# Research and concepts

# Incorporating patients' assessments of satisfaction and quality: an integrative model of patients' evaluations of their care

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## Abstract

This study investigates the apparent methodological shortcomings of the current literature that considers patients' evaluations of their care. In an effort to resolve the evident discrepancies between stated assertions and empirical evidence, integrates the two prominent streams of research to produce a more comprehensive model. Results suggest that just two distinct dimensions of the care experience were found to capture 74 per cent of the variance in satisfaction-quality, with patients' sociodemographic differences accounting for only 1 per cent.

## Introduction and background

A firm understanding of how patients evaluate their health care is critical to the development of sound initiatives aimed at maintaining and improving these evaluations. As a critical aspect of health care marketing, managing patients' assessments of their care is increasing in importance due to heightened competition, the decreasing asymmetry of information between providers and their patients, and legislative reactions to the increasingly vocal demands of patients. The increasing use of report cards containing patient satisfaction components and comparing health care organizations, and the increasing participation of non-military, civilian providers in the Department of Defense's TRICARE managed care programs, further heightens the importance of a deeper understanding of military patients' assessments.

With the increasing emphasis on cost containment and competition in the established capitated medical environment, it becomes more important than ever for health care organizations to have an accurate representation of patients' perceptions of care. Further, if these perceptions suggest deficiencies, policies and initiatives should make strides to improve care delivery. Patient assessments, when used in concert with other effectiveness and efficiency measures, can provide a more comprehensive consideration of organizational contributions (Finkelstein *et al.*, 1999). Preliminary results from health care report cards suggest that without an emphasis on patients' perceptions and in the presence of varying degrees of patient choices, health care organizations may not be prepared to meet the demands of patients (Jewett and Hibbard, 1996; Knutson *et al.*, 1998).

Although numerous studies have examined patients' assessments, many questions still remain unanswered. Patients' evaluations of quality remain unclear. In the absence of medical training, patients are not as qualified as their providers to determine technical competence. However, with health care organizations marketing directly to patients via television advertisements and the Internet, this asymmetry of information may be decreasing. Additionally, the number of distinct concepts upon which patients base their evaluations is questionable. The relationship between the established variables

and models containing satisfaction and quality provide a unique research opportunity. Thus, this is an area of research that will enhance managerial understanding. Our study will use a factor analysis of the common variables to determine if there is enough overlap between variables to make them indistinguishable to the patient. If there is statistically significant overlap, then a better understanding of how the variables cluster together and suggestions for prioritizing efforts should result.

This would save both time and resources for the institution performing the survey and time for the patient completing the survey. Without discounting the obvious benefits of a multi-item instrument, significant findings can provide valuable information for the development of health care research methods and policy. Conversely, non-significant findings will also yield theory-advancing insight as patients' areas of interest and concern are better delineated.

Finally, a secondary focus of our study is to begin the process of delineating the similarities or dissimilarities between military and civilian patients. In published literature, there are very few studies identifying the potential differences of military patients whose care is provided or subsidized by the federal government. Furthermore, no solid stream of comparative research has surfaced that addresses this population of non-indigent military service members and their non-military family members. Our study seeks to provide one of the most comprehensive considerations of these two populations by comparing published models and studies of military and non-military patients, to our empirically based assessments of patients affiliated with the military.

Surveys on patients' satisfaction and quality assessments must allow the researcher to identify correctly predictors of variations in order to be useful. Patient-specific sociodemographic and health care encounter characteristics have yielded inconclusive findings as predictors. Therefore our study will also examine sociodemographic characteristics and determine how they relate to patients' evaluations of quality and satisfaction. In summary, our study examines the empirical and multi-faceted focus of patients' evaluations of satisfaction and quality of care.

## Theoretical foundation and hypotheses

### Patient satisfaction theory

Assessments of health care, that include and are more comprehensive than assessments of medical care, encompass medical, social, cognitive and emotional components (Dean, 1999). Patient satisfaction cannot be considered as a unitary concept. According to Linder-Pelz's patient satisfaction theory, patient satisfaction with health care, as an attitude, is based on the summation of the very subjective assessments of the dimensions of the care experience (Linder-Pelz, 1982). These dimensions can include interactions with providers, the ease of access, the burden of costs, and the environmental issues such as cleanliness of the health care facility.

Patient satisfaction has been operationally defined and measured through an abundance of methods and instruments. Although using a multitude of scales and tools, the published literature strongly supports the depiction of patients' satisfaction as a multi-faceted attitude (Chisick, 1997; Hall and Dornan, 1988; Hall and Press, 1996; Lewis, 1994; McKinley et al., 1997; Mittal and Baldasare, 1996; Norcross et al., 1996). As such, patient satisfaction should be considered as a multidimensional concept. Published studies indicate that access (Hall and Press, 1996; McKinley et al., 1997; Piette, 1999), communication (Cooper-Patrick et al., 1999; Joos et al., 1996; Piette, 1999; Roter et al., 1997), and outcomes (Bayley et al., 1995; Cooper-Patrick et al., 1999; Hall and Dornan, 1988; Kyes et al., 1999; Piette, 1999; Rutledge and Nascimento, 1996) predict patients' satisfaction with their care. These predictive variables have consistently manifested a positive association with patients' satisfaction.

### Patient assessments of quality

Patients' evaluations of the quality of the care received often deviate significantly from clinically based measures of quality (Edgman-Levitan and Cleary, 1996; Hibbard and Jewett, 1997; Jewett and Hibbard, 1996). Information asymmetry and the denial or exaggeration of the severity of illness and injury are possible explanations for this disparity. Notwithstanding this potentially inaccurate evaluation of care quality, patients will often readily enter into the opportunity to provide such evaluations (Isaacs, 1996).

