Papers

The Satisfaction with Information about Medicines Scale (SIMS): a new measurement tool for audit and research

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Abstract

***Objective*—To develop and examine the psychometric properties of the Satisfaction with Information about Medicines Scale (SIMS), a new 17-item tool designed to assess the extent to which patients feel they have received enough information about prescribed medicines.**

***Methods*—Patients from eight diagnostic categories were recruited at hospitals in London and Brighton and completed the SIMS questionnaire during hospital admission or attendance at outpatient clinic appointments. The SIMS was evaluated in terms of its ease of use, internal consistency, test-retest reliability, and criterion related validity using existing self-report measures of adherence and patient beliefs about medicines.**

***Results*—The SIMS was well accepted by patients in a variety of clinical settings and showed satisfactory internal consistency and test-retest reliability. As predicted, higher levels of satisfaction with medicines information were associated with higher levels of reported adherence, and lower levels of satisfaction were associated with stronger concerns about the potential adverse effects of medicines, providing evidence of criterion related validity.**

***Conclusion*—The SIMS performed well on a number of psychometric indicators and shows promise as a tool for audit (measuring patients' satisfaction with information about their prescribed medicines), research (evaluating current or new forms of information provision), and clinical practice (identifying the information needs of individual patients and as an aid to planning medicine related consultations).**

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Providing patients with information about their prescribed medicines is essential to facilitate their appropriate use and an understanding of the likely benefits and risks.[1–5] This has been recognised by the publication of recommendations for the provision of medication information to patients[6 7] including instructions for use—for example, the dose, route of administration, and details of action to be taken in the event of missed doses or accidental overdose—and a listing of all contraindications, precautions, and side effects.

Simply providing written information in a standardised form, however, does not guarantee the appropriate use of medication.[8] Rather, the provision of information should be tailored to meet the needs of the individual. Although a certain minimum level of basic information is required by all—for example, how to take the medicine—the absolute amount required will

Key messages

- A key arbiter of the quality of medicines information given to patients is the extent to which individuals perceive that it has met their needs and are satisfied with the information provided.
- The Satisfaction with Information about Medicines Scale (SIMS) assesses whether the individual has received enough information about a range of topics relating to prescribed medication.
- The psychometric properties of the SIMS were tested in patients from a variety of diagnostic categories in both inpatient and outpatient settings.
- The measure was well accepted by patients and showed satisfactory internal consistency, test-retest reliability, and criterion related validity.
- The SIMS provides a valid and reliable tool for assessing how well the needs of individual patients for medicines information are being met.

What this paper adds to the subject

Previous research has found that patients' requirements for information about medicines vary among individuals, but to date no validated measures are available for assessing these requirements and quantifying differences between individuals. The SIMS offers a valid and reliable method for assessing patients' satisfaction with medicines information that can be used to quantify information requirements, with potential applications in clinical care, audit, and research.

Table 1 Characteristics of the validation sample

	Anticoagulant (n=150)	*Cardiac IP (n=120)*	*General medical IP (n=91)*	*Cardiac rehabilitation (n=44)*	*Asthma (n=153)*	*Diabetic insulin treated (n=65)*	*Diabetic OAA (n=112)*	*Oncology (n=91)*
Response, n (%)	121 (81)	175 (83)		38 (86)	(82)*	(82)*	(82)*	83 (91)
Male, n (%)	91 (61)	85 (71)	46 (51)	34 (77)	64 (42)	24 (37)	76 (68)	47 (52)
Mean (SD) age (years)	67.5 (12.4)	63.6 (12.4)	54.0 (19.8)	62.1 (9.9)	45.8 (18.5)	47.9 (17.0)	58.2 (15.9)	58.5 (15.8)

IP = inpatients; OAA = oral antihypoglycaemic agents.
*Asthma and diabetes data were collected in a single audit study with an average response rate of 82%.

vary between individuals. People prescribed the same medicines require different levels of information because they deal with being ill in different ways.[9 10] Some react by becoming actively involved with their treatment and seek detailed information about aspects such as the possible side effects of their medicines. In contrast, other patients respond with more "avoidant" coping strategies—for example, by thinking about their illness as little as possible or wanting others to "take charge"—and may find additional information unhelpful or even distressing.[9]

