Original Article

Effects of Survey Mode on Results of a Patient Satisfaction Survey at the Observation Unit of an Acute Care Hospital in Singapore

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Abstract

Introduction: Over the years, surveys have become powerful tools for assessing a wide range of outcomes among patients. Healthcare managers and professionals now consider patient satisfaction as an outcome by itself. This study aims to determine if results of a patient satisfaction survey are affected by the manner by which the survey instrument is administered. Materials and Methods: A patient satisfaction survey was conducted from May 2006 to October 2007 in a tertiary level acute care facility. All patients admitted to the observation unit during the study period were invited to participate. Using a contextualised version of the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Hospital Survey, data was collected through either a phone interview, face to face interview or self-administered questionnaire. Each of these survey modes was administered during 3 different phases within the study period. Results: Eight hundred thirty-two (832) patients were included in the survey. Based on results of univariate analysis, out of the 18 questions, responses to 11 (61.1%) were related to survey mode. Face-to-face interview resulted in the greatest proportion of socially desirable responses (72.7%), while phone interview yielded the highest proportion of socially undesirable responses (63.3%). After controlling for possible confounders, logistic regression results showed that responses to 55.6% of the questions were affected by survey mode. Variations in response between phone interview and self-administered questionnaire accounted for 87.5% of the observed differences. Conclusions: Researchers must be aware that the choice of survey method has serious implications on results of patient satisfaction surveys.

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Key words: Methods, Patient satisfaction, Surveys

Introduction

Surveys are tools originally built around the social sciences, and which have found their way to the health disciplines. Medical specialties have explored the value of surveys for evaluating diseases. Questionnaires have been developed as aids for managing conditions such as asthma, headache and other chronic respiratory diseases.[1-3] Another domain within healthcare where surveys are increasingly being used is health services research (HSR). The US Institute of Medicine defines HSR as "a multi-disciplinary field of inquiry, both basic and applied, that examines the use, costs, quality, accessibility, delivery, organisation, financing, and outcomes of health care services to increase knowledge and understanding of the structure, processes, and effects of health services for individuals and populations."[4] As HSR investigates patients' "preferences for and expectations of health services,"[5] there is a need to obtain feedback about patients' perceived state of health and experience with care.

Over the years, physicians and managers of health care facilities have recognised the value of patient reported outcomes and patient satisfaction surveys as quality improvement tools. The proliferation of patient reported outcome measures began in the 1990s and has grown exponentially. From 1990 to 1999, there were 3921 reports describing patient assessed measures.[6] Perhaps the most popular of these, the SF-36 is a generic measure of well-being, physical, functional and mental health, and a preference-based health utility index. It is cited in close to 4000 publications.[7]

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After years of grappling with issues concerning the validity and reliability of surveys, whether the lay person is qualified to "judge" the performance of health professionals, getting the evidence into practice, and problems with older perception-based tools, the role of patient satisfaction surveys in health care quality improvement has become clearer. Advocates of performance improvement and health care quality particularly accreditation bodies, are powerful drivers of patient satisfaction surveys and patient reported outcomes. Instruments for obtaining feedback from patients have progressed from complaint reports to subjective rating scale type surveys, to experience-based episode of care centered satisfaction surveys.

The Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Hospital Survey is one of the newer tools for assessing patients' satisfaction with quality of care. It is a product of a multi-year initiative of the Agency for Healthcare Research and Quality (AHRQ) to support the assessment of consumers' experiences with health care.[8] This internationally validated tool was developed by a consortium of organisations which include the Centers for Medicare & Medicaid Services (CMS), Centers for Disease Control and Prevention, National Institute for Disability and Rehabilitation Research, Harvard Medical School, American Institutes for Research, Research Triangle Institute, Yale School of Public Health, and RAND Corporation. These tools are intended for a variety of users including patients, quality monitors, regulators, as well as provider organizations and health plans.[9] Unlike traditional surveys, CAHPS® questions are anchored on a specific episode of contact between the patient and healthcare professional. Rather than asking patients about their perceptions, questions focus on actual experiences during the care process. Instead of being asked to rate attributes of care, patients are asked if they received or experienced a specific quality of care indicator. It has been used in countries including the United States, Canada, Belgium, Germany, the Netherlands, Japan and Korea. Local adaptations of CAHPS®, including HCAHPS® and the Clinician and Group Survey have been used in a number of institutions within the National Healthcare Group. Users outside of the US are free to customise the supplemental CAHPS® questions. However, developers of the tool discourage revisions to the core questions mainly because this prevents users from making cross-institutional comparisons and benchmarking against the National CAHPS® Benchmarking Database.[10] While some Asian countries have adopted CAHPS®, literature on the validation of the instrument in the Asian context is apparently lacking.

To complement the survey tool, health facility managers must choose the best method for obtaining patient feedback. These methods have evolved, as have survey tools. After being limited to unsolicited comments, survey methods now encompass elaborate sampling and data collection techniques. Data collection methods have adapted to technological advances. Face-to-face surveys have been augmented by telephone interviews, and more recently by computer-assisted personal interviewing and audio computer-assisted self-interviewing.[11,12] It has been suggested that the effect of survey mode may occasionally be large enough to fully account for the difference in results of surveys.[13] The researcher's choice of method is influenced by factors such as anticipated rates of non-response and missing data, availability of resources, mode effects, and various forms of bias.[13-15] As with other surveys, proponents of patient satisfaction surveys must be aware of implications of the choice of method on results.[16]

This study aims to describe differences in results obtained from the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Hospital Survey when administered using 3 survey methods at the Observation Medicine Unit (OU) of a major acute care facility in Singapore.

Materials and Methods

The study was conducted at the OU, a catchment area for Emergency Department (ED) patients who require short-term management of up to 24-hours. These patients are often admitted from the ED as they require an extended period of observation or for investigation modalities not available in the ED. The OU manages its patients based on 13 evidence-based clinical protocols. It is manned by the ED medical and nursing staff and the management is supervised by the ED consultant on duty with 3 clinical rounds conducted at each change of shift to ensure that a seamless continuum of care is provided for the patients.

The survey instrument used was based on the original English version of the CAHPS® Hospital Survey. Contents of the original tool were reviewed for their relevance to the local hospital context and were revised accordingly. The modified English version was translated into Mandarin. The final instrument contained 27 items. Four items covered socio-demographic characteristics of the patients, 5 were filter questions or were not considered as quality of care questions and 18 inquired about quality of care provided in the facility. Fifteen of the 18 quality of care questions were rated on a 4-category Likert scale, 2 were dichotomous and 1 involved a 10-point rating scale. English and Mandarin versions of the tool were made available for surveys implemented at the OU from May 2006 to October 2007. Approval by the appropriate institutional review board was sought prior to study implementation.

The survey was administered to all patients who were admitted for any of the following 13 diagnoses: allergy, appendicitis, asthma, blunt trauma, cellulitis, gastroenteritis,

gout, head injury, heart failure, hypoglycaemia, pneumonia, pyelonephritis and seizures. Trained data collectors provided the respondents with standard introductory information regarding objectives of the activity. Post-discharge phone interviews were conducted from May to September 2006. Follow-up calls were made whenever initial attempts were unsuccessful. Details of phone call attempts were logged, including whether or not the interview was successful. A single research assistant conducted the phone interviews. Succeeding phases of the survey from October 2006 to October 2007 involved data collection during hospitalisation. Through an information sheet, all patients admitted to the OU were invited to participate in the survey. The second phase of the study conducted from October to November 2006 and January to June 2007 involved a self-administered pen-and-paper survey using the same tool. During the third phase of the study conducted in July to October 2007, aside from self-administered surveys, subjects were given the option of a personal interview to further improve response rates. Proxy respondents were allowed if patients were unable to provide the necessary information in any of the three phases of the study. Only 1 research assistant conducted the face-to-face interviews.