More importantly to health care organizations, patients tend to make decisions regarding their source of care based upon these evaluations. This makes their evaluations of quality important no matter how impaired.

Jun et al. (1998) categorize perceptions of quality as evaluations of the care experience. More definitively, previous works have suggested and empirically supported that caring (Bowers et al., 1994; Jun et al., 1998; Lewis, 1994; Linder-Pelz, 1982; Tucker, 1998; Ware et al., 1978; Ware and Snyder, 1975; Ware et al., 1983), empathy, reliability, and responsiveness (Bowers et al., 1994; Calleja and Gauci, 1999; Hall and Dornan, 1988; Jun et al., 1998; Lewis, 1994; Tudor et al., 1998), predict patients' assessments of the quality of their care. Further, the relationship between these predictive variables has proven to be positively associated with patients' assessments.

Published studies of patients' assessments of quality have considered expectations, disconfirmation and perceptions as associated factors, through service quality (SERVQUAL) models. In one of the strongest empirical studies to date, Taylor and Cronin (1994) concluded that patients' expectations failed to significantly predict their satisfaction or disconfirmation. Their findings strongly suggest that the gap analysis portion of SERVQUAL models, although adding value, may be inappropriate as a stand-alone methodology for capturing patients' assessments of their care. Consistent with service performance (SERVPERF) models, SERVQUAL variables in absentia of gap analysis appear to be salient and are used in our study (Hibbard et al., 1996; McAlexander et al., 1994). This stream of research suggests that patients' assessments of quality are best understood as attitudes which continue to be empirically validated in recent studies (Andaleeb, 1998; Bebko, 1998; Dyck, 1996).

The literature on patient determined quality inconclusively predicts the direction between satisfaction and quality from the patient's perspective (Cleary and McNeil, 1988; Koehler et al., 1992; Taylor, 1994; Taylor and Cronin, 1994; Oswald et al., 1998; McAlexander et al., 1994). Further supporting this position, the National Committee for Quality Assurance uses a patient satisfaction survey as part of its Health Plan Employer Data and Information Set (HEDIS) quality standards. Consequently, it is used in the Quality Compass report card, and in the decisions concerning managed care plan accreditation. Additionally, a number of public and private health care organizations also use the HEDIS framework in their assessments of quality (Bolus and Pitts, 1999; Thompson et al., 1998) and quality is found to be positively correlated with satisfaction. The correlation between quality and satisfaction is rarely refuted but the direction and strength of the predictive relationship remains unclear.

Several conclusions can be gleaned from these studies:

- patients perceive quality based on elements of care other than technical dimensions such as the technical competence of the provider;
- the importance of expectations and disconfirmation is unclear;
- the relationship between patients' assessments of satisfaction and quality is undecided; and
- patients will make evaluations of their care whether they are medically qualified or not.
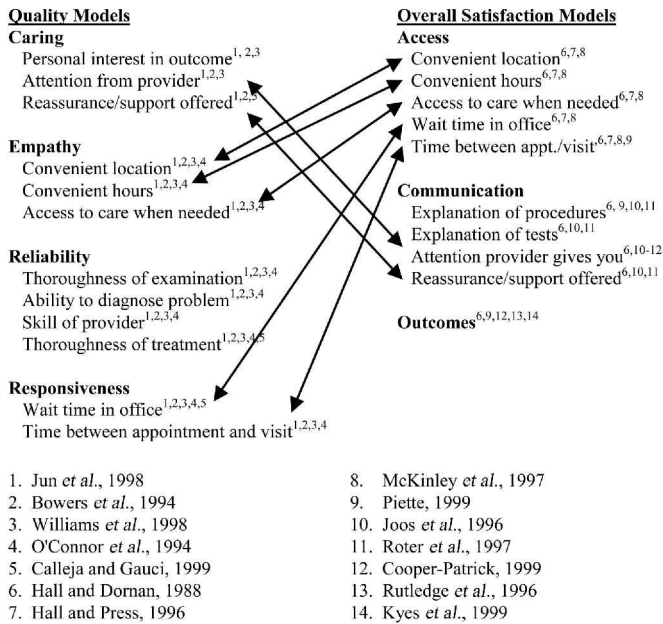
Herein lies a portion of the contribution of our study.

## The integrated model

Multi-item surveys provide the opportunity to address specific issues or concerns and measure individual concepts. However, potential problems arise with multi-item patient satisfaction surveys. First, they often include dozens of variables that do not appear to specify distinct and separate concepts. Additionally, such an instrument can be very expensive to administer effectively, and often takes patients excessive time to complete. As a result, health care organizations may not be able to afford to administer comprehensive surveys. In addition, patients may be unwilling to complete the surveys or may submit incomplete surveys.

As Figure 1 shows, between satisfaction and quality models, several of the variables are cross-referenced by their operational definitions. These numerous duplications of the operational definitions of the variables discovered in published studies seriously challenge whether these models are distinct and separate. Additionally, there is inconclusive evidence as to the predictive direction of the relationship between
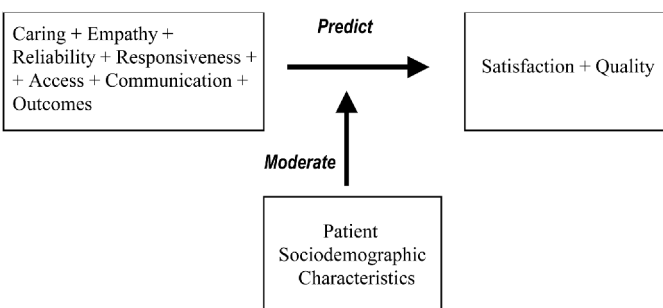
**Figure 1** Cross-referenced models demonstrating duplications



Meredith and Wood, 1996; O'Connor *et al.*, 1994; Young *et al.*, 1996), social psychological theory suggests a basis for patients' evaluations. Individual life experiences and interpersonal relationships between providers often alter these evaluations. This provides a fertile opportunity for research and discovery. As a result, a de-confounding statistical technique is required to isolate and extract the underlying phenomena at work. This theoretical foundation purports the following hypothesis:

*H1.* Patients' integrated evaluations of access, communication, outcomes, caring, empathy, reliability, and responsiveness, will be positively associated with their integrated evaluations of satisfaction and quality.