An important arbiter of the quality of medication information is therefore the extent to which individuals perceive that it has met their needs and are satisfied with the information provided. We believe that assessing patients' satisfaction with the amount of medication information provided is a prerequisite for partnership in the use of medication.[11] Moreover, identifying deficits in satisfaction provides a target for interventions designed to tailor information provision according to individual needs.[12] To do this we need a valid instrument for assessing patients' perceptions of the quality of medication information they have received. We could find no published instruments that specifically address this key issue in a search of the Medline, PsycInfo, and Science Citation Index databases. The Satisfaction with Information about Medicines Scale (SIMS) which asks patients to indicate whether they have received *enough* information about their prescribed medicines was therefore developed and piloted. The purpose of this paper was to establish the psychometric properties of the measure in a variety of clinical settings. The SIMS was evaluated in terms of its acceptability (ease of use), internal consistency, test-retest reliability, and criterion related validity using existing self-report measures of adherence and patient beliefs about medicines.

Methods

ITEM DEVELOPMENT AND SCORING OF THE SIMS

The SIMS consists of 17 items derived from the published recommendations of the ABPI for the type of information that patients require in order to facilitate the safe self-management of medication.[7] Each item refers to a particular aspect of their medicines. Examples include "How to use your medicine" and "What you should do if you experience unwanted side effects". Participants are asked to rate the amount of information they have received using the following response scale: "too much", "about right", "too little", "none received", "none needed". The responses are analysed at three levels:

- a *detailed medicine information profile*, obtained by examining the ratings for each individual item to identify individual types of information that patients feel they are lacking;
- a *total satisfaction rating*, obtained by summing the scores for each item. If the patient is satisfied that he/she has received a particular aspect of medication information (with a rating of "about right" or "none needed"), this is given a score of 1. If the patient is dissatisfied with the amount of information received (with a rating of "too much", "too little", or "none received"), this is scored 0. Scores range from 0 to 17 with high scores indicating a high degree of overall satisfaction with the amount of medication information received;
- *two subscale scores*, identifying patients' satisfaction with information about the *Action and usage of medication* (items 1–9), and the *Potential problems of medication* (items 10–17).

PARTICIPANTS

A sample of patients was recruited in both inpatient and outpatient settings at hospitals in London and Brighton, involving a number of studies conducted between 1995 and 1998. The diagnostic categories from which patients were sampled were chosen to reflect a variety of disease and treatment characteristics. Patients were included if they had been prescribed one or more medicines for regular use in the treatment of their illness for at least 2 months prior to the study, and if they could read and understand the questionnaire and felt well enough to complete it. Ethical approval was granted for the study by the local research ethics committee in each of the participating clinics and hospitals, except in cases where the data were collected as part of a wider audit study and formal ethical approval was not required. Patients were invited to participate in the study by a trained researcher or member of the hospital staff. Standard procedures for informed consent and patient confidentiality were followed. Questionnaires were completed on the ward or in the outpatient clinic.

The characteristics of the sample, including sex and age composition, are shown in table 1. Recruitment details of the individual diagnostic categories were as follows:

The *Anticoagulant* sample (n=150) comprised consecutive attenders at an anticoagulant outpatient clinic in a London teaching hospital. Patients were approached by the clinic administrator and asked to participate in the study, involving the completion of the questionnaire while waiting for their appointment with the clinician.

The *Asthma* (n=153) and *Diabetic* (n=177) samples were recruited as part of an audit of medication information needs in outpatient clinics at three teaching hospitals and nine non-teaching hospitals, representing the demographic spread within the geographical area encompassing the South Thames regional health authority.[13] The diabetic sample consisted of subgroups of patients treated with insulin (n=65) or oral antihypoglycaemic agents (n=112). Data were collected by 24 pharmacy graduates undertaking their preregistration training within the hospitals. Each was asked to collect data from at least five consecutive patients attending the asthma or diabetes outpatient clinics. Patients were invited to take part while waiting for their clinic appointment.

The *Cardiac Rehabilitation* sample (n=44) was recruited as part of an investigation of medication and illness beliefs among patients[14] and comprised patients referred to a cardiac rehabilitation programme with a referring diagnosis of myocardial infarction (n=26), surgery (n=7), or myocardial infarction followed by surgery (n=11). A total of 51 patients were approached for consent to participate in the study by a trained researcher. Of these 51, three declined to take part and a further three were excluded because of low comprehension of English or inability to understand the questionnaire. Forty five patients gave their consent for inclusion in the study. One patient failed to return the questionnaire having previously agreed to take part. Questionnaires were completed and returned before commencing the rehabilitation programme by 44 patients.

