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## Patient satisfaction with anesthesia services

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**Purpose:** The evaluation of services by patients is an essential component of continuous quality improvement in anesthesiology. Little is known, however, about how to achieve this objective. Our goal was to conduct a systematic review of all available studies on patient satisfaction with anesthesia services, thereby ascertaining the present level of knowledge in this field and suggesting ways of improving current measurement methodologies.

**Source:** We reviewed relevant major data banks - Medline, Dissertation Abstract, Psyclit and Cochrane - between 1980 and 2000 and bibliographies from primary sources. We used the following keywords for our search: quality improvement, anesthesia, quality, patient perceptions, consumer satisfaction, continuous quality improvement, outcome measures.

**Principal findings :** The review yielded 14 pertinent studies. Studies were divided into two groups (A & B), according to the quality of the psychometric evaluation (tests performed to verify the reliability and validity of an instrument). While all studies reported high levels of patient satisfaction with anesthesia services, many used methods of questionable value. None of the 14 studies controlled for any confounding variables, such as social desirability. Four studies had seriously biased their data collection and the majority of the studies lacked rigour in the development of the instrument used to measure patient satisfaction. Only one study presented a definition of the concept measured, and none provided a conceptual model of patients' satisfaction with anesthesia services.

**Conclusion:** The currently available studies of patient satisfaction are of questionable value. Only rigorous methods and reliable instruments will yield valid and clinically relevant findings of this important issue in anesthesiology.

**Objectif :** L'évaluation de la qualité des services, par les patients, est une composante essentielle de l'amélioration de la qualité des services en anesthésiologie. Cependant, nos connaissances dans ce domaine sont limitées. Nous proposons une évaluation systématique de la littérature sur ce sujet dans le but d'améliorer la méthodologie reliée à la mesure de ce concept.

**Source des références :** Nous avons procédé à une revue systématique de plusieurs banques de données - Medline, Dissertation Abstract, Psyclit, et Cochrane - pour la période de 1980 à 2000 ainsi que les bibliographies des références primaires. Les mots-clés suivants ont été utilisés : amélioration de la qualité, anesthésie, qualité, perceptions des patients, satisfaction de la clientèle, amélioration continue de la qualité, mesure des résultats.

**Principaux résultats :** La revue systématique de la littérature a permis de recenser 14 études pertinentes. Elles ont été divisées en deux groupes (A & B) selon la qualité de l'évaluation psychométrique (vérification de la fidélité et de la validité des instruments). Toutes ces études présentent des taux élevés de satisfaction des patients à l'égard des services anesthésiques. Cependant, les méthodes choisies pour l'évaluation de la satisfaction des patients présentent des biais importants. Aucune de ces études n'a présenté de moyens de contrôle des variables confondantes telles que la désirabilité sociale. Il y a présence de biais dans la collecte de données de quatre études et la majorité démontre peu de rigueur dans le développement de l'instrument utilisé. Une seule étude a fourni une définition du concept mesuré et aucune n'a proposé de cadre conceptuel.

**Conclusion :** Les études publiées à ce jour sur la satisfaction des patients sont d'une valeur douteuse. Il est essentiel d'employer des méthodes rigoureuses ainsi que des instruments fiables, afin de générer des résultats valides et cliniquement pertinents sur ce domaine important en anesthésiologie.

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**T**HE major data banks contain a vast array of articles, published between 1980 and 2000, that examined patient satisfaction with medical care. Few of these publications, however, cover patient satisfaction with services provided by anesthesiologists. Despite the paucity of publications in the field, several authors believe that patient satisfaction is an attribute of the quality of care in anesthesia.<sup>1-3</sup>

Recently, a review on patient satisfaction and anesthesia care was published,<sup>4</sup> focusing on the appropriateness of different methodologies used to measure patient satisfaction. In contrast, this present article seeks to provide a more critical review of the methodology, the development of the instrument used by the authors and psychometrics (when available) and the results obtained by selective studies treating this concept.

#### Sources

Our methods were inspired by Cook.<sup>5</sup> Her suggested format for a systematic review of the literature includes: a description of the data sources, study selection, data extraction-synthesis and a presentation of the results.

#### Data sources

We searched Medline, Current Contents, the Cochrane Data Base, and Dissertation Abstract for studies published between 1980 and March 2000. We searched the bibliographies of primary and review articles for other relevant studies. Our search was restricted to French and English publications.

