Assessment of patient satisfaction with endoscopy using an interactive voice response system

Claude ALTMAN (1), Thomas BIRRAUX (2), Jean LAPUELLE (3), Jean-Christophe LETARD (4), Franck TUSSEAU (5), Jean-Marc CANARD (6)

(1) Cabinet Médical, Le Kremlin-Bicêtre; (2) Neuilly Plaisance; (3) Clinique Saint Jean, Toulouse; (4) Polyclinique de Poitiers, (5) Cabinet Médical, Sartrouville; (6) Cabinet Médical, Paris.

SUMMARY

Aim — The aim of this study was to determine the feasibility of patient’s satisfaction assessment after endoscopy using an interactive voice response (IVR) system.

Methods — A specific IVR system was developed for this study and proposed to patients by 161 private gastroenterologists after an endoscopic procedure. No reminder was used for the patients not calling spontaneously the IVR.

Results — After endoscopy, 31% of the patients called the IVR and 1052 answered the entire questionnaire. The answers obtained by the IVR and a face-to-face interview were concordant for 98.8% of the questions. The endoscopy was carried out with anesthesia for 94% of the patients and 95% stated they would agree to undergo the procedure again under the same conditions. This was independently associated with the presence of explanations about the procedure before its realization, male gender and, for the patients having had a colonoscopy, difficulties in taking the bowel cleaner and the presence of pain after the colonoscopy.

Conclusion — This study shows the feasibility of patient’s satisfaction assessment with endoscopy using an IVR system under routine conditions of endoscopy practice.

Introduction

Patient satisfaction is an important criterion for evaluating the quality of health care [1, 2]. Regular assessment of patient satisfaction should have been instituted in France since 1996 in all public and private health care institutions [3]. Evaluation of patient satisfaction is nevertheless difficult [4]. Paper questionnaires are generally given to patients at discharge. Handling these questionnaires creates a significant work load, and some wonder whether it is worthwhile because of the low return rate and difficulties in exploitation of the results [5].

Interactive voice response (IVR) systems are frequently used in the service industry. This type of system enables use of self-administered questionnaires which can be modulated in real time according to the responses obtained. The responses are automatically integrated into a computer database, facilitating exploitation of the results. Many medical applications for IVR systems have been developed and the quality of information collected from patients is of at least equivalent quality to that collected from face-to-face interviews [6, 7]. Use of an IVR would have the advantage of reducing time and burden needed for data collection. This would allow the conception of routine investigations in various medical structures without additional workload for the personnel. The goal of our study was to evaluate the feasibility of assessing patient satisfaction after endoscopy using a self-administered questionnaire carried out by an IVR in the usual conditions of practice.

Materials and methods

Interactive voice response

The opinion of the patients was collected using a telephone self-administered questionnaire carried out with the assistance of an IVR system. The IVR system was specifically developed for this study and implemented by the one of the authors (TB) using a PC micro-computer to...
which a Dialogic® telephone card was added to link the computer to regular telephone lines. The IVR used CT Studio (Envox®) software. The questions delivered by the system were recorded with a real voice. Digitalized voice systems or vocal recognition were not used. The patients responded to the questions by pressing on the keys of their telephone. The questionnaire was composed of modules delivered in an ordered determined by the responses to items concerning the procedure (gastroscopy and/or colonoscopy) and the conditions of the procedure (with or without anesthesia). The questionnaire was only available in French.

The questionnaire was organized according to the following flow-chart: introductory module during which questions were asked about the type of procedure, the conditions of the procedure, and demographic data (age, gender). This module was followed by a specific module depending on the type of procedure carried out (gastroscopy or colonoscopy) and the conditions in which it was carried out (with or without anesthesia). Questions concerning the procedure were automatically selected according to the responses given during the introductory module. At the end of the questionnaire, questions were asked concerning the patient’s overall satisfaction with the procedure, its usefulness for the patient’s health, and if any complications occurred after the procedure. The patients who had undergone both gastroscopy and colonoscopy successively replied to the questions for the gastroscopy module and then the colonoscopy module. The responses recorded by the IVR system were integrated to a database then automatically processed for statistical analysis (SPSS 11®). At the time of each question, the IVR software verified that the patient’s response corresponded to a possible value among the ones expected. In case of a non-valid response, the system refused the response and asked the question again.