**Social psychological theory**

Social psychological theories propose that patients' evaluations are moderated, or in some cases mediated, by personal feelings of equity in the exchange, disconfirmation between desires and outcomes, individual preferences, social comparisons, and other complex phenomena (Williams *et al.*, 1998). These theories strongly suggest that differences among patients can influence their attitudes. That is, people differ in their orientations towards care because of social, cultural, and otherwise distinct orientations to which they associate themselves (Fox and Storms, 1981). According to social identity theory, attitudes are moderated by demographic, situational, environmental, and psychosocial factors (Haslam *et al.*, 1993; Jackson *et al.*, 1996; Kosmitzki, 1996; Platow *et al.*, 1997). Further, interpretations of these factors are tempered by individual beliefs, perceptions, and frames of references that are fine-tuned by cultural orientations (Carr-Hill, 1992).

Individual stereotypes (Haslam *et al.*, 1993; Vonk and van-Knippenberg, 1995), experiences (Fox and Wold, 1996; Rowland and Shoemaker, 1995), situational circumstances (Brennan, 1995), physical environment (Reidenbach and Sandifer-Smallwood, 1990), and social comparisons (Brady and Logsdon, 1988; Festinger, 1954; Klein, 1997) are factors that have been shown to affect attitude formation and development. Additionally, the documented disparity between the health care needs of patients of different ages (Callahan, 1992; Kohler, 1990) and gender (Byles *et al.*, 1997; Levison, 1996), and the health care seeking behaviors

satisfaction and quality (Cleary and McNeil, 1988; Jun *et al.*, 1998; Koehler *et al.*, 1992; McAlexander *et al.*, 1994). That is, studies have not shown whether a patient's satisfaction with their care predicts their assessments of the quality of that care or vice versa. This, coupled with the high degree of correlation between the two variables of satisfaction and quality (Cleary and McNeil, 1988; Koehler *et al.*, 1992; Lewis, 1994; McAlexander *et al.*, 1994), suggests that an integrative model of access, communication, outcomes, caring, empathy, reliability, and responsiveness should predict the combined variables of satisfaction and quality. If this proves to be true, then a single survey of grouped and focused variables can predict both patient satisfaction and quality (Figure 2).

Since most patients lack the technical expertise in health care delivery to effectively evaluate each individual aspect of their care (Chaston, 1994; Jackson and Kroenke, 1997;

**Figure 2** Integrative model of patients' evaluations of their care

of patients of different races (Bailey, 1987; Francis, 1990; Raczynski *et al.*, 1993; Williams, 1994) and gender (Cooper-Patrick *et al.*, 1999; Norcross *et al.*, 1996), could produce experiences which influence satisfaction and quality evaluations positively or negatively (Mummalaneni and Gopalakrishna, 1995) (Figure 2).

Finally, as patient sociodemographic characteristics are theorized to moderate and not mediate their integrated evaluations of satisfaction and quality, the evaluations of patients affiliated with the military should fit patient satisfaction and quality models used in previous studies. By virtue of their association with the different branches of the military, the models should merely be altered and not destroyed. These moderating characteristics suggest the following hypothesis:

*H2.* Patients' sociodemographic characteristics will moderate the relationship between their integrated evaluations of access, communication, outcomes, caring, empathy, reliability, and responsiveness, and their integrated evaluations of satisfaction and quality.

## Methods

### Data
In May and June of 1996, the Department of Defense (DOD) conducted a patient satisfaction survey and descriptive study of the more than 8 million worldwide DOD beneficiaries (Data Recognition Corporation *et al.*, 1997). The data for our study come from 89,701 Army, Air Force, Navy, Marine Corps, Coast Guard, Public Health Service, and National Oceanic and Atmospheric Administration beneficiaries located around the world who responded to the survey. Respondents included active duty military service members, retirees, and their non-military family members. The 57 per cent response rate exceeded the required sample size of 89,079 for a 95 per cent confidence level (Cochran, 1977; Data Recognition Corporation *et al.*, 1997). The sociodemographic profile of the 49,478 respondents who received care in a military facility is found in Table I.

### Measures
The variables under analysis and the actual questions used to measure the variables are listed in Table II. Using the operational definitions from previously published works, all variables were captured on five-point Likert scales contained in a survey that was mailed to patients. Patients were asked to rate a number of different aspects of the health care that they received (Table II) as excellent (5), very good (4), good (3), fair (2) or poor (1), not their satisfaction with these aspects. For example, the access questions asked patients to rate the various dimensions of access to health care from excellent to poor, not their satisfaction with their access to health care. Exceptions to this methodology were the measures for quality and satisfaction as individual dependent variables, and questions pertaining to patient sociodemographic characteristics. Only the questions comparable to previously published works and pertaining to the variables under consideration were used in our study.