We used the following key words to retrieve articles: quality improvement, anesthesia (including anaesthesia), quality, patient satisfaction, patient perceptions, consumer satisfaction, continuous quality improvement, outcome measures. We also combined some of the main keywords: quality and anesthesia, quality improvement and anesthesia, patient (and consumer) satisfaction and anesthesia, quality and patient satisfaction and anesthesia (including anaesthesia).

#### Study selection

We selected studies that emphasized patients' satisfaction with anesthesia services. Included were studies covering both ambulatory and hospitalized patients. Since relatively few studies focused mainly on patient satisfaction with anesthesia services, we did not use any selection criteria and included all publications in the present review. We excluded drug trials regarding patient satisfaction over pain management. These studies used relief of pain as the sole indicator of patient satisfaction.

#### Data extraction and synthesis

Data were extracted following three specific categories: source, population (characteristics of the sample), a summary of the main results vis-a-vis patient satisfaction and the instrument used. Studies were divided in two groups (A and B). Group A includes those studies in which no psychometric testing (tests performed to evaluate the reliability and validity of instruments) was done on the scales employed to measure patient satisfaction. Group B includes the studies that performed certain psychometric tests on the scale employed to measure patient satisfaction.

#### Principal findings

We found 14 studies that focused on patient satisfaction with anesthesia services. A synthesis of the data extracted from these studies is presented in the Table. Studies were divided in two groups (A & B) according to the quality of the psychometric evaluation (tests performed to verify the reliability and validity of an instrument) of the instrument used to collect data. Group A includes studies where the authors did not perform any psychometric tests on the instrument they used. Group B includes the studies where the authors performed some psychometric tests on the instrument they employed.

#### General characteristics of the studies

Only four studies were randomized trials.<sup>6-9</sup> The others used convenience or consecutive samples. With regards to methods of data collection, three studies used interviews only,<sup>10-12</sup> six either mailed or handed questionnaires to patients,<sup>6,7,9,13-15</sup> and five used a combination of interviews and a paper-and-pencil questionnaire.<sup>8,16-19</sup> Almost all the authors developed their own questionnaire (or questions) for measuring patient satisfaction with anesthesia services. One author<sup>11</sup> selected a questionnaire previously developed and tested.<sup>20</sup> Only the studies in Group B presented the results of psychometric tests conducted on the scale employed to gather data.<sup>9,11,13,15,16,19</sup>

#### Main results on patient satisfaction and psychometrics

The majority of studies, whether from group A or B, reported high levels of patient satisfaction with anesthesia. However, when patients were given an opportunity to express themselves freely, they noted certain unsatisfactory elements in the care received from anesthesiologists.

The Group B studies, although using more rigorous methods than those in Group A, still obtained very high levels of satisfaction. Only one study<sup>11</sup> (in Group B) defined patient satisfaction, and none of the