Results

There were 832 patients included in the study. The largest proportion of participants came from the 20 to 39 year age group (Table 1). More than half obtained at least secondary or technical education, had Chinese ethnicity, and mainly spoke Mandarin or other Chinese dialect at home.

Half (52.5%) of the respondents were surveyed through phone interview while only 3% opted for a personal interview (Table 2).

There were 1459 patients discharged from April to October 2006 who were eligible for phone interviews. However, only 437 phone interviews were completed (30.0%). The rest did not provide contact details, refused, could not be reached, did not finish the interview, could not communicate in English or Mandarin, or could not communicate on the phone due to their physical impairment.

Table 1. Demographic Characteristics of Subjects (N = 832)

Characteristics	Number	(%)
Age (y)		
<20	89	10.8
20-39	354	43.0
40-59	214	26.0
60+	167	20.3
Total	824	100.0
Gender		
Male	416	50.4
Female	409	49.6
Total	825	100.0
Educational attainment		
None	68	8.6
Primary	130	16.4
Secondary or Technical education	343	43.1
Junior college	52	6.5
Degree or diploma	184	23.1
Higher education	18	2.3
Total	795	100.0
Ethnicity		
Chinese	559	68.3
Malay	137	16.7
Indian	83	10.1
Mixed & Others	40	4.9
Total	819	100.0
Main language spoken at home		
Mandarin	309	37.9
Chinese dialect	139	17.0
Malay	116	14.2
Tamil	39	4.8
English	192	23.5
Others	21	2.6
Total	816	100.0

Association Between Survey Mode and Responses to Questions

Univariate analysis revealed that out of the 18 items pertaining to patients' satisfaction with quality of care, responses to 11 items (61.1%) were related to survey mode (Table 3). Socially desirable responses were obtained through face to face interview in 8 out of 11 (72.7%) questions. On the other hand, socially undesirable responses were obtained through phone interviews in 7 out of the 11 (63.3%) questions.

Effects of survey mode on responses were explored further using logistic regression by controlling for age, gender, ethnicity, and educational attainment. Results of regression models for each of the 11 questions are summarised in Table 4. Multinomial regression was used for questions with more than 2 responses categories while binary logistic regression was used for questions with dichotomous outcomes.

Table 2. Distribution of Subjects by Survey Mode and Period Conducted

Period	Survey mode			
	Phone interview n (% of total)	Self-administered n (% of total)	Face to face interview n (% of total)	Total n (% of total)
Apr to Oct '06	437 (52.5)	0 (0.0)	0 (0.0)	437 (52.5)
Oct '06 to Jul '07	0 (0.0)	124 (14.9)	0 (0.0)	124 (14.9)
Jul to Oct '07	0 (0.0)	249 (22.9)	22 (2.6)	271 (32.6)
Total n (% of total)	437 (52.5)	373 (44.8)	22 (2.7)	832 (100.0)

Table 3. Questions for which Responses were Associated with Survey Method*

Question	Survey method associated with most socially desirable response	Survey method associated with least socially desirable response
How often did the nurses treat you with courtesy and respect?	Face to face interview	Phone interview
How often did the nurses listen carefully to you?	Face to face interview	Phone interview
How often did nurses explain things in a way you could understand?	Face to face interview	Phone interview
How often did the doctors treat you with courtesy and respect?	Face to face interview	Phone interview
How often did the doctors listen carefully to you?	Face to face interview	Phone interview
How often did doctors explain things in a way you could understand?	Face to face interview	Phone interview
How often was the area around your room quiet?	Face to face interview	Phone interview
How often did the hospital staff tell you what the medicine was for?	Phone interview	Face to face interview
How often did the hospital staff describe possible side effects in a way you could understand?	Self administered	Face to face interview
Did you get information in writing about what symptoms or health problems to look out for after you leave the hospital?	Face to face interview	Self administered
Would you recommend the EDTC to your friends and family?	Phone interview	Face to face interview