The questions chosen for the questionnaire were selected from previous studies reported in the literature [8, 9] and reflected factors considered as important by patients.

In order to guarantee anonymous response to the questionnaire, the telephone company (France Telecom) was asked to deactivate the caller ID service of the voice service. The call number to the service was an ordinary number, with no extra toll. The cost of the call, born by the patient, corresponded to a local call in the Paris area.

**Study design**

**Physicians participating in the study**

Participation to this study was proposed by mail to all private gastroenterologists practicing in the Ile-de-France region (N = 472). One hundred sixty-one (34 %) agreed to participate. Each practitioner was selected according to the responses given during the introductory module. At the end of the questionnaire, questions were asked concerning the patient’s overall satisfaction with the procedure, its usefulness for the patient’s health, and if any complications occurred after the procedure. The patients who had undergone both gastroscopy and colonoscopy successively replied to the questions for the gastroscopy module and then the colonoscopy module. The responses recorded by the IVR system were integrated to a database then automatically processed for statistical analysis (SPSS 11®). At the time of each question, the IVR software verified that the patient’s response corresponded to a possible value among the ones expected. In case of a non-valid response, the system refused the response and asked the question again.

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**Patient participation**

Physicians suggested participation in the study to their patients by giving them a document after the endoscopy explaining the goal of the study and its methods. This document included the phone number of the physician when it was proposed called the server. No reminder was given to the patients to incite them to reply to the questionnaire.

1 173 patient calls were recorded by the IVR system. In 121 cases, the calls were incomplete, the patient hanging up before the final question. For 78 of these 121 calls, the hang-up came early, during the first module concerning the type of procedure carried out. The causes of this interruption are not known: an error in the given response, non-comprehension of the questions, decision not to reply further. The same patient could hang-up at the beginning of questionnaire, and then call the IVR again. These incomplete responses were not taken into account in the results.

The results presented concern the 1 052 patients who called the IVR and replied to the full questionnaire. The average age of the patients was 56.7 ± 13.9 years; 95 (9%) patients were older than 74 years, and 603 (57.3%) were women.

These patients had undergone 836 colonoscopic procedures and 488 upper GI endoscopies. Both upper and lower endoscopies had been performed in 272 patients; 564 patients had a single colonoscopy and 216 patients a single fibroscopy. This was a first endoscopic procedure for 369 patients (44%) undergoing colonoscopy and 253 patients (52%) undergoing gastroscopy. The procedures were performed with general anesthesia for 990 (94.1%) patients. Twenty-five colonoscopies and 44 gastroscopies were carried out without general anesthesia. A total of 938 patients (89.2%) stated that the conditions of the procedure had been explained to them by a doctor before it was performed and 934 patients (88.8 %) declared that they had received a document explaining the risks and conditions of the procedure.

Patients’ opinion concerning the delay to obtain an endoscopy appointment is presented in table I. The number of patients considering the appointment delay as too long was significantly associated with the length of this delay (P < 0.0001).

One-third of patients (N = 351, 33.4 %) reported they were worried about the procedure; patients having an endoscopy for the first time were more worried than those who had previously had the procedure (P < 0.0001). Results concerning patient apprehension are presented according to the type of procedure in table II. The proportion of patients who stated they were afraid was comparable for upper and lower procedures, and did not
Patient satisfaction after endoscopy differ significantly according to whether the procedure was performed with or without anesthesia. Among the 351 patients who stated they had been afraid of having the procedure, 281 (79.2%) believed that this fear was not warranted once the procedure had been performed.