TABLE Characteristics of the studies

<i>Group A: Studies with no psychometric evaluation of instrument</i>		
Journal & year (periodic or manuscript)	Population (sample) (N = targeted sample)	Main general results on patient satisfaction and instrument (n = number of respondents)
Keep <i>et al.</i> (1978) <sup>10</sup> (Anaesthesia)	Convenience sample N = Not mentioned  Types of surgery: general, thoracic, ENT, dental, orthopedic, gynecology	<ul style="list-style-type: none"> <li>• n = 100 respondents</li> <li>• All 100 patients said that they were either satisfied or very satisfied with their anesthetic</li> <li>• Development of the instrument not specified</li> </ul>
Burrow (1982) <sup>17</sup> (Anaesthesia & Intensive Care)	N = 175 patients for general surgery	<ul style="list-style-type: none"> <li>• n = 139 respondents</li> <li>• 72% of patients were satisfied with the time spent by the anesthesiologist for the preoperative evaluation</li> <li>• 64% lacked preoperative information</li> <li>• Only 7.9% answered affirmatively to a general question regarding complaints, but on specific questioning 80% said they had experienced discomfort or worse</li> <li>• Development of the instrument not specified</li> </ul>
Dodds <i>et al.</i> (1985) <sup>18</sup> (Anaesthesia & Intensive Care)	N = 124, convenience sample Types of surgery not mentioned	<ul style="list-style-type: none"> <li>• n = 121 respondents</li> <li>• Patients had a very high expectation of uneventful anaesthesia (85%) but a significant number of patients (21%) expressed specific fears of anaesthesia (e.g. not waking up)</li> <li>• The preoperative visit was considered to be of adequate duration by 110 patients (91%)</li> <li>• Women reported a significantly higher incidence of postoperative shivering, headaches and a feeling of being cold (<math>P &lt; 0.05</math>)</li> <li>• Development of the instrument not specified</li> </ul>
Preble <i>et al.</i> (1993) <sup>7</sup> (Connecticut Medicine)	Randomized sample of N=2374 patients (ambulatory & hospitalized)  Longitudinal study (Oct. '86 - Oct. '91)	<ul style="list-style-type: none"> <li>• n = 1291 respondents</li> <li>• High degree of patient satisfaction for all categories: the preoperative visit (<math>X = 9.17 \pm 1.6</math>), the postoperative visit (<math>X = 8.33 \pm 2.7</math>) and overall satisfaction (<math>X = 9.15 \pm 1.7</math>)</li> <li>• Postoperative visit lowest score; identified as an area of patient concern</li> <li>• Although results on satisfaction levels were high, specific comments from patients revealed areas of dissatisfaction with anesthetic care</li> <li>• 0.9% of the patients surveyed rated their interaction with the department as unsatisfactory in all three areas; 2.6% in two areas, 10.8% in at least one area</li> <li>• Development of the Patient Satisfaction Survey not specified</li> </ul>
Penon & Ecoffey (1995) <sup>14</sup> (Annales Françaises d'Anesthésie et de Réanimation)	N = Not mentioned Patients for ENT & gastric surgeries	<ul style="list-style-type: none"> <li>• n = 90 respondents</li> <li>• 96% of patients were satisfied with the care received from anesthetists</li> <li>• Personalized evaluation by the anesthetists decreased anxiety for 21 patients (73% of 29 patients)</li> <li>• Anaesthesia was perceived as the main cause of anxiety for 40 patients (65% of 62 patients)</li> <li>• Preoperative visit by anesthetist produced a minor decrease of anxiety for 46 patients (59% of 78 patients) and a major decrease for 21 patients (27% of 78 patients)</li> <li>• Development and content of the instrument not specified</li> </ul>
Zvara <i>et al.</i> (1996) <sup>8</sup>	Prospective study, randomized sample of N=151 patients: A=51 (1 visit, B=50 (2 visits), C=50 (3 visits), patients for elective surgeries	<ul style="list-style-type: none"> <li>• Group A (n=48), Group B (n=48), Group C (n=48)</li> <li>• Patient evaluation of hospital, surgical, and anaesthesia care was high for all groups and did not vary by group</li> <li>• Increasing the number of postoperative visits does not improve physician recognition nor patient satisfaction with anaesthesia services (<math>P &lt; 0.05</math>)</li> <li>• Instrument: Patient Perception and satisfaction with Hospital and Anaesthesia Care (10 questions 2 general questions and 8 more specific (grade: [1 poor] to 5 [outstanding])</li> <li>• Development of the instrument not specified</li> </ul>