* Significant at $P < 0.05$

After controlling for the effects of socio-demographic characteristics, results showed that responses to 10 questions were affected by survey mode. This implies that responses to 10 out of the original 18 questions were influenced by survey method. Using phone interview as reference group, there were more responses obtained through self-administered surveys which were more different than those obtained through face-to-face interviews. Out of 16 significant differences identified, 14 (87.5%) were from self-administered questionnaires. While face-to-face interviews generated the most number of socially desirable responses based on univariate analysis, after controlling for effects of demographic characteristics there were only 2 questions for which responses to face-to-face interviews were significantly different from phone interviews. Results of the logistic regression models showed very wide confidence intervals for odds ratios when face-to-face interview was compared with phone interview.

Discussion

The applicability of a survey instrument in a particular setting must first be established before it can be used. Recognising that situations vary from one place to another, developers of CAHPS® allow customisation of the tool's contents to a certain extent. In fact, AHRQ encourages users in other settings to fund the development and validation of appropriate tools which may be an adaptation of the original instrument.[10] For this survey, the original CAHPS® underwent a series of reviews, modifications, translations and tests in order to ensure its contextual relevance and appropriateness.

Results of this study demonstrate how mode effects may occur in the healthcare setting. Studies have attempted to compare data collection modes and to relate these to survey results. Points of comparison include response rates, completeness of data, cost, consistency of results, and responses obtained. While data on response rates for face-

Table 4. Logistic Regression Results for Effect of Survey Mode on Responses to Questions

Question	Survey mode significantly different from phone interview	Odds ratio (OR) (95% CI for ORs)
How often did the nurses treat you with courtesy and respect?		
Never or sometimes*		
Usually	—	—
Always	Self-administered	2.56 (1.24, 5.30)
How often did the nurses listen carefully to you?		
Never or sometimes*		
Usually	—	—
Always	—	—
How often did nurses explain things in a way you could understand?		
Never or sometimes*		
Usually	Self-administered	2.54 (1.28, 5.04)
Always	Self-administered	2.37 (1.23, 4.55)
How often did the doctors treat you with courtesy and respect?		
Never or sometimes*		
Usually	Self-administered	2.97 (1.39, 6.36)
Always	Self-administered	4.84 (2.35, 9.96)
How often did the doctors listen carefully to you?		
Never or sometimes*		
Usually	Self-administered	2.30 (1.22, 4.39)
Always	Self-administered	3.20 (1.77, 5.79)
How often did doctors explain things in a way you could understand?		
Never or sometimes*		
Usually	Self-administered	1.94 (1.07, 3.52)
Always	Self-administered	2.27 (1.31, 3.94)
How often was the area around your room quiet?		
Never or sometimes*		
Usually	Self-administered	3.13 (1.98, 4.95)
Always	—	—
How often did the hospital staff tell you what the medicine was for?		
Never or sometimes*		
Usually	Self-administered	2.88 (1.37, 6.05)
Always	—	—
How often did the hospital staff describe possible side effects in a way you could understand?		
Never or sometimes*		
Usually Self-administered	Self-administered	2.13 (1.01, 4.50)
Always	—	—
Did you get information in writing about what symptoms or health problems to look out for after you leave the hospital?		
No*	Face-to-face	0.28 (0.10, 0.76)
Yes	Self-administered	1.83 (1.31, 2.54)
Would you recommend the EDTC to your friends and family?		
Definitely yes*		
Probably yes	Self-administered	7.08 (4.85, 10.34)
Definitely or probably no	Face-to-face	6.51 (2.04, 20.72)