### Satisfaction variables
As a dependent variable and consistent with published patient satisfaction models (Figure 3), satisfaction was measured by a single survey question that asked patients how satisfied they were with the health care that they received (strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree). The multidimensional aspects of satisfaction suggested by previous studies (Chisick, 1997; Hall and Dornan, 1988; Hall and Press, 1996; Lewis, 1994; McKinley *et al.*, 1997; Mittal and Baldasare, 1996; Norcross *et al.*, 1996), offer the following independent variables to predict satisfaction: access (Hall and Press, 1996; McKinley *et al.*, 1997; Piette, 1999), communication (Cooper-Patrick *et al.*, 1999; Joos *et al.*, 1996; Piette, 1999; Roter *et al.*, 1997), and outcomes (Bayley *et al.*, 1995; Cooper-Patrick *et al.*, 1999; Hall and Dornan, 1988; Kyes *et al.*, 1999; Piette, 1999; Rutledge and Nascimento, 1996). Figure 1 provides a listing of the satisfaction variables extracted from the literature and our data set, and used for our study.

#### Access
Access addresses patients' ability to obtain their health care and outlines barriers to obtaining that care. Five questions were used to measure patients' assessments of access. Patients were asked to rate the convenience of their treatment location, the convenience of

**Table I** Means, standard deviations, and correlations

| Variable | Mean | s.d. | N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Convenient location | 3.73 | 1.19 | 50900 | | | | | | | | | | | | | | | | | | | | | | |
| 2. Convenient hours | 3.33 | 1.17 | 50557 | 0.52* | | | | | | | | | | | | | | | | | | | | | |
| 3. Access to care when needed | 2.94 | 1.31 | 49935 | 0.46* | 0.62* | | | | | | | | | | | | | | | | | | | | |
| 4. Provider personal interest in outcome | 3.00 | 1.21 | 46619 | 0.31* | 0.47* | 0.53* | | | | | | | | | | | | | | | | | | | |
| 5. Wait time in office | 2.81 | 1.11 | 50016 | 0.35* | 0.50* | 0.54* | 0.56* | | | | | | | | | | | | | | | | | | |
| 6. Time between appointment and visit | 2.76 | 1.12 | 47470 | 0.36* | 0.49* | 0.63* | 0.51* | 0.66* | | | | | | | | | | | | | | | | | |
| 7. Thoroughness of treatment | 3.1 | 1.11 | 48999 | 0.33* | 0.50* | 0.54* | 0.74* | 0.56* | 0.51* | | | | | | | | | | | | | | | | |
| 8. Ability to diagnose problem | 3.14 | 1.13 | 48269 | 0.32* | 0.49* | 0.53* | 0.70* | 0.55* | 0.50* | 0.85* | | | | | | | | | | | | | | | |
| 9. Skill of care provider | 3.34 | 1.07 | 49616 | 0.33* | 0.49* | 0.51* | 0.72* | 0.54* | 0.49* | 0.88* | 0.85* | | | | | | | | | | | | | | |
| 10. Thoroughness of examination | 3.24 | 1.12 | 48700 | 0.33* | 0.48* | 0.52* | 0.71* | 0.55* | 0.50* | 0.82* | 0.81* | 0.79* | | | | | | | | | | | | | |
| 11. Explanation of procedures | 3.26 | 1.11 | 48577 | 0.34* | 0.49* | 0.55* | 0.74* | 0.55* | 0.52* | 0.78* | 0.75* | 0.77* | 0.75* | | | | | | | | | | | | |
| 12. Explanation of tests | 3.24 | 1.13 | 46033 | 0.33* | 0.49* | 0.54* | 0.74* | 0.55* | 0.51* | 0.77* | 0.74* | 0.76* | 0.73* | 0.87* | | | | | | | | | | | |
| 13. Attention provider gives you | 3.1 | 1.16 | 49517 | 0.31* | 0.48* | 0.53* | 0.77* | 0.55* | 0.51* | 0.78* | 0.75* | 0.77* | 0.75* | 0.81* | 0.82* | | | | | | | | | | |
| 14. Reassurance/support | 3.24 | 1.13 | 46635 | 0.33* | 0.50* | 0.54* | 0.82* | 0.57* | 0.52* | 0.76* | 0.72* | 0.74* | 0.72* | 0.77* | 0.76* | 0.79* | | | | | | | | | |
| 15. Outcome of care | 3.22 | 1.10 | 49169 | 0.34* | 0.49* | 0.56* | 0.72* | 0.55* | 0.53* | 0.85* | 0.81* | 0.80* | 0.76* | 0.77* | 0.74* | 0.76* | 0.74* | | | | | | | | |
| 16. Quality | 3.22 | 1.10 | 50009 | 0.38* | 0.48* | 0.59* | 0.74* | 0.60* | 0.58* | 0.84* | 0.80* | 0.81* | 0.77* | 0.80* | 0.77* | 0.77* | 0.76* | 0.85* | | | | | | | |
| 17. Satisfaction | 3.57 | 1.13 | 54393 | 0.28* | 0.55* | −0.64* | 0.58* | 0.52* | 0.51* | 0.63* | 0.61* | 0.61* | 0.59* | 0.60* | 0.58* | 0.59* | 0.59* | 0.63* | 0.71* | | | | | | |
| 18. Age | 47.18 | 18.2 | 58504 | 0.03* | 0.29* | 0.56* | 0.29* | 0.24* | 0.11* | 0.28* | 0.26* | 0.26* | 0.25* | 0.21* | 0.24* | 0.24* | 0.27* | 0.1* | 0.25* | 0.17* | | | | | |
| 19. Number of visits | 6.1 | 9.69 | 54284 | 0.02* | 0.03* | 0.05* | 0.06* | 0.02* | 0.03* | 0.03* | 0.02* | 0.03* | 0.03* | 0.04* | 0.04* | 0.03* | 0.05* | 0.01* | 0.04* | 0.04* | 0.00 | | | | |
| 20. Health status | 3.49 | 1.00 | 58244 | 0.10* | 0.00 | 0.08* | 0.01* | 0.04* | 0.09* | 0.06* | 0.07* | 0.05* | 0.06* | 0.07* | 0.05* | 0.07* | 0.04* | 0.11* | 0.08* | 0.07* | −0.39* | −0.16* | | | |
| 21. Marital status | 1.91 | 0.28 | 58122 | −0.04 | 0.06* | −0.03* | 0.03* | 0.03* | −0.03* | 0.03* | 0.03* | 0.03* | 0.03* | 0.02* | 0.03* | 0.01* | 0.03* | 0.02* | 0.01* | 0.01* | 0.35* | 0.02* | −0.12* | | |
| 22. Race | 1.20 | 0.40 | 57141 | −0.00 | −0.03* | 0.03* | −0.02* | −0.05* | −0.02* | −0.05* | −0.06* | −0.06* | −0.05* | −0.04* | −0.04* | −0.03* | −0.03* | −0.04* | −0.03* | −0.02* | −0.15* | 0.02* | 0.00 | −0.06* | |
| 23. Gender | 1.51 | 0.50 | 57277 | −0.01* | −0.02* | −0.04* | −0.06* | −0.02* | −0.04* | −0.04* | −0.04* | −0.04* | −0.03* | −0.02* | −0.03* | −0.05* | −0.05* | −0.04 | −0.03* | −0.01 | −0.00 | −0.01 | −0.04* | 0.11* | 0.15* |

