Diabetes Medication Satisfaction Tool

A focus on treatment regimens

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OBJECTIVE — To develop and test a patient questionnaire on treatment satisfaction with diabetes regimens.

RESEARCH DESIGN AND METHODS — Survey items were developed from community clinic focus groups, pretested in patients with diabetes, and examined in two samples of treated patients.

RESULTS — Sixteen items performed well in assessing treatment experiences: ease and convenience, lifestyle burdens, well-being, and medical control. Construct validity was supported by associations ($P < 0.05$) with treatment complexity, self-rated glucose control, health worries, and A1C. Internal consistency ranged from 0.89 to 0.95.

CONCLUSIONS — The Diabetes Medication Satisfaction Tool offers a comprehensive assessment of patient acceptability, with diabetes therapy useful for individualizing therapeutic decision making.

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Long-term glucose control is challenging to patients and clinicians alike (1,2). It is estimated that 30% of all primary care office visits for diabetes are for symptoms and complications (e.g., dizziness, exhaustion, vision, and foot complaints), often involving three or more medications (3,4). Routine assessment of treatment satisfaction is an important step toward building and maintaining a therapeutic alliance among the patient and family, the physician, and the other members of the health care team (1,4) to successfully tailor treatment regimens (5,6).

Whereas the Diabetes Treatment Satisfaction Questionnaire (DTSQ) (7) performs well in measuring patients' blood glucose control and overall satisfaction with treatment, it, along with similar-purpose measures (8–10), does not conceptualize satisfaction in the context of multiple medications, where regimen complexity and treatment burden may become important. We developed and tested a brief instrument (the Diabetes Medication Treatment Satisfaction Tool [DMSAT]) designed to measure patients' satisfaction with diabetes medication treatment regimens—from simple to complex.

A copy of the DMSAT instrument and a full report regarding its use can be accessed at http://www.hmc.psu/diabetes/research-instrument.html.

RESEARCH DESIGN AND METHODS

— This study involved item generation, testing, and refinement. Institutional review board approval was obtained from the Wake Forest University, and informed consent forms were completed for all participants. Items for four concepts identified in the literature were "glucose control," "well-being and side-effects," "lifestyle burden," and "treatment complexity and convenience" and were evaluated in a series of five focus groups made up of five to eight patients drawn from an evaluation study of community diabetes clinics in North Carolina (11). Participants were male and female and white and nonwhite with simple and complex medication regimens and A1C levels that ranged from well controlled to uncontrolled. The resulting 35-item prototype instrument was administered by mail to a convenience sample of 75 patients (the exploratory sample), who were treated with diabetes medications at our study community-care site, to assess item reliability, mean and distribution, redundancy or uniqueness, skewness, and construct validity. Also examined were item correlations with A1C level, the Multidimensional Diabetes Questionnaire (12) lifestyle interference scale, the Medical Outcomes Studies (MOS) Health Worries Scale score (13), and global items assessing extent that blood glucose has been unacceptably high or low. An item performance score was constructed (0, weak; 1, moderate; or 2, ideal performance) to guide item retention. Fifty-five (73%) patients completed the survey, and nine items were removed based on skewness or redundancy ($r > 0.75$) with other items.

In the initial test sample, patients of a large family-medicine practice treated for diabetes with a recent A1C value within the last 3 months (the evaluation sample) were invited to complete the study survey packet including the revised 26-item instrument and validation instrument described above. Medication complexity was assessed using a score of 0 or 1 (no/yes) for common diabetes medications and a score of 0 or 2 (no/yes) for insulin, a more demanding regimen. Self-reported adherence to medications was by recall of skipped or missed doses over the last 10 days. Packets were mailed to patients with instructions and a voucher for a 25 USD gift certificate. Exploratory factor analysis

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Table 1—*Final model of known groups validity*