The overall satisfaction with the procedure was excellent and 1003 (95.3%) patients stated that they would have the procedure again in the same conditions. Variables significantly associated with acceptance to have the procedure again in the same conditions are presented in Table III. At univariate analysis, patient age, excessive delay to appointment, and, among patients having a colonoscopy, the type of product used for bowel cleaning (PEG vs PMDS) were not associated with agreement to have the procedure again under the same conditions. At multivariate analysis, using data from all patients, independent factors associated with acceptance to have the procedure again under the same conditions were: having received explanations from a doctor before the procedure (OR: 3.15 [IC95%: 1.61-6.14] and the male gender (OR: 2.14 [IC95%: 1.078-4.24]).

999 patients (95%) stated that they had been informed of the results of the procedure the day of the procedure, and 1044 patients (99%) considered that having the procedure was useful for their health.

UPPER ENDOSCOPIC PROCEDURES WITHOUT ANESTHESIA

Forty-four upper gastroscopies were carried out without general anesthesia. Local anesthesia was used in 38 (86%) patients.

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**Tableau I.** – Patient opinion concerning the time to obtain an appointment for an endoscopic procedure (number of patients (%)).

<table>
<thead>
<tr>
<th>Time to appointment</th>
<th>no</th>
<th>yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than one week</td>
<td>361 (98.6%)</td>
<td>5 (1.4%)</td>
<td>366</td>
</tr>
<tr>
<td>One to two weeks</td>
<td>405 (92.9%)</td>
<td>31 (7.1%)</td>
<td>436</td>
</tr>
<tr>
<td>Two to four weeks</td>
<td>161 (82.6%)</td>
<td>34 (17.4%)</td>
<td>195</td>
</tr>
<tr>
<td>More than one month</td>
<td>32 (58.2%)</td>
<td>23 (41.8%)</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>959</td>
<td>93</td>
<td>1052</td>
</tr>
</tbody>
</table>

The number of patients who thought the delay was too long was significantly associated with the length of this delay (P < 0.0001).

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**Tableau II.** – Fear of the procedure according to the type of procedure and the presence of an earlier experience (number of patients (%)).

<table>
<thead>
<tr>
<th>Fearful before the examination</th>
<th>no</th>
<th>yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastroscopy alone a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First exam</td>
<td>60 (49.6%)</td>
<td>61 (50.4%)</td>
<td>121</td>
</tr>
<tr>
<td>Prior experience</td>
<td>74 (77.9%)</td>
<td>21 (22.1%)</td>
<td>95</td>
</tr>
<tr>
<td>Total gastroscopies</td>
<td>134 (62.0%)</td>
<td>82 (38.0%)</td>
<td>216</td>
</tr>
<tr>
<td>Colonscopy alone a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First exam</td>
<td>147 (56.5%)</td>
<td>113 (43.5%)</td>
<td>260</td>
</tr>
<tr>
<td>Prior experience</td>
<td>239 (78.6%)</td>
<td>65 (21.4%)</td>
<td>304</td>
</tr>
<tr>
<td>Total colonscopies</td>
<td>386 (68.4%)</td>
<td>178 (31.6%)</td>
<td>564</td>
</tr>
<tr>
<td>Gastroscopy and colonscopes a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First exam</td>
<td>43 (50.6%)</td>
<td>42 (49.4%)</td>
<td>85</td>
</tr>
<tr>
<td>Prior experience</td>
<td>138 (73.8%)</td>
<td>49 (26.2%)</td>
<td>187</td>
</tr>
<tr>
<td>Total gastroscopies and colonscopes</td>
<td>181 (66.5%)</td>
<td>91 (33.5%)</td>
<td>272</td>
</tr>
</tbody>
</table>

**Tableau III.** – Factors significantly associated with the answer to the question: “Are you ready to have the procedure again under the same conditions?” (number of patients (%)). Univariate analysis.