The *Cardiac* and *General Medical* samples (n=120 and n=91, respectively) comprised consecutive new admissions to the general medical wards of two London teaching hospitals and five district general hospitals in London and Brighton as part of a wider study of patient perceptions of and adherence to medication.[15] Patients were approached on the ward by seven preregistration pharmacy students and asked to participate in the study. Of 254 eligible patients, 37 refused to take part and 217 entered into the study. Six of the questionnaires were rejected (>10% of responses to questionnaire statements were missing or illegible). The remaining 211 questionnaires were retained for analysis. The final completion rate was therefore 211/254 = 83.1%. On the basis of primary diagnosis, this group comprised chronic cardiac disease (n=120), chronic respiratory disease (n=34), gastrointestinal disorders (n=23), diabetes (n=21), cancer (n=8), and epilepsy (n=5). For the statistical analyses, patients with chronic cardiac disease were considered as a single subgroup and the remaining patients were grouped together as "general medical inpatients".

The *Oncology* sample (n=91) comprised consecutive attenders at an oncology outpatient clinic (n=51) and hospital ward (n=40) at a London teaching hospital as part of a wider study of patient perceptions of and adherence to medication.[15] A total of 100 eligible patients were approached by a trained researcher and 91 completed the questionnaire, giving a response rate of 91%.

TESTING THE ACCEPTABILITY, RELIABILITY, AND VALIDITY OF THE SIMS

Acceptability

Acceptability of the SIMS—that is, ease of use—was judged in terms of the percentage of respondents in each of the validation sample patient groups who completed the scale without omitting any items.

Reliability

Internal consistency estimates the extent to which items within a scale are assessing a single construct and is tested using Cronbach's alpha. This scores the internal consistency of the scale from 0 to 1, where scores of 0 are indicative of no consistency (the items are unrelated to each other) and scores of 1 indicate that the items are practically identical. Opinions differ as to the cut off point for acceptable scores but scores below 0.6 are problematic. Cronbach's alpha scores were calculated for all patient groups comprising the sample.

Test-retest reliability refers to the likelihood that a given measure will yield the same description of a given phenomenon if that measurement is repeated. Test-retest reliability was assessed with the anticoagulant group of patients, involving the administration of a second questionnaire to patients who re-visited the clinic 2 weeks after their initial visit for a routine follow up appointment (n=72). These patients were classified as having either a "stable" or "unstable" clinical status obtained from medical records.

Validity

The validity of a questionnaire refers to the extent that it provides data that relate to commonly accepted meanings of a particular concept—that is, that it actually measures what it claims to measure. When accepted "gold standard" tools for measuring the same construct are not available, validity is judged on the basis of relationships between the questionnaire and other relevant constructs. This is done by setting up hypotheses about relationships between the constructs—for example, pain scores and psychological distress—a process known as *criterion related validity*. In the present study this was assessed in terms of relationships between scores on the SIMS and existing self-report measures of adherence (the Medication Adherence Report Scale (MARS); R Horne, M Hankins, unpublished) and patient beliefs about medicines (the Beliefs about Medicines Questionnaire, Specific Version (BMQ)[15]). In the MARS, non-adherence is operationalised as a tendency to (a) avoid, forget, or stop taking medication, and (b) adjust or alter the dose from that recommended by the physician. The MARS comprises six adherence statements, each scored on a 5-point Likert scale with reverse scoring (where 1 = "always true", 2 = "often true", 3 = "sometimes true", 4 = "rarely true", and 5 = "never true"). Examples include "*I avoid using these medicines if I can*" and "*I alter the dose of*

Table 2 Internal consistency (Cronbach's alpha) of the Satisfaction with Information about Medicines Scale (SIMS)

	Anticoagulant (n=150)	*Asthma (n=153)*	*Cardiac IP (n=120)*	*General medical IP (n=91)*	*Cardiac rehabilitation (n=44)*	*Diabetic insulin treated (n=65)*	*Diabetic OAA (n=112)*	*Oncology (n=91)*
SIMS (Total)	0.85	0.89	0.89	0.88	0.91	0.81	0.88	0.88
SIMS (AU)	0.67	0.87	0.85	0.83	0.81	0.77	0.79	0.83
SIMS (PPM)	0.84	0.81	0.83	0.85	0.89	0.61	0.79	0.81

IP = inpatients; OAA = oral antihypoglycaemic agent treatment; AU = *Action and usage* subscale; PPM = *Potential problems of medication* subscale.

these medicines". A total medication adherence score is obtained by summing the responses to each of the items. Scores range from 6 to 30 with higher scores indicating greater reported adherence. The MARS has demonstrated good internal reliability and test-retest reliability in a sample of patients with asthma, diabetes and hypertension (R Horne, M Hankins, unpublished).