		Treatment complexity*		Self-rated glucose control†		Perceived general health‡		A1C	
	Items (*n*)	High	Low	Good	Poor	High	Low	>8%	<8%
DMSAT§									
Lifestyle	5	59.8	70.9‖	76.2¶	63.3	79.8	62.3#	61.4	69.0
Convenience	3	68.4	77.7‖	82.6¶	71.1	84.3	70.7¶	68.2	76.6
Glucose control	5	50.4	61.4‖	74.1#	51.0	68.1	53.5¶	47.2	61.3¶
Well-being	3	55.1	64.7	75.2#	55.9	76.9	55.5#	53.2	64.2‖
Total score	16	59.9	70.1‖	77.6#	62.1	78.4	62.0#	59.3	69.0‖
DTSQ ($n = 92$)	8	25.9	28.2	30.3¶	26.2	30.9	26.1#	25.6	28.0

Data are score means unless otherwise indicated. *High: score of 3+; low: score of 0–2. †Good: excellent or very good score; poor: good, fair, or poor score. ‡High: excellent or very good score; poor: good, fair, or poor score. §Lower scores indicate less treatment satisfaction. ‖$P < 0.05$. ¶$P < 0.01$. #$P < 0.001$.

(EFA) of the DMSAT items was conducted using SAS (version 8; SAS, Cary, NC) to assess whether the common factor model was appropriate (14) based on Kaiser's sampling adequacy, Scree plot, and model fit. An oblique rotation of the initial factor solution was performed to allow correlated factors. Discriminant validity of the DMSAT was examined by comparing means across levels of A1C (<8% and ≥8%), treatment complexity (low and high), self-reported adherence, and MOS health worries.

For the final test sample, another sample of patients from our community diabetes care clinics (11) and from an academic medical center was recruited to conduct and evaluate confirmatory factor analysis of the DMSAT and confirm validity. Internal consistency reliability of the DMSAT scales and total score was also assessed.

RESULTS — In the evaluation sample, 194 (63%) of 307 eligible patients returned the survey packet; of these, 140 reported current medication use. Participants had a mean age of 63 years, and most had completed high school (77%) and had been diagnosed with diabetes at least 5 years previously (61%). One-third (29–39%) were taking one, two, or three medications for diabetes, with 16% taking insulin; 14% had a recent A1C >8.0%, and 19% rated their adherence to their medication regimen in the last 10 days as less than complete. Ten items displayed high inter-item correlations (>0.75) and were removed. Initial factor analysis of the reduced 16-item questionnaire identified a four-factor structure consistent with our domains of lifestyle, medical control, convenience, and well-being and explained 75% of the total variance. Kaiser's measure (0.92) suggested a common-factor model. Reliability estimates of the four DMSAT scales and total score were 0.89 to 0.95. Percents at the ceiling of the scales were low (1.45–6.62%). As shown in Table 1, DMSAT scales and total score discriminated ($P < 0.05$) between high and low levels of treatment complexity, self-rated glucose control, MOS Health Worries Scale score, and clinical value for recent A1C (<8% vs. ≥8%) in the expected direction. Correlation of the DMSAT scores with continuous A1C values was −0.24 ($P = 0.0049$). In the final, confirmatory sample, the DMSAT instrument and survey packet were obtained from 92 patients. Confirmatory factor analysis closely replicated the earlier 16-item structure (not shown). As shown in Table 1, DMSAT scales and total scores discriminated between validity groups as in the previous sample and were highly correlated with the DTSQ ($r = 0.68$; $P < 0.001$). Unlike the DMSAT, the DTSQ total score did not discriminate between levels of treatment complexity and clinical A1C value.

CONCLUSIONS — The DMSAT is intended as a brief measure of diabetes medication treatment satisfaction and discriminates between important correlates of patient management. It performed as well as the DTSQ in detecting self-rated glucose control and health worries but showed superior properties in correspondence with treatment complexity and A1C. Note that appraisals of cost of medications or specific side effects that may be caused by diabetes or its treatment, such as diminished sexual functioning, bloating, or weight gain, are not separately assessed and may require assessment elsewhere. Longitudinal data are needed to examine responsiveness to interventions. In summary, we believe that the 16-item DMSAT offers a comprehensive assessment of satisfaction with diabetes therapy and may aid in individualizing patient diabetes treatment.

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DTSQ data for results in Table 1 are used with the permission of C. Bradley, Department of Psychology, Royal Holloway, University of London Egham, Surrey, U.K.

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