	0.52	<0.002	0.50	<0.004	0.49	<0.005	0.64	<0.0001
Positive symptom total	0.55	<0.001	0.43	<0.02	0.35	<0.054	0.40	<0.03	0.56	<0.001
Positive symptom distress index	0.59	<0.001	0.43	<0.02	0.53	<0.002	0.51	<0.003	0.63	<0.0001
American Urologic Association Symptom Score	0.10	<0.59	0.62	<0.0001	0.41	<0.03	0.35	<0.06	0.38	<0.04

TABLE 2. Relation of Severity of Illness Measures^a and Demographic Characteristics to Patient Grouping in Patients With Urinary Tract Symptoms Assigned to INTERMED Low-Complexity and High-Complexity Clusters^b

Measure or Demographic Characteristic	Low-Complexity Cluster (N = 25)		High-Complexity Cluster (N = 6)		Analysis		Odds Ratio	95% CI
	N	%	N	%	χ^2	df		
Normal score on Hospital Anxiety and Depression Scale								
Anxiety	24	96.0	4	66.7	3.84	1	<0.05	0.76-75.16
Depression	22	88.0	2	33.3	9.57	1	<0.002	2.25-87.25
Normal score on Brief Symptom Inventory								
Global severity index	15	60.0	1	16.7	6.35	1	<0.02	1.28-33.03
Positive symptom total	16	64.0	2	33.3	2.64	1	<0.11	—
Positive symptom distress index	16	64.0	1	16.7	6.35	1	<0.02	—
Better American Urologic Association Symptom Score at 3-month follow-up	22	88.0	3	50.0	6.65	1	<0.01	1.72-181.29
Patient Characteristic								
Unemployed	1	4.0	1	16.7	12.34	1	<0.0001	—
With higher education	10	40.0	1	16.7	0.88	1	<0.35	—
Living with a partner	15	60.0	0	0.0	18.36	1	<0.0001	—
Childless	5	20.0	1	16.7	2.13	1	<0.15	—

^aAdjusted for group differences. Published threshold values were used for normal and pathological scores on the Hospital Anxiety and Depression Scale, the Brief Symptom Inventory, and the American Urologic Association Symptom Score.

^bLow-complexity patients had INTERMED scores <21, and high-complexity patients had INTERMED scores \geq 21 out of 60 possible points.

Treatment of Complex Urological Cases

complexity group's health care domain score was in line with the patients' low therapy interruption rate.

On the other hand, the small high-complexity cluster comprised patients with severe medical conditions and, consequently, severe impairment of quality of life. These patients experienced both disease-related psychological distress—mostly depressive disturbances—and more general psychological symptoms. In one-half of these patients, symptoms required psychiatric admission. The high-complexity group's health care domain score could be linked to the fact that one-third of the patients interrupted their medical therapy.

A comparison of the two groups showed that the high-complexity patients tended to be significantly more anxious and depressed, to have more psychological symptoms and poorer social integration—more often being unemployed and living without a partner—to experience more impairment of quality of life, and to have a worse clinical outcome than the low-complexity patients. These results underline the content and prognostic validity of the INTERMED.

Since the INTERMED has proved its validity in different clinical subpopulations, the first goal of this study was to evaluate to what extent the INTERMED scoring procedure could be transferred to urology patients. Data concerning a larger group of patients were needed in order to generalize our findings. However, the study shows that the use of INTERMED is feasible in a busy urological

clinic and confirms the ability of the INTERMED to detect vulnerable patients and patients with poor compliance with medical treatment who need an interdisciplinary therapeutic approach and, sometimes, case management. It also suggests that the INTERMED can be useful in heterogeneous populations, in which screening with standard psychological questionnaires or medical treatments may overlook at-risk patients.

Even if the low-complexity patients did not need immediate psychosocial interventions, their INTERMED total scores were in some cases 17–19, and approximately one-seventh of these patients experienced disease-related anxiety or depression disturbances, general psychological distress, or a large amount of intense psychological symptoms. This may suggest that even in low-complexity populations there could be a core of patients whose still fragile but not yet critical situation can eventually undergo sudden worsening. These patients with an intermediate score may need very careful follow-up procedures and prophylactic interventions, particularly if they do not experience severe physical illness. Further research may develop with the INTERMED for methods to better differentiate the needs of low-complexity patients.

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TABLE 3. Relation of INTERMED Total and Domain Scores to Patient Grouping in Patients With Urinary Tract Symptoms Assigned to INTERMED Low-Complexity and High-Complexity Clusters^a

INTERMED Score	Low-Complexity Cluster (N = 25, 80.6%)		High-Complexity Cluster (N = 6, 19.4%)	
	Median	Range	Median	Range
Total	14	3–19	28.5	22–41
Domain				
Biological	5	1–11	10	8–12
Psychological	2	0–6	10	5–12
Social	0	0–4	4.8	2–6
Health care	4	0–7	8	6–9

^aLow-complexity patients had INTERMED scores <21, and high-complexity patients had INTERMED scores ≥21 out of 60 possible points.

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