TABLE Characteristics of the studies - *continued*

Brown <i>et al.</i> (1997) <sup>6</sup> (Mayo Clinic Proceedings)	N = 315 patients, divided into 3 groups (N=105/group): A(no problems), B(airway problems), C (cardiovascular problems)  Randomized (groups A and C) Convenience (group B)	<ul style="list-style-type: none"> <li>• Group A (n=76), Group B (n=83), Group C (n=80)</li> <li>• No significant difference between the groups regarding satisfaction with anesthesia care ( 98% were very satisfied or satisfied in each group ). According to these results, overall patient satisfaction postoperatively is unaffected by intraoperative anesthetic events (<math>P &lt; 0.05</math>)</li> <li>• Comments of patients specified that increased collaboration between doctors and nurses as well as decreased waiting time before surgery augments patient satisfaction</li> <li>• Development of the instrument not specified</li> </ul>
Myles <i>et al.</i> (2000) <sup>12</sup> (British Journal of Anaesthesia)	N = 17 106 patients for general and specialty surgery	<ul style="list-style-type: none"> <li>• n = 10 811 patients</li> <li>• No mention of instrument used to collect data</li> <li>• Overall level of satisfaction with anesthesia care was 96,8%. Factors strongly associated with satisfaction: older age patient, male sex and measures of increased perioperative risk (co-morbidity + ASA status &gt; III). Strong relation between patient dissatisfaction and postoperative pain, nausea, vomiting and other complications (<math>P &lt; 0.0005</math>)</li> </ul>
<i>Group B: Studies that included some psychometric evaluation of instrument</i>		
Source & year (periodic or manuscript)	Population (sample) (N = Targeted sample)	Main general results on patient satisfaction and instrument (n = number of respondents)
Shevde & Panagopoulos (1991) <sup>19</sup>  (Anesthesia & Analgesia)	N = Not mentioned Consecutive sample  Minor + major surgeries 30% ambulatory	<ul style="list-style-type: none"> <li>• n = 800 respondents</li> <li>• Patients' rating of their confidence in the anesthetist preoperatively fell into the «very high» level ( X = 3.97; SD = 1.07; range = 1-5 ) but was significantly lower than that described for the surgeon ( X = 4.47; SD=0.80; <math>t = -15.49</math>, <math>P &lt; 0.001</math>)</li> <li>• Patients rated the significance of the anesthetist in the pre-operative care as being at the same level as their medical doctor ( t= -1.61, <math>P = 0.10</math> ). Ratings of both specialists were significantly lower than those assigned to surgeons ( t = 5.52, <math>P &lt; 0.001</math>)</li> <li>• Most significant preoperative concerns regarding the anesthetist: qualifications (45%), experience (43%), presence in the O.R. (32%). Other concerns: possibility of not waking up (37%), experiencing pain (34%), and becoming paralyzed (32%)</li> <li>• Instrument: Patient Survey (preoperative concerns)</li> <li>• Psychometric evaluation: Construct validity (Factor analysis)</li> </ul>
Pestey (1992) <sup>16</sup> (Master's thesis)	Stratified sample of patients for elective surgery. Stratification by types of anesthesia and types of admission (Short-term surgery, Same-day admission, Previous day admission) N = 50 patients in each group All surgeries except: emergency, obstetrics, transfers to ICU, pediatrics	<ul style="list-style-type: none"> <li>• n = 150 respondents</li> <li>• Satisfaction levels with the service: anesthesia staff (92%), time spent (87%), fears relieved (86%), knowledge gained (82%), and effects explained (74 %)</li> <li>• No significant differences in satisfaction between same-day admission, previous day admission, and short-term surgery (<math>P &lt; 0.05</math>)</li> <li>• Instrument: Questionnaire Tool</li> <li>• Development of the instrument not specified</li> <li>• Psychometric evaluation: Reliability</li> </ul>
Whitty <i>et al.</i> (1996) <sup>15</sup> (Anaesthesia)	Consecutive sample of N = 172 patients for ophthalmic, general, and maxillofacial surgeries (pilot study)	<ul style="list-style-type: none"> <li>• n = 126 respondents</li> <li>• 67% of patients reported that they were very satisfied with their anesthetic care</li> <li>• 65% of patients mentioned that they would be very happy to have the same <i>anesthetist</i> for a future operation</li> <li>• 55% of patients mentioned that they would be very happy to have the same <i>anesthetic</i> for a future operation</li> </ul>