The BMQ Specific Version assesses patients' beliefs about medicines prescribed for their personal use and comprises two subscales. The first assesses beliefs about the *necessity* of taking prescribed medicines and the second measures *concerns* about these medicines based on beliefs about the danger of dependence, long term toxicity, and the disruptive effects of medicines. Each subscale comprises five items that are scored on a Likert-type scale where 1 = "strongly disagree", 2 = "disagree", 3 = "uncertain", 4 = "agree" and 5 = "strongly agree". The BMQ Specific Version has shown good internal reliability, criterion related validity, and discriminant validity in a range of chronic illness groups.[15]

Pearson correlation coefficients were calculated between MARS, BMQ, and SIMS scores. Criterion related validity of the SIMS was assessed in terms of the following predictions:

- *Adherence to medicines.* Patient satisfaction with different aspects of their health care is associated with a variety of health outcomes including medication adherence.[16] It was hypothesised that higher levels of patient satisfaction with information about their medicines would be associated with greater adherence to those medicines.
- *Beliefs about medicines.* Individuals receiving the same medication may have different information requirements.[9 10] One reason for wanting more detailed information about medication is concern about possible side effects. A need for more information is therefore likely to be associated with higher scores on the *Concerns* subscale of the BMQ Specific Version measure. The level of detail provided by medicines information, however, may be insufficient to ease patient concerns, resulting in lower satisfaction. Accordingly, it was hypothesised that stronger concerns about the effects of their medicines would be associated with lower levels of satisfaction with information about medicines.

Results

ACCEPTABILITY

The SIMS was well accepted by patients, as indicated by the very low proportion of missing data (see table 1). The percentage of respondents in each validation sample completing the scale without omitting any items ranged from 81% (anticoagulant sample) to 91% (oncology sample). A further 11% of the anticoagulant sample omitted only a single item. Most patients were able to complete the questionnaire within 10 minutes.

RELIABILITY

Internal consistency

Cronbach's alpha coefficients for the SIMS obtained in each sample are shown in table 2. The complete SIMS showed good internal reliability in all of the validation samples, ranging from 0.81 (insulin-treated diabetes) to 0.91 (cardiac rehabilitation). Both of the subscales showed satisfactory internal consistency, ranging from 0.77 (insulin-treated diabetes) to 0.89 (cardiac rehabilitation), with the possible exception of the *Action and usage* subscale for patients in the anticoagulant sample (0.67) and the *Potential problems of medication* subscale in the insulin-treated diabetes sample (0.61).

Test-retest reliability

Test-retest correlations of the SIMS scores for patients in the anticoagulant sample classified as having "stable" or "unstable" clinical status are shown in table 3. All correlations were statistically significant and indicated satisfactory test-retest reliability for the complete SIMS and subscales (> 0.6), with the exception of the *Action and usage* subscale in the "unstable" group (0.40).

VALIDITY

Adherence to medicines

In the cardiac rehabilitation sample, satisfaction with information about the use of cardiac medication was positively correlated with reported adherence to anticholesterol agents ($\rho=0.31$, $p<0.05$). Patients with higher levels of satisfaction reported greater adherence to their medicines.

Beliefs about medicines

Total SIMS scores relating to medicines prescribed for secondary prevention of myocardial infarction were negatively correlated

Table 3 Test-retest reliability (Pearson correlations) of the Satisfaction with Information about Medicines Scale (SIMS)

	Anticoagulant sample (retest n=72)	
	Stable (n=48)	*Unstable (n=25)*
SIMS (Total)	0.76**	0.67**
SIMS (AU)	0.73**	0.40*
SIMS (PPM)	0.68**	0.66**

AU = *Action and usage* subscale; PPM = *Potential problems of medication* subscale.
*p<0.05; **p<0.01.

with scores on the *Concerns* subscale of the BMQ Specific Version (r=–0.33, $p<0.05$). Patients who held stronger concerns about the potential adverse effects of their medicines were less satisfied with the information they had received about it.