*Reference category for outcome

to-face interview and self-administered questionnaire groups were not collected in this study, the low response rate found for the phone interview group is consistent with findings of other studies. In a study by Feveile, the response rate of 56% for phone interview was lower than rates obtained for face-to-face interview and self-administered questionnaire.[13] This study showed an even lower response rate of 30%. While face-to-face interviews are generally more costly than self-administered questionnaires and telephone interviews.[17,18] response rates for face-to-face interviews were considered superior to the other two modes.[17,19] Except for surveys which ask sensitive questions,

response rates for self-administered questionnaires and phone interviews are often comparable.[19,13,20] Studies have attempted to identify strategies for improving response rates. In a study by VanGeest,[14] even small financial incentives were shown to boost response rate. Non-monetary tokens were less effective. In order to improve response rates despite limited resources, some researchers have designed surveys which employ mixed modes of data collection. For example, a survey may begin by using phone interviews, later following up on non-respondents with face-to-face interviews.[21]

Most research on survey mode effects were initiated by social scientists and eventually taken on by professionals from non-health disciplines such as market researchers. With the growing interest in quality improvement, patient empowerment and the need for qualitative research in the health professions, individuals involved in surveys on patient satisfaction and patient-reported outcomes have become more discriminating in their choice of survey method. They adopted the findings of earlier studies and contextualised the methods into the healthcare setting. This has enabled them to identify peculiarities in survey mode effects when applied in healthcare. For example, the impact on survey results of a seller-buyer relationship in commerce may be very different from the impact resulting from a physician-patient relationship in healthcare. Patient satisfaction surveys tend to be skewed towards socially desirable responses because of the reluctance of patients to criticise caregivers[22] whom they may view as irreproachable.

In this study, variation in the distribution of responses between survey modes was observed. Based on univariate analysis, variation was greatest between face-to-face and phone interview. On the other hand, results of logistic regression showed that results obtained from self-administered survey differed the most from phone interview. However, the small sample size of the face-to-face interview group was likely to be responsible for imprecise odds ratio estimates. It may therefore be premature to conclude that responses obtained from personal interviews are comparable to those obtained through phone interviews. Another observation was that compared to phone interview, face-to-face interview generally produced more socially desirable responses. This observation may relate to the natural human desire to be seen in a positive light, especially in the presence of the interrogator. This finding is not shared by 2 social science researches which showed that telephone respondents were more likely to give socially desirable responses.[23,24] On the other hand, medical and allied health studies have found no difference in agreement rates between face-to-face and phone interviews.[25-30]

Some authors suggest that survey mode may interact with other factors to affect response rates and actual responses. Race of the respondent and sensitivity of the topic are two such factors.[13,19] In a study by Andre,[31] a higher proportion of socially undesirable responses was obtained through mailed questionnaires compared to face-to-face and phone interviews when inquiring about sensitive topics such as abortion and birth control. In contrast, responses were similar when the topic was about health data. In another study, variation in response was observed when inquiring about the respondent's mental status, but not with the relatively innocuous topic of physical status.[32]

A few features of this study may have important implications on the findings. As this study was part of a project which aimed to describe patients' level of satisfaction rather than one primarily interested in the methods, no randomisation of survey modes was done. Each survey mode was carried out at different time periods instead of simultaneously, as would have been ideal for rigorous health service research. Possible differences in characteristics between patients who opted for a face-to-face interview and self-administered survey mode may be a source of selection bias. In addition, restricting coverage to 13 specific diagnoses provided only minimal control over the effect of type of disease. Having been mainly concerned with real world assessment of patient satisfaction, data on disease acuity was not collected and was therefore, not taken into account in the analysis. These methodologic features reflect the project's original intent of serving quality improvement efforts at the ED rather than providing raw material for research.

Conclusion and Recommendations

There are 3 levels at which surveys are most vulnerable to bias.[15] The manner by which individual questions are designed, the way by which the questionnaire as a whole is designed, and the mode of administration of the questionnaire all affect responses obtained. In this study, the content and design of the questions was contextualised by subjecting the original instrument to a series of reviews and revisions by domain and methods experts. In addition, translation and back translation to the local language, as well as cognitive testing was conducted. Local researchers may consider improving the tool further by subjecting results to validity tests.