**Note** * $p < 0.05$

**Table II** Variables of the study

**Independent variables[a]**

Please rate the following aspects of the health care you received at Military facilities in the past 12 months. (If question does not apply to you, mark Not Applicable.)

Convenience of location of treatment

Convenience of hours

Access to health care whenever you need it

Health care provider's personal interest in the outcome of your problem

Length of time you wait at the office to see the provider

Length of time you wait between making an appointment for routine care and the day of your visit

Thoroughness of treatment

Ability to diagnose your health care problems

Skill of health care providers

Thoroughness of examination

Provider's explanation of procedures

Provider's explanation of medical tests

Attention provider gives to what you have to say

Reassurance and support offered to you by health care providers

The outcomes of your health care (how much you were helped)

**Moderating variables**

What age were you on your last birthday?

Are you eligible for care because of your own military service, your spouse's service or both?

What is the zip code, APO, or FPO where you live now?

What is your present rank?

In which branch of the service are you, or your spouse if you are not military, presently serving?

What is the highest school grade or academic degree that you have?

Which of the following best describes your current health status?

What race do you consider yourself to be?

Are you a male or female?

In general, would you say your health is:[a]

How many visits did you make to a military treatment facility in the past 12 months?

**Dependent variables**

Overall quality of health care[a]

I am satisfied with the health care that I received[b]

**Notes:** [a]Excellent (5), very good (4), good (3), fair (2) or poor (1); [b]strongly agree (5), agree (4), neither agree nor disagree (3), disagree (2), strongly disagree (1)

the available hours for treatment, access to care when needed, in-office waiting times and the length of time between making their appointment and the day of their treatment.

*Communication*

Counseling, advice and guidance from providers all serve as gauges of patient-provider communication. To assess patients' sentiments regarding communication during their health care encounters, patients were asked to rate their provider's explanations of health care procedures, explanations of tests, the attention that providers offered to them, and the reassurance and support given by their providers.

*Outcomes*

Although patients are limited in assessing clinical outcomes, they will inexplicably form opinions about improvements in their condition, functionality and interactions with providers. These opinions can be transformed and interpreted by patients as outcomes of care if they attribute the change in their condition or status to the efforts of their providers. This final satisfaction variable was captured with one question. Patients were asked to rate the outcomes of their health care and how much they felt that they were helped.

**Quality variables**

As a dependent variable, quality was also measured by a single survey question that asked patients to rate the overall quality of the health care that they received. As suggested by previous studies, the independent variables used to predict quality were caring (Bowers *et*

*al.*, 1994; Jun *et al.*, 1998; Lewis, 1994; Linder-Pelz, 1982; Tucker, 1998; Ware *et al.*, 1978; Ware and Snyder, 1975; Ware *et al.*, 1983), empathy, reliability, and responsiveness (Bowers *et al.*, 1994; Calleja and Gauci, 1999; Hall and Dornan, 1988; Jun *et al.*, 1998; Lewis, 1994; Tudor *et al.*, 1998) (Figure 4). These variables were also captured via patients' ratings on five-point Likert scales (excellent, very good, good, fair and poor). Figure 1 provides a listing of the quality variables extracted from the literature and our data set, and used for our study.

*Caring*

Caring is conceptually defined as the thoughtfulness expressed by providers and was captured by measuring the provider's ability to interact with their patients. Three questions were used to measure caring from the patient's perspective. First, patients were asked to rate the degree to which they felt their providers expressed a personal interest in the outcome of their problem. Second, they were asked to rate the degree to which providers conveyed attentiveness to their comments and concerns. Finally, patients were asked to rate the feelings of reassurance and support offered by their health care providers.

*Empathy*

Different from caring, empathy considers deeper, often unseen expressions of compassion and concern by providers. As such, assessments of empathy are more perceptual than assessments of caring. To assess empathy, patients were also asked three different questions. Patients were asked to rate the convenience of the location of their treatment, the convenience of the available hours for their treatment, and their access to health care whenever they felt that it was needed.

*Reliability*

Reliability was measured using four questions. First, patients were asked to rate the thoroughness of their examination. Second, patients were asked to rate their perception of their provider's ability to

diagnose their problem. Third, patients were asked to rate their perception of their provider's skills. Finally, patients were asked to rate the thoroughness of their treatment.