TABLE Characteristics of the studies - *continued*

Whitty <i>et al.</i> (1996) <sup>15</sup> - <i>continued</i>		<ul style="list-style-type: none"> <li>• Patients' perceptions of having had adequate information about the anesthetic preoperatively, † having had postanesthetic sequelae explained,* and having undergoing a reasonable length of time without a drink preoperatively, † all seemed to affect a patient's willingness to have the same anesthetic again (statistically significant results, *<math>P &lt; .01</math> and †<math>P &lt; .05</math>)</li> <li>• Perception of reassurance after the preoperative visit seemed to affect patients' overall satisfaction with anesthetic care (<math>P &lt; 0.01</math>)</li> <li>• Focus groups used to generate patients' concerns and pool of questions</li> <li>• Psychometric evaluation: Content validity</li> </ul>
Tong <i>et al.</i> (1997) <sup>11</sup> (Anesthesiology)	<p>Consecutive sample of N = 6285 patients after ambulatory surgery (Ophthalmology, C&amp;C, arthroscopy, laparoscopy and 20 other types of surgery)</p> <p>Prospective study</p>	<ul style="list-style-type: none"> <li>• n = 2730 respondents.</li> <li>• Dissatisfaction with anesthesia was associated with a 12-fold increase in global dissatisfaction (<math>P = 0.0001</math>)</li> <li>• The number of symptoms occurring 24 hr after operation was associated with an exponential (0.28 X N)-fold increase in dissatisfaction with anesthesia for N number of symptoms (<math>P = 0.0001</math>)</li> <li>• Intraoperative and postoperative adverse outcomes were the major causes of dissatisfaction with anesthesia (88%)</li> <li>• Instrument: Patient Questionnaire (Abramovitz <i>et al.</i>, 1987)</li> <li>• Psychometric evaluation: Reliability</li> </ul>
Dexter <i>et al.</i> (1997) <sup>13</sup> (Anesthesiology)	<p>Patients for ambulatory surgery (ophthalmology 60%, gynecology 14%, knee 14%, others 12%)</p>	<ul style="list-style-type: none"> <li>• n = 80 respondents</li> <li>• Patients overall score on ISAS (mean <math>\pm</math> SD): 2.1 <math>\pm</math> 0.87 (max: 3.0)</li> <li>• Instrument: Iowa Satisfaction with Anesthesia Scale (ISAS)</li> <li>• Psychometric evaluation: Reliability, content validity, convergent validity</li> </ul>
Fleisher <i>et al.</i> (1999) <sup>9</sup> (J Clin Anesth)	<p>Randomized sample of N = 371 outpatients without adverse anesthetic events</p>	<ul style="list-style-type: none"> <li>• n = 229 respondents</li> <li>• Patients in the group that received an Anesthesiology Consultant Report (ACR) were more satisfied with the management of their pain and other symptoms (<math>P &lt; 0.05</math>, by Wilcoxon rank sums) and were more satisfied overall with the quality of the anesthesia care (<math>P &lt; 0.01</math>, by Wilcoxon rank sums). Patients deemed the quality of their anesthetic care as excellent in the ACR group compared to control (83% vs 67%, <math>P &lt; 0.01</math>)</li> <li>• Instrument: Postoperative Questionnaire</li> <li>• Development of the instrument not specified</li> <li>• Psychometric evaluation: Reliability</li> </ul>

six studies included a conceptual framework of their constructs. Furthermore, no study included other questionnaires to control for confounding variables, such as level of psychological distress or social desirability, even though these variables may affect a patient's ability to properly complete a questionnaire on satisfaction and to answer rationally.

The psychometric testing of the scales was performed in a variety of ways. Shevde & Panagopoulos,<sup>19</sup> presented a factor analysis of the data to reveal the presence of four distinct factors (specific complications of anesthesia, characteristics of the anesthesiologist, anxiety about

being hospitalized and pain). No other testing was performed on their scale. Pestey<sup>16</sup> evaluated the reliability of her scale using a test-retest with short term surgery patients only (n=38). Pearson correlation coefficients were calculated for each individualized questions (Q2=0.76, Q3=0.88, Q4=0.76, Q5=0.79, Q7=0.66). Whitty *et al.*,<sup>15</sup> developed a scale using patient focus groups, comments from anesthesiologists and a theory of patient satisfaction. Content validity was verified with patients, anesthesiologists, experts on questionnaire design, and a "fog index" (Microsoft Word software that screens a text and identifies words exceeding the level of

grade 6). No other testing was performed on their scale. Tong *et al.*<sup>11</sup> used a Kappa (interrater agreement) between nurses and anesthesiologists to assess the reliability of their two scales (a standardized check-off form for adverse events, a 24-hr postoperative telephone questionnaire). Values of  $k > 0.9$  were obtained for both scales. As to the reliability of the questions on satisfaction, these authors relied on the psychometric information obtained in a previous study<sup>20</sup> and did no testing of the data (data obtained using the questionnaire of Abramovitz and colleagues). Dexter and colleagues<sup>13</sup> performed various tests on their new scale (Iowa Satisfaction with Anesthesia Scale [ISAS]) and obtained a value of 0.80 for internal consistency (Cronbach's Alpha), and correlations of  $R^2 = 0.74$  (after one hour) and  $R^2 = 0.76$  (after four days) for stability (test-retest). Content validity (evaluation of the extent to which the method of measurement includes all the major elements relevant to the construct being measured) of the ISAS was verified once, before the study began; the verification was performed by professionals. To establish convergent validity, the authors compared patients' overall scores to those predicted by their anesthesia provider ( $R^2 = 0.23$ ,  $P > 0.01$ ). Fleisher *et al.*<sup>9</sup> relied on the correlation between the question regarding quality of care and the one regarding satisfaction with pain management to verify the internal consistency of their instrument. A Cronbach's Alpha of 0.62 was obtained. No other testing was performed on the scale.