<table>
<thead>
<tr>
<th>Are you ready to have the procedure again under the same conditions?</th>
<th>no</th>
<th>yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanations from a doctor before the endoscopic procedure a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>14 (12.3%)</td>
<td>100 (87.7%)</td>
<td>114</td>
</tr>
<tr>
<td>yes</td>
<td>35 (3.7%)</td>
<td>903 (96.3%)</td>
<td>938</td>
</tr>
<tr>
<td>Exam with general anesthesiab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>6 (9.7%)</td>
<td>56 (90.3%)</td>
<td>62</td>
</tr>
<tr>
<td>yes</td>
<td>43 (4.3%)</td>
<td>947 (95.7%)</td>
<td>990</td>
</tr>
<tr>
<td>Fear before exam c</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>26 (3.7%)</td>
<td>675 (96.3%)</td>
<td>701</td>
</tr>
<tr>
<td>yes</td>
<td>23 (6.6%)</td>
<td>328 (93.4%)</td>
<td>351</td>
</tr>
<tr>
<td>Gender a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>12 (2.7%)</td>
<td>437 (97.3%)</td>
<td>449</td>
</tr>
<tr>
<td>female</td>
<td>37 (6.1%)</td>
<td>566 (93.9%)</td>
<td>603</td>
</tr>
<tr>
<td>Pain after coloscopy a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>21 (3.8%)</td>
<td>538 (96.2%)</td>
<td>559</td>
</tr>
<tr>
<td>yes</td>
<td>21 (8.3%)</td>
<td>231 (91.7%)</td>
<td>252</td>
</tr>
<tr>
<td>Difficulty drinking the bowel preparation a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>6 (1.7%)</td>
<td>355 (98.3%)</td>
<td>361</td>
</tr>
<tr>
<td>yes</td>
<td>36 (8.2%)</td>
<td>402 (91.8%)</td>
<td>438</td>
</tr>
</tbody>
</table>

If the gastroscopy had been performed without anesthesia, patients were asked if the endoscope had been introduced via the mouth or the nose (naso-fibroscopy); only 1 patient stated that the endoscope had been introduced through the nose.

Twenty-seven patients (27%) stated that they had difficulties in swallowing the endoscope, the procedure was completed in all cases. Sixteen patients (36%) stated that they had experienced pain during the procedure, 32 (73%) felt like vomiting during the procedure and 9 (20%) had difficulty breathing during the procedure. Eighteen patients (41%) stated they had a difficult time tolerating the procedure.

**Upper Endoscopic Procedures with Anesthesia**

For the 444 patients who underwent an upper procedure with anesthesia, 434 patients (98%) stated that they felt nothing during the procedure. Only two patients (0.5%) stated that they had difficulty swallowing the endoscope and three (0.7%) stated that they wanted to vomit during the procedure. Waking up was considered easy by 428 (96%) patients.

**Colonoscopic Procedures without Anesthesia**

Twenty-five patients stated that they had a colonoscopy without anesthesia. In 15 cases (60%), the patients stated that decisions to perform the procedure without anesthesia were made by their doctor. In 10 cases (40%) the patients stated that they chose themselves to have the procedure without anesthetics. Eleven patients stated that they received pain medication, either orally or injected, during the colonoscopy. The procedure was described as painful by 7 (28%) patients.

**Colonoscopy with Anesthesia**

In all, 811 patients had a colonoscopy with anesthetics, 791 (98%) stated that they had not felt anything during the procedure. Twenty patients declared having felt something but only four (0.5%) declared experiencing pain during the procedure. Waking up after the procedure was considered easy by 769 (95%) patients.

**Preparation for Colonoscopy**

Of the 836 patients undergoing colonoscopy, 17 stated that they had not had a bowel preparation. The questions concerning the preparation therefore concerned 819 patients. PEG was used for 615 patients (75%), and PMDS for 204 (25%). The solution was difficult to drink for 448 patients (55%) with no significant difference between the two types of preparations (51% and 56% of patients considering the solution difficult to drink for PMDS and PEG respectively). For patients who received PMDS, 91% stated that they drank the whole preparation compared with 85% of the patients who received PEG ($P = 0.03$).

**Pain after Colonoscopy**

Of the 836 patients who had a colonoscopy, 263 (31%) stated that they had experienced pain after the procedure. Pain was scored “not very severe” by 211 patients and “severe” or “very severe” by 52 patients. Twenty-one patients stated that they had received treatment for pain.