*Responsiveness*

The final variable, gleaned from previously published quality models, is responsiveness. As an assessment of how reactive health care systems and providers are to patients' needs, responsiveness seeks to delineate patients' perceptions of sensitivity and consideration. Patients were asked to rate the length of time that they waited in the office to see a provider, the length of time between making their appointment and the day of their treatment.

**Moderating sociodemographic variables**

The moderating sociodemographic variables considered in our study are shown in Table II. Variables specific to military populations include beneficiary group, catchment area, rank, and service branch. Beneficiary group specifies whether a patient was full time, reserve or retired military, or an entitled non-military family member of an aforementioned group. Catchment area designates patients by the 40 mile (outside the USA) or 60 mile (in the USA) radius of responsibility of each military health care facility, and rank designates full-time, reserve or retired patients by military grade or title.

Rank, generally characterized as enlisted or officer, represents the social and authoritative hierarchy of the military. Enlisted service members are required to possess the minimum of a high school education (or equivalent) and officers must have obtained at least a baccalaureate degree from an accredited university. Enlisted service members hold a rank at one of nine different levels. On the other hand, officers maintain social and authoritative power at a level higher than any enlisted member and possess a rank at one of 11 different levels. As a result, rank can be used as a proxy for social class.

Finally, service branch denotes patients as affiliated with the Army, Navy, Air Force, Marine Corps, Coast Guard, Public Health Service or other DOD branch.

**Analysis**

Principal component factor analysis and regression were used due to their combined ability to address issues of confounding and multicollinearity. Empirically, a sound factor

**Figure 3** Patient satisfaction models

$$\text{Satisfaction}(Y) = \beta_0 + \text{Access}\beta_1 + \text{Communication}\beta_2 + \text{Outcomes}\beta_3 + \varepsilon$$

**Figure 4** Models of patient assessments of the quality of their care

$$\text{Quality}(Y) = \beta_0 + \text{Caring}\beta_1 + \text{Empathy}\beta_2 + \text{Reliability}\beta_3 + \text{Responsiveness}\beta_4 + \varepsilon$$

structure produces derivatives of the analyzed variables that are not correlated, and can subsequently be used as variables. This data reduction technique clusters variables into groups that are internally correlated but lack cross group relationships.

First, factor analysis was used to reduce the independent variables of the quality and satisfaction models to create the independent factors that would ultimately serve as the integrated evaluations of access, communication, outcomes, caring, empathy, reliability, and responsiveness. The factors derived from this portion of the analyses served as the independent variables in subsequent hierarchical regressions. Second, factor analysis was again used to reduce the two dependent variables, satisfaction and quality, to create the dependent factor that was used as the integrated evaluation of satisfaction and quality. This factor ultimately served as the dependent variable. Finally, the initial factor analysis was also used to reduce the sociodemographic variables and create the factors that were used to assess the moderating effects of patient characteristics.

Hierarchical linear regression was used to assess the predictive value of the final model and the moderating effects of patients' specific characteristics. First, the independent variables as reduced factors were loaded into a regression model to determine their predictive value. A sound regression model and significant $R^2$ were the burdens of support for the first hypothesis. Next, the sociodemographic moderating variables as reduced factors were introduced into the first regression model to determine their moderating effects. A sound regression model and a statistically significant change in the $R^2$ served as the burden of support for moderation and the second hypothesis.

## Results

The descriptive statistics are reported in Table I and Table III presents the results of the factor analysis on the variables of our study. Principal components factor analysis with Varimax rotation extracted eight factors that explained the original 26 independent and sociodemographic variables. This suggests that the models truly depict only eight unrelated phenomena as opposed to 26

distinct concepts or variables. The derived factor structure in Table III was a good fit to the data ($\chi^2_{325} = 580665, \frac{\chi^2}{df} = 1786.66$) and empirically sound for several reasons. First, attesting to scale reliability, the Cronbach's alpha for each multi-item scale is greater than 0.70 (0.74 − 0.98) and the Hotelling's $T$-Squared statistics are significant at the 0.01 level. Second, attesting to factor model reliability and stability, the factor loadings are all significant at the less than 0.01 level ($> |0.38|$), the factors explain more than 70 per cent of the variance in the original variables (74 per cent), and the mean communality is greater than 0.60 (18.488/26 = 0.74). Finally, the appropriateness of the factor model is strongly supported by a Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy >0.5 (0.924) and Bartlett's Tests of Sphericity significant at the 0.01 level (Stevens, 1996).

Cronbach's alphas certify that the factors are reliable measures of the original variables and the remaining statistics confirm the validity and adequacy of the factors. Additionally, and consistent with previous works, all multi-scaled items loaded together under individual factors. This suggests that the multiple questions used to measure each variable are internally consistent and measure related phenomena.

Finally, Table IV shows that the factor structure of the two dependent variables, satisfaction and quality as a single item, also significantly exceeds prescribed standards with a Cronbach's alpha of 0.95, factor loading (correlation due to the use of two variables) of greater than 0.92, and a communality of 0.85. Further, the derived factor explains more than 85 per cent of the variance in the two original variables (Stevens, 1996).