While questionnaire design is one factor which significantly affects the validity of survey results, this study focused on the effect of data collection methods on survey findings. Results revealed that after controlling for the effects of selected socio-demographic characteristics, responses to over half of the questions were influenced by survey mode. Although multivariate analysis showed that responses obtained through phone interview differed more from self-administered questionnaire than from face-to-

face interview, significant differences between responses from face-to-face interview and other survey modes cannot be discounted.

More local studies designed specifically to address the issue of mode effects are needed in order to inform data collection plans for future surveys. These studies should ideally use randomised designs involving uniformly trained surveyors and employing concurrent data collection for comparison groups.

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REFERENCES

1. Torén K, Brisman J, Järvholm B. Asthma and asthma-like symptoms in adults assessed by questionnaires. A literature review. Chest 1993;104:600-8.
2. Rasmussen BK, Jansen R, Olesen J. Questionnaire versus clinical interview in the diagnosis of headache. Headache 1991;31:290-5.
3. Aitken JF, Youl PH, Janda M, Elwood M, Ring IT, Lowe JB. Comparability of skin screening histories obtained by telephone interviews and mailed questionnaires: a randomized crossover study. Am J Epidemiol 2004;160:598-604.
4. UW School of Public Health Department of Health Services. What is health services research? Available at: http://depts.washington.edu/hserv/hs-research-definitions. Accessed 23 April 2009.
5. Institute of Medicine Division of Health Care Services. Health services research defined. In: Health Services Research: Report of a Study. The National Academies Press, 1979.
6. Garratt A, Schmidt L, Mackintosh A, Fitzpatrick R. Quality of life measurement: bibliographic study of patient assessed health outcome measures. BMJ 2002;324:1417.
7. Ware J. SF-36® health survey update. Available at: http://www.sf-36.org/tools/SF36.shtml. Accessed 23 April 2009.
8. Agency for Healthcare Research and Quality. The CAHPS program. Available at: https://www.cahps.ahrq.gov/content/cahpsOverview/Over_Program.asp?p=101&s=12. Accessed 23 April 2009.
9. Agency for Healthcare Research and Quality. Users of CAHPS surveys and data. Available at: https://www.cahps.ahrq.gov/content/cahpsOverview/Over_CAHPSUSers.asp?p=101&s=16 Accessed 23 April 2009.
10. Agency for Healthcare Research and Quality. CAHPS 101 Implications of adapting CAHPS surveys. The CAHPS Connection 2007; 4:8. Available at: http://cahps.ahrq.gov/content/CAHPSConnection/files/CAHPSConnectionVolume4Issue1.pdf Accessed 23 April 2009.
11. NIMH Collaborative HIV/STD Prevention Trial Group. The feasibility of audio computer-assisted self-interviewing in international settings. AIDS 2007:2(Suppl 1):S49-S58.
12. Acheson LS, Zyzanski SJ, Stange KC, Deptowicz A, Wiesner GL. Validation of a self-administered, computerized tool for collecting and displaying the family history of cancer. J Clin Oncol 2006;24:5395-402.
13. Feveile H, Olsen O, Hogh A. A randomized trial of mailed questionnaires versus telephone interviews: response patterns in a survey. BMC Med Res Methodol Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1925106. Accessed on 23 April 2009.
14. VanGeest JB, Johnson TP, Welch VL. Methodologies for improving response rates in surveys of physicians: a systematic review. Eval Health Prof 2007;30:303-21.
15. Choi BCK, Pak AWP. A catalog of biases in questionnaires. PCD Available at: http://www.cdc.gov/PCD/about_the_journal/index.htm. Accessed 23 April 2009.
16. Bowling A. Mode of questionnaire