**Complications after Endoscopy**

Nineteen patients reported complications after the endoscopy (1.8%). Only three (0.3%) stated that this complication led to hospitalization. Two patients (0.2%) stated they had had a surgical operation.

**Comparison of the responses obtained with the IVR system and face-to-face interviews**

Thirty patients participated in face-to-face interviews in addition to responding to the IVR questionnaire. These patients replied first to the IVR questionnaire, and then participated in an interview the same day using the same questionnaire. Among the 828 questions to which the 30 patients replied, 10 different responses were noted between the two interrogation methods. Considering the face-to-face interview as the reference method, the rate of observed errors with the IVR was 1.2%.

**Discussion**

This study is, to our knowledge, the first to use an IVR system to self-administer a patient satisfaction evaluation questionnaire after a medical procedure. IVR systems have proven useful for improving management practices for patients with cardiac or respiratory failure, hypertension, diabetes, or psychiatric disorders [6]. These studies have shown that patients accept IVR systems quite well, even the elderly [10]. The low rate of drop-outs in the course of the questionnaire observed in our study (10%) demonstrates that patients find the IVR system easy to use.

Several studies have shown that the quality of information obtained with the assistance of an IVR was at least as good as a face-to-face interview [11-13]. Our study confirms these results showing a correlation between the responses obtained with the IVR and a face-to-face interview for 98.8% of the questions. For certain types of “sensitive” information, it has even been suggested that the IVR allows obtaining information closer to the reality than does a face-to-face interview. This has been demonstrated for alcohol intake [14], drug abuse, and sexual behavior [15-17]. The more accurate information collected with an IVR system could be related to the absence of a human interrogator, who could have a positive or negative attitude concerning the responses given, thus influence the patient’s response.

Measuring patient satisfaction is a complex task. Several evaluation methodologies are available: patient questionnaires by interview or self-administration, small group discussions, analysis of documents given to the hospital by patients or family. No one method appears superior [1, 18]. The most widespread method is a paper questionnaire document to be filled out by the patient and returned at discharge. This method is applicable for time-point studies, but requires an active participation of the investigators to collect the questionnaires and recall patients by phone or mail in the event of non-response. Except for specific situations, it has been shown that discharge questionnaires are of little use for routine practice because of the low return rate and the difficulty in exploiting available responses [5].

In addition, digestive endoscopy is a particular type of procedure because it is frequently performed with anesthesia. Since anesthetics used could impair the patient’s judgement, valid evaluation of patient satisfaction must be carried out some time after patients have returned home.

There is thus a need for other methods for evaluating patient satisfaction. Methods using the internet or electronic mail have been proposed, in particular after endoscopy [19, 20]. These methods necessitate access to internet and raise problems of confidentiality which limit their use [20]. In this context, IVR systems present several advantages. The questionnaire is interactive, allowing adaptation depending on the responses received.

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somewhat like the generalized electronic interviewing system (GEIS) [21]. IVR can also be used simultaneously by several teams, guaranteeing a perfect reproducibility of data collection methods. Finally, the data collected are automatically integrated into a computer database facilitating exploitation of the results. There are however specific problems inherent with IVR systems, in particular for patients with hearing impairment. Problems with communication (foreign language) could also hinder use, but could easily be overcome by programming the IVR in several languages from which the patient could choose.

Since there is no consensus instrument validated for measuring patient satisfaction after endoscopic procedures, we retained for our questionnaire items proposed in the literature [8, 9]. Several studies designed to define pertinent criteria for evaluation of endoscopic patient satisfaction have been published [22]. The importance of reported pain as noted by Yacavone and al. [9] was confirmed in our results, showing that the presence of pain after colonoscopy is an independent factor predictive of refusal to accept another procedure under the same conditions. Such pain is probably secondary to air insufflation [23], but the interest of an exsufflation after the procedure remains controversial [24].

One of the goals of this study was to evaluate the use of an IVR in routine endoscopy practice. This first evaluation was therefore carried out by private practitioners. In 2003, in France, 80% of colonoscopic procedures and 68% of upper GI endoscopies were carried out by private practitioners (Dr JM Canard, personal communication).