### Discussion

Overall, surveys of patient satisfaction presented in this review yielded very positive results. Unfortunately, these results are often accepted at face value and considered as the sole indicator that the services offered by the department of anesthesiology, as evaluated by patients, are adequate. Since the results are so favourable, the incentive to improve further the quality of services provided is slight.<sup>11</sup> Only one author<sup>10</sup> questioned the high level of satisfaction suggested by their results: "This apparent satisfaction should therefore give the anaesthetist little cause for self-congratulation, since it implies that the patient neither expects nor demands a high standard of service or expertise from his anaesthetist...".

Another possible explanation for these positive results is that most researchers have a bias towards measuring satisfaction. In other words, they do not allow elements of dissatisfaction to emerge from their surveys. Questionnaires are oriented more towards the researchers' desire for positive results. They do not offer open-ended questions where patients can

advance opinions or express dissatisfaction concerning elements covered or not by the survey.

Only one study<sup>11</sup> presented a clear definition of the concept of patient satisfaction. As for the remainder, since no definition was provided, it is not clear what these studies truly measured. For example, the ISAS scale<sup>13</sup> appears to measure more patients' physical condition at a precise moment in time than the patients' satisfaction regarding anesthesia services. Further, none of the 14 studies presented a conceptual framework relative to patients' satisfaction with anesthesia services, thus leaving the reader in the dark as to what variables might explain the underlying concept.

Another important cause for concern is that no study attempted to control for any confounding variables. Respondents might not be answering the items of primary interest for the reasons we assume. There may be other motivations influencing their responses. One type of motivation that can be assessed fairly easily is social desirability. Social desirability is defined as the motivation of a person to present herself or himself in a way that society regards as positive.<sup>21</sup> If respondents are influenced by social desirability, they may distort their answers and thus invalidate their evaluation of satisfaction. For instance, in the Dexter *et al.* study,<sup>13</sup> 90% of the respondents, in the first version of their instrument, answered that they totally agreed with the statement "I like my anesthetist". Also, in the study by Keep *et al.*<sup>10</sup> one patient who had been awake during her esophagoscopy mentioned that she was satisfied with the anesthetic but would prefer to be asleep the next time! Did social desirability influence or help to explain the high levels of satisfaction obtained? Since none of the 14 studies reviewed controlled for social desirability, the validity of the results remains open to question. Perhaps the use of Marlow & Crowne's abridged social desirability scale,<sup>22</sup> along with a patient satisfaction scale, would help to increase the validity of the results obtained by excluding respondents vulnerable to social desirability.

In at least four of the studies reviewed,<sup>7,8,13,17</sup> patients may have been influenced by either the presence of the anesthesiologist or the suspicion that the anesthesiologist could identify them. For instance, if the anesthesiologist remains nearby while the patient is completing the questionnaire, as occurred in three studies<sup>10,13,17</sup> the patients' right to anonymity and confidentiality is not protected. Patients cannot be expected to express their comments, suggestions or grievances if they have even the slightest doubt that their right to confidentiality and anonymity is not being respected.<sup>23</sup>

Few clinicians are aware of the importance of psy-

chometric evaluation in the development of a new scale.<sup>4</sup> For example, Dexter *et al.*<sup>13</sup> tested for reliability after an interval of four days, mentioning that “the test-retest method of assessing reliability is sensitive to the time interval between testing. The longer the time interval, the lower is the reliability”. Yet, for paper-and-pencil measures, experts recommend a waiting period of two weeks to a month between tests, the goal being to keep subjects from remembering their answers to the first test, which could lead to an overestimation of the test’s reliability.<sup>21,24</sup> Further, it is considered irrelevant to perform test-retest evaluation with instruments measuring patient satisfaction since this concept may vary in time and it is also influenced by the effect of memory which is an undesirable consequence in the measurement of this concept. It is more appropriate to focus on obtaining reliable results regarding the internal consistency of the scale, thus an elevated Alpha of Cronbach. Similarly, having a small developmental sample (less than 10 subjects per items) to evaluate internal consistency (Cronbach’s Alpha) can produce inappropriately favourable results.<sup>21,25</sup> When the ratio of subjects to items is relatively low and the sample size is small, correlations between items will be influenced by chance to a substantial degree. An Alpha of Cronbach of 0.80 using only 49 subjects, on a scale of 11 items,<sup>13</sup> should therefore be questioned. Finally, even the employment of a very large sample<sup>12</sup> (10,811 patients) did not compensate the evidence and consequences of a lack of rigour in the methods and the development of the instrument to measure patient satisfaction. Indeed, in the study by Myles *et al.*,<sup>12</sup> the variable «patient satisfaction», considered as a major outcome, was measured by a question with only three choices of answer and results dichotomized between satisfied *vs* somewhat dissatisfied-dissatisfied. Such strategy is not very well considered,<sup>26</sup> and it does not generate enough variance in the distribution of the data collected. In addition, services offered by anesthesiologists include many components. We doubt that such a complex issue can be properly evaluated by only one question. Thus there are serious doubts about the significance of results obtained with an invalid and unreliable instrument. Further, even though the authors recognize the influence of social desirability on respondents, no measures were taken to evaluate the impact of this important confounding variable.<sup>27</sup>