### The facets of patients' evaluations
*Predictors of satisfaction and quality*
The first factor, which we called "provider" performance, is the most significant by virtue of its loading order. This suggests that issues associated with interpersonal relations between patients and providers are by far the most significant in predicting patients' assessments. The provider performance factor, as the name connotes, encompasses the independent variables that are directly related to the patient-caregiver interaction that occurs during presentation and care

**Table III** Results of the factor analysis used to derive factors used as variables

| Item | Provider performance | Access | Physiologic | Status | Gender | Mission | Utilization | Marital status |
|---|---|---|---|---|---|---|---|---|
| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | Factor 6 | Factor 7 | Factor 8 |
| Convenient location | | 0.72 | | | | | | |
| Convenient hours | | 0.70 | | | | | | |
| Access to needed care | | 0.67 | | | | | | |
| Interest in outcome | 0.84 | | | | | | | |
| Wait time in office | | 0.54 | | | | | | |
| Time between appt. and visit | | 0.62 | | | | | | |
| Examination thoroughness | 0.86 | | | | | | | |
| Ability to diagnose problem | 0.87 | | | | | | | |
| Skill of health care provider | 0.89 | | | | | | | |
| Thorough treatment | 0.90 | | | | | | | |
| Explanation of tests | 0.88 | | | | | | | |
| Attention from provider | 0.89 | | | | | | | |
| Reassurance/support offered | 0.85 | | | | | | | |
| Outcome | 0.87 | | | | | | | |
| Age | | | 0.86 | | | | | |
| Beneficiary group | | | 0.80 | | | | | |
| Catchment area | | | | | | 0.63 | | |
| Rank | | | | 0.85 | | | | |
| Service branch | | | | | | 0.74 | | |
| Education | | | | 0.73 | | | | |
| Marital status | | | | | | | | 0.96 |
| Race[a] | | | | 0.38 | | | | |
| Gender | | | | | 0.95 | | | |
| Health status | | | 0.67 | | | | | |
| Number visits | | | | | | | 0.96 | |
| Eigenvalue | 10.05 | 2.13 | 1.605 | 1.31 | 1.10 | 1.07 | 1.02 | 1.01 |
| Cumulative variance (%) | 38.65 | 46.83 | 53.00 | 58.05 | 62.26 | 66.38 | 70.28 | 74.14 |
| Explained $\alpha$ or $r^{2a}$ | 0.98 | 0.89 | 0.87 | 0.76 | 0.95[a] | 0.74 | 0.96[a] | 0.96[a] |

Note: [a]Directionally recoded

**Table IV** Results of factor analysis used to derive the factor used as a dependent variable

| Satisfaction-quality single item measure | Evaluation |
|---|---|
| Eigenvalue | 1.706 |
| Cronbach's alpha | 0.95 |
| Variance explained (%) | 85.32 |
| Satisfied with care received | 0.924 |
| Overall health care quality | 0.924 |

delivery. The second factor, which we labeled "access", includes those variables related to the patient's ability to gain care and impediments to that process.

In the first step of the hierarchical regression model, the two factors depicting the independent variables of caring, empathy, reliability, responsiveness, access, communication and outcomes were regressed on the single factor depicting the dependent variables of satisfaction and quality (Table V).

In significant support of the first hypothesis, the independent factors explain 74 per cent ($R^2 = 0.74$; $p < 0.01$) of patients' evaluations of satisfaction and quality. Patients' assessments of provider performance ($\beta = 0.80$; $p\,0.01$) and Access ($\beta = 0.33$; $p\,0.01$) were both positively associated with patients' assessments of satisfaction-quality ($F_{2,32959} = 48,497$, $p < 0.01$; $R^2 = 0.74$).

*Moderators of satisfaction and quality*
Among the moderating variables, our physiologic factor encompasses health status, age, and beneficiary group. Our status factor integrates rank, education, and race; our gender factor captures patients' gender; and our mission factor comprises patients' branch of service. Finally, our utilization factor depicts patients' presentation rates, and our Marital Status factor reflects whether patients were married.

**Table V** Result of hierarchical regression analysis

| Variable | Step 1: Independent effect | Step 2: Moderating effect |
| --- | --- | --- |
| Provider performance | 0.80 | 0.80 |
| Access | 0.33 | 0.33 |
| Physiologic | | 0.07 |
| Status | | 0.02 |
| Gender | | 0.01 |
| Mission | | 0.02 |
| Utilization | | −0.01 |
| Marital status | | −0.03 |
| $R^2$ | 0.74 | 0.75 |
| Adjusted $R^2$ | 0.74 | 0.75 |
| $\Delta R^2$ | | 0.01 |
| F | 48,497 | 12,619 |
| df | 2 | 8 |

**Note:** Entries are betas; $p < 0.01$

The factors depicting the moderating variables were added to the original model in the second step of the hierarchical regression. As shown in Table V, the addition of the moderating factors and the regression of the full model on the dependent factor (satisfaction-quality), produces a 1 per cent change in $R^2$ (0.75-0.74 = 0.01). The predictive value of patients' assessments of provider performance and access appeared to change with the introduction of patients' sociodemographic characteristics ($F_{8,32953} = 12,619$, $p < 0.01$; $R^2 = 0.75$). Due to the factor analysis-hierarchical regression methodology employed in our study, this small change in the predictive value of the model suggests that patients' characteristics explain only 1 per cent of their evaluations of satisfaction and quality. This provides very limited support for our second hypothesis. Although sociodemographic characteristics produce a moderating effect, this effect is very miniscule in value. Further, the significant reduction in $F$ (48,497-12,619 = 35,878) suggests that this marginal value could largely be attributed to the large sample size.

The fit and quality of the model in Table V is determined to be good due to statistical significance at less than 0.01 for the coefficients and the overall model, and the large amount of variation explained ($R^2 = 0.74$). Additionally, a Durbin-Watson Statistic of 1.996 suggests no correlation between residuals (error terms) and variance inflation factors (VIFs) well below 10 (1.0)

suggest that the independent factors (variables) are not correlated with each other (Stevens, 1996; Studenmund, 1992).

## Discussion

Our study examined the relationship between two measures thought to be largely independent of one another: patients' satisfaction with their care, and their assessments of the quality of that care. The literature suggests confounding in current models used to assess satisfaction and quality from the patient's viewpoint. The clusters of variables created by our factor analysis suggest that variables commonly associated with patients' assessments of satisfaction and quality actually address only two distinct phenomena: feelings induced by the provider, and issues regarding access. The former, labeled provider performance in our study, appears to be the more significant of the two. Additionally, our derived model suggests a statistically significant assessment tool for capturing patients' evaluations.