Patient participation rate in our study (31%) was comparable to spontaneous participation obtained with satisfaction studies using paper questionnaires [25]. Higher participation rates, to the order of 70-80%, can be achieved with phone or postal reminders, but at the cost of an extra workload generally not feasible in daily practice. Also, the usefulness of such reminders is controversial. It has been shown that satisfaction scores were comparable with the patients replying spontaneously or after a reminder [25]. In a recent evaluation of patient satisfaction after colonoscopy [26], the rate of patients who were globally satisfied after the examination (95.8%), evaluated by direct telephone call to patients with a participation rate of 74%, was comparable to that found in our study (95.3%). This suggests that reminders to non-responders would not be useful to obtain a reliable estimation of patient satisfaction. It is also possible that the IVR system induces a specific selection bias concerning satisfaction after a medical procedure and those patient responders could be different from the overall patient population, in regards to their satisfaction. Long-term studies comparing the responses of patients using IVR and the entire population of patients having undergone the procedure would be needed to clarify this point.

Our results are corroborated by those of previous studies, confirming the reliability of data collected with the IVR system. Among our patients, 94% underwent their endoscopic procedure with anesthesia. This result is comparable to the most recent study on endoscopic practice in France, showing that 95% of procedures are carried out under anesthesia in private practice (Dr JM Canard, personal communication). Concerning the upper GI endoscopies, our results again demonstrated the better tolerance of the procedures carried out with anesthesia as already reported by Raymond et al. [27]; 41% of patients in our study had gastroscopy without anesthesia and described the examination as difficult to tolerate. This result could appear somewhat discordant with the fact that 90.3% of the patients had undergone a previous examination without anesthesia and were ready to undergo another under the same conditions. This might be related to the fact that use of anesthesia or not is generally the patient's choice at the time of procedure when it is performed in a private practice and not related to the availability of anesthetists.

The rate of complications requiring hospitalization after colonoscopy (0.3%) was comparable to recent series in the literature [28]. Our overall rate of complications (1.8%) was smaller than reported in one study carried out 30 days after colonoscopy [29]. The type of complications after endoscopy (perforation, hemorrhage, or other) was not recorded by our IVR. Similarly, the delay between the procedure and the IVR call is not known. Bleeding from a scar falling off after polypectomy typically occurs several days after the examination and may have been missed if the patient replied to the questionnaire before the complication arose. Furthermore, specific questions were not asked concerning low-grade bleeding, a frequent complication after colonoscopy [29].

Our results also show that many patients (55%) had difficulty swallowing the bowel preparation before colonoscopy. PMDS preparations were accepted better than PEG preparations [30, 31], but there is the risk of electrolyte disturbances with PMDS preparations [32]. Our study allowed an evaluation of other aspects of patient satisfaction rarely recorded. The patients appeared to expect the waiting time for an endoscopic appointment to be two to four weeks, a delay acceptable for 82.6% of them; 42% felt a delay beyond four weeks was too long. The ideal delay might be less than two weeks.

Our results show that about 50% of the patients experienced fear with regard to having an endoscopic procedure. It would therefore be important to take this apprehension into account, particularly for screening campaigns for the detection of colorectal cancer, in order limit the number of patients with a positive fecal occult blood sample who do not follow up with colonoscopy. This problem is recognized as one of the factors limiting screening [33]. The quality of information delivered to the patient before the examination should diminish this fear [34]. Information given before the procedure also influences the degree of overall patient satisfaction. The explanation received from a doctor before the procedure was, in our study, independently associated with accepting having the procedure redone under the same conditions.

In conclusion, patient satisfaction after endoscopy can be assessed. Automatic assessment using an IVR system simplifies data collection and lessens the workload for endoscopy teams. Data collected with an IVR system are comparable with data obtained with other commonly used techniques (paper questionnaires, direct interview, and telephone interview). A questionnaire specifically validated for endoscopy procedures, then adapted for use with an IVR system, would allow collection of even more pertinent data on patient satisfaction.

REFERENCES