Discussion

The SIMS performed well on a number of psychometric indicators and shows considerable promise as an effective tool for assessing how well the medication information needs of patients are being met. The scale demonstrated acceptable internal consistency among patients from a variety of diagnostic categories. Test-retest reliability was satisfactory in all but one of the groups comprising the validation sample. Criterion related validity was demonstrated by significant correlations between SIMS scores and patient reports of beliefs about and adherence to their medicines. As predicted, higher levels of satisfaction were related to greater reported adherence to medication. This is consistent with the results of previous research[16] and underlines the importance of addressing issues of patient satisfaction with information about their treatment to achieve optimum health outcomes. Lower levels of satisfaction with information were found to be associated with stronger concerns about the adverse effects of medication. In previous studies such concerns were also related to non-adherence to medication.[17] This finding represents one example of how the SIMS can highlight particular issues to the clinician that may otherwise have not surfaced during their consultation with the patient.

The performance of the SIMS was problematic in only one of the eight patient groups of the validation sample. The test-retest reliability of the *Action and usage* subscale was unsatisfactory for those individuals in the anticoagulant group classified as having an "unstable" clinical status. In order to stabilise their condition these patients are likely to experience changes in either the dose or type of medicine prescribed during the course of treatment. As a result, it is possible that their needs for and satisfaction with information about their medicine may be more likely to fluctuate over time than individuals with a "stable" clinical status, resulting in poor test-retest reliability of their SIMS scores.

The evaluation of the SIMS was hampered by the lack of opportunity to examine both test-retest reliability and criterion related validity in all of the diagnostic categories sampled. Additional research is required to assess these psychometric properties in a broader range of clinical settings. With regard to methodological limitations, the recruitment of a consecutive rather than strictly random sample of patients may have biased our findings. Other potential biases may also have been introduced by the large number of researchers involved in recruiting patients comprising the asthma and diabetes samples. Moreover, with exception of the test-retest sample, the evaluation of the SIMS relied on cross sectional data. We were therefore unable to test the predictive validity of the SIMS and further studies are now justified to do this.

Despite these limitations, we believe that our data provide preliminary evidence that the SIMS is a valid and reliable measure with a number of potential applications in audit, research, and clinical practice.

PRACTICAL APPLICATIONS

Audit

The SIMS could be used to audit patients' satisfaction with the information they have received as part of their routine care and to identify targets for improvement. Subsequent evaluations using the scale could assess whether the "audit loop" has been closed.[18]

Research

The SIMS offers a valid and reliable method for investigating the impact of interventions on levels of satisfaction with information about medicines. For example, it may be particularly useful for evaluating new information leaflets or for judging the acceptability and efficacy of existing medicine information provision (such as standardised package inserts). We are currently adapting the SIMS format for assessing patient satisfaction with information about their medical condition.

Clinical practice

Previous research has demonstrated large variations in patients' desire for information about their illness and treatment.[8] The provision of information by clinicians should therefore be targeted to meet the preferences of the individual patient. The SIMS takes account of individual differences by eliciting patients' own views about the medication information they have received, rather than measuring the absolute quantity or quality of that information. The SIMS could aid clinicians in planning for and structuring consultations in order to meet the needs of the patient by pinpointing deficits in information provision prior to the consultation, and allowing the clinician to target the content of the consultation accordingly. Consideration should be given to using the SIMS as a twofold assessment tool where, firstly, patients' information needs are identified and, secondly, their level of dissatisfaction with the information is measured and addressed by the healthcare provider. The SIMS may prove useful to a number of professional groups working in the healthcare team, particularly doctors, pharmacists, and nurses.

Providing patients with clear information about their condition and treatment is a key principle of the NHS.[19] The SIMS offers a novel method for assessing the extent to which the information needs of individual patients have been met. As such, we hope that it will function as an effective measurement tool in the areas of audit, research, and clinical practice.

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Appendix 1: Satisfaction with Information About Medicines Scale (SIMS)

Information About Medicines

We would like to ask you about **the information you have received about your medicines.** *Please rate the information you have received about each of the following aspects of your medicines. If you use more than one medicine, please give your overall feeling about information you have received* **about all your medicines.**

(Rated: too much, about right, too little, none received, none needed).

1. What your medicine is called.
2. What your medicine is for.
3. What it does.
4. How it works.
5. How long it will take to act.
6. How you can tell if it is working.
7. How long you will need to be on your medicine.
8. How to use your medicine.
9. How to get a further supply.
10. Whether the medicine has any unwanted effects (side effects).
11. What are the risks of you getting side effects.
12. What you should do if you experience unwanted side effects.
13. Whether you can drink alcohol whilst taking this medicine.
14. Whether the medicine interferes with other medicines.
15. Whether the medication will make you feel drowsy.
16. Whether the medication will affect your sex life.
17. What you should do if you forget to take a dose.

Other information (please specify below)

Action and usage subscale: items 1–9.
Potential problems of medication subscale: items 10–17.

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