The process that must be followed to obtain valid results is complex. It involves more than writing up a few questions and passing them along to the desired population. As well, a newly developed scale must be tested to verify what it really measures, in view of pro-

ducing valid results. The initial testing of a scale is not sufficient to verify all of the attributes of both reliability and validity of the scale. Results obtained with a new scale must therefore be interpreted with caution. For the sake of psychometrics, one must “sacrifice” at least one sample; only then can one pretend to significant results on the concept measured.<sup>26</sup>

In a first trial, such psychometric measures as establishing content validity, internal consistency and construct validity (determines whether the instrument actually measures the theoretical construct it purports to measure) are considered sufficient for evaluating the properties of a scale, taking into account that a theoretical construct of the variables of the study is presented at first.<sup>26</sup> Indeed, it is inappropriate to try to perform every psychometric test available on a new scale in a single study. Achieving the complete psychometric profile of a new scale takes time.<sup>26</sup> Any new instrument must go through several specific phases and trim before it can be considered to be reliable and valid. Also, the control of major confounding variables is essential to reduce the “contamination” of the main variable (e.g. satisfaction) to be measured by an instrument.

The task of maintaining reliability and validity of instruments is never concluded. Measurement devices are nearly always subject to the effects of social context. Values and practice patterns change, individuals think differently about a number of matters, and terminologies go out of fashion.<sup>28</sup> Scale development is a continuous and retroactive process. Finally, care should be taken when attempting to generalize results obtained with a new instrument of unestablished validity and reliability; otherwise, one risks making false assumptions concerning the population from which the sample was drawn.

## Conclusions

The perceptions of patients, along with quality assurance, are an important component of the evaluation of the quality of services in anesthesiology. Even though perceptions are subjective, this information is important to anesthesiologists. Indeed, patients offer an unique perspective for evaluating the nontechnical aspects of medical care.<sup>29</sup> However, to be useful and valid for clinicians and researchers and to engender improvement in the practice of anesthesiology, such information must be collected using rigorous methods and a valid, reliable instrument derived from a conceptual framework. It is doubtful that the results of the studies presented in this review truly represent perceptions of patients regarding the anesthesia care received.

As with all standardized data collection, creating and performing high quality surveys of patients’ perceptions can be challenging. Valid and reliable patient

survey data can enable practitioners to identify areas for improvement, and demonstrate to external reviewers the quality of care they provide to their patients.<sup>2,9</sup> That is why the development of valid and reliable instruments to measure patient satisfaction must adhere to specific psychometric requirements and control for major confounding variables. The procedure is complex. Use of a non-validated and/or non-specific instrument will only produce unreliable and meaningless results. Generalization of results from a given patient population is hazardous, especially when the initial methods are questionable.

Finally, this review allowed emphasis on the absence of appropriate instruments to measure patient satisfaction with anesthesia services, the many biases present in the methodology employed, the lack of rigour regarding the psychometric testing of the instrument used and also the very high levels of satisfaction usually obtained by surveys on patient satisfaction with anesthesia services to be demystified. We proposed solutions to increase the validity of the measurement of patients' satisfaction regarding the services provided by anesthesiologists.