The provider performance aspects of the care experience includes patients' assessments of an expressed interest in outcomes of the care experience, reassurance and attention, thoroughness of examinations and treatments, technical skill and the ability to diagnose problems, explanations of procedures and tests, and outcomes. This factor structure suggests that these variables are interrelated and cannot be considered separate or distinct concepts. For example, asking a patient a provider performance factor question will essentially provide a portion of the same predictive concept captured by any of the other provider performance factor questions. The proposition for such a finding is that a model does not have to contain all of the variables to be salient. In addition, variables should be chosen by groups, considering the highest factor loadings first, to capture patients' attitudes accurately.

Patients' concerns regarding the expedience, convenience and availability of care are captured by the access factor. This factor structure suggests that patients' assessments of the convenience of the location and hours, access to care and waiting times are largely indistinguishable. Although not to the level of rigor of the provider performance factor, these loadings suggest that there is

value in selecting the highest loading variables and excluding the others if necessary, particularly when cost is a factor or brevity of the instrument is a concern.

An additional significant finding of our study is the minimal predictive power of patients' sociodemographic characteristics. Patients' age, beneficiary group, location, rank, service affiliation, education, marital status, race, gender, health status and number of visits yielded six individual phenomena at work with a combined predictive power of only 1 per cent. This is significant in that patients' individual differences appear to explain little in the way of their evaluations of their care.

## Conclusions and implications

The findings of our study indicate that patients appear not to distinguish between satisfaction and quality when evaluating their care experiences. Additionally, there appear to be only eight distinct dimensions of concern that contain an individual number of strongly correlated variables with two of the dimensions, provider performance and access, being of extreme consequence. By virtue of the clustering of the correlations, the variables contained in each factor occur together as distinct phenomena.

The interpersonal aspects of the care experienced, as well as issues associated with accessing care, explain the two major issues that patients report. As theoretically suggested and empirically supported, the two hypotheses show that the multiple, and dual questions in published satisfaction and quality models appear to measure very similar patient concerns. Additionally, as suggested by previous works, when asked to rate the quality of their care, and their satisfaction with their care, patients failed to differentiate these two concepts in their assessments. There is no doubt that patients produce very strong feelings and evaluations concerning their care, but it appears that these feelings and evaluations boil down to two major categories of very similar variables.

As a secondary opportunity for this study, the application of satisfaction and quality models developed for general populations to military populations provides an opportunity to assess their differences and similarities. Our study's methodology and findings fall short of

suggesting that military and non-military populations are identical, but the findings support the notion that non-military patients and DOD affiliated respondents tend to be similar. Although social identity theory suggests that these two populations would be different, there is uncertainty as to whether this difference is statistically significant in the realm of patients' evaluations of their care. As the findings of our study support established theoretical and empirical models, and patients' characteristics provide little explanatory value, the question is closer to being answered.

The implication for health care managers and marketers is that they should focus on the eight dimensions of provider performance, access, physiologic, status, gender, mission, utilization, marital status, as they accurately depict the other 26 variables. This is particularly important to non-military, civilian providers who participate in the DOD's TRICARE programs. As TRICARE, the Department of Defense managed care program, permits patients to seek care from military and participating civilian providers, the study's findings are valuable for administrators and providers considering or presently providing care to patients associated with the military.

Although our study falls short of suggesting that variables with low factor loadings should be deleted from surveys, it does suggest an empirically supported prioritizing methodology. That is to say that based upon the methodology chosen here, variables that load high in the factor structure, and produce larger betas in the regressions, are more significant in understanding patients' evaluations. Therefore, a limited availability of resources would suggest that priority should be assigned based upon these findings. Thus, in an effort to maximize patient input and better understand the underlying issues in patients' evaluations, future patient surveys and improvement initiatives can potentially be shortened and still remain valid and reliable. However, the limitations of such a synopsis should be clearly understood.

## Limitations and suggestions for further reseach

Although the findings of our study provide a methodologically strong model for assessing

patients' evaluations, the model and the results derived from its use should be interpreted carefully. It is important to note the loss of multi-item scales in the collapsed model. By clustering the questions of traditional models, the total explained variance is still maintained but the opportunity to look at specific, individual variables is lost. This could be a particularly significant issue in small populations. For example, if in an integrated survey tool, two questions each were chosen from the provider performance and access lists, will patients interpret these results in an identical way as two other questions each from the same categories? As the factor loadings are very large, statistical theory would purport yes, but this remains to be tested. In traditional multi-item instruments, researchers are able to drill down into the variables, accepting the significant inter-variable overlap between items and the potentially reduced response rate due to survey length.

Our study assessed patients associated with the military. Social and psychological theories suggest that experiences can alter attitudes, so the use of this potentially different population perhaps limits its generalizability. Although no reviewed studies suggest a major difference in satisfaction and quality assessments between these patients and the general populace from which they come, there remains the possibility for a statistically significant difference. Additionally, although the survey was anonymous and voluntary, participants may have felt an obligation or duty to respond. This may have biased their responses positively in support of their organizations, or negatively in defiance. Further research on a non-military population can provide more definitive, empirically supported and generalizable findings that may apply to patients regardless of orientation. Further, applying the model to a non-military population could further explain the moderating effects of DOD affiliation.

Finally, consideration should be given to the potential existence of additional factors not analyzed in this or previous studies. Additionally, due to the use of secondary data, our study does not purport to capture all satisfaction and quality models, or all portions of the chosen models. Perhaps a more open-ended survey tool would illuminate additional ways in which patients evaluate their care experiences.

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