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#### References

- 1 *Duncan P.* Quality: a job well done! (Editorial) *Can J Anaesth* 1993; 40: 813-5.
- 2 *Bierstein K.* Consumer satisfaction surveys in anesthesiology practice. *American Society of Anesthesiologists Newsletter* 1996; 60: 26-9.
- 3 *Eagle CL, Davies JM.* Current models of "quality" - an introduction for anaesthetists. *Can J Anaesth* 1993; 40: 851-62.
- 4 *Fung D, Cohen MM.* Measuring patient satisfaction with anesthesia care: a review of current methodology. *Anesth Analg* 1998; 87: 1089-98.
- 5 *Cook D.* Systematic reviews: the case for rigorous methods and rigorous reporting. *Can J Anaesth* 1997; 44: 350-3.
- 6 *Brown DL, Warner ME, Schroeder DR, Offord KP.* Effect of intraoperative anesthetic events on postoperative patient satisfaction. *Mayo Clin Proc* 1997; 72: 20-5.
- 7 *Preble LM, Perlstein L, Katsoff-Seidman, L, O'Connor TZ, Barash PG.* The patient care evaluation system: patients' perceptions of anesthetic care. *Connecticut Med* 1993; 57: 363-6.
- 8 *Zvara DA, Nelson JM, Brooker RF, et al.* The importance of the postoperative anesthetic visit: do repeated visits improve patient satisfaction or physician recognition? *Anesth Analg* 1996; 83: 793-7.
- 9 *Fleisher LA, Mark L, Lam J, et al.* Disseminating information using an anesthesiology consultant report: impact on patient perceptions of quality of care. *J Clin Anesth* 1999; 11: 380-5.
- 10 *Keep PJ, Jenkins JR.* From the other end of the needle. The patient's experience of routine anaesthesia. *Anaesthesia* 1978; 33: 830-2.
- 11 *Tong D, Chung F, Wong D.* Predictive factors in global and anesthesia satisfaction in ambulatory surgery patients. *Anesthesiology* 1997; 87: 856-64.
- 12 *Myles PS, Williams DL, Hendrata M, Anderson H, Weeks AM.* Patient satisfaction after anaesthesia and surgery: results of a prospective survey of 10 811 patients. *Br J Anaesth* 2000; 84: 6-10.
- 13 *Dexter F, Aker J, Wright WA.* Development of a measure of patient satisfaction with monitored anesthesia care. The Iowa satisfaction with anesthesia scale. *Anesthesiology* 1997; 87: 865-73.
- 14 *Penon C, Ecoffey C.* Patients opinion on the quality of anaesthetic management. (French) *An Fr Anesth Réanim* 1995; 14: 374-5.
- 15 *Whitty PM, Shaw IH, Goodwin DR.* Patient satisfaction with general anaesthesia. Too difficult to measure? *Anaesthesia* 1996; 51: 327-32.
- 16 *Pestey ME.* Patient satisfaction with anesthesia services delivered in the cost containment atmosphere of healthcare today. Unpublished master thesis. New Haven, Connecticut: Southern Connecticut State University, 1992.
- 17 *Burrow BJ.* The patient's view of anaesthesia in an Australian teaching hospital. *Anaesth Intensive Care* 1982; 10: 20-4.
- 18 *Dodds CP, Harding MI, More DG.* Anaesthesia in an Australian private hospital: the consumer's view. *Anaesth Intensive Care* 1985; 13: 325-9.
- 19 *Shevde K, Panagopoulos G.* A survey of 800 patients' knowledge, attitudes, and concerns regarding anesthesia. *Anesth Analg* 1991; 73: 190-8.
- 20 *Abramovitz S, Coté AA, Berry E.* Analyzing patient satisfaction: a multi-analytic approach. *Quality Review Bulletin* 1987; 13: 122-30.
- 21 *DeVellis RF.* Scale development: Theory and Applications. London: Sage Publications, 1991.
- 22 *Strahan R, Gerbasi KC.* Short homogenous versions of the Marlow-Crowne social desirability scale. *J Clin Psychol* 1972; 28: 191-3.
- 23 *Strasser S, Davis RM.* Measuring patient satisfaction for



- improved patient services. Ann Arbor, Michigan: Health Administration Press, 1991.
- 24 *Nunnally JC, Bernstein IH* Psychometric Theory, 3rd ed. Montreal: McGraw Hill Inc., 1994.
- 25 *Streiner DL, Norman GR*. Health Measurement Scales. A Practical Guide to their Development and Use, 2nd ed. Oxford: Oxford University Press, 1995.
- 26 *Crocker L, Algina J*. Introduction to Classical and Modern Test Theory. Fort Worth: Harcourt Brace Jovanovich College Publishers, 1986.
- 27 Le May S, Hardy J-F, Taillefer M-C, Dupuis G. Inappropriate methods for patient satisfaction (Letter). *Br J Anaesth* 2000; 84: 821.
- 28 *Williams MA*. Instrument development: always unfinished (Editorial). *Res Nurs Health* 1989; 12: iii-iv.
- 29 *Epstein KR, Laine C, Farber NJ, Nelson EC, Davidoff F*. Patients' perceptions of office medical practice: judging quality through the patients' eyes. *Am J Med Qual* 1996; 11: 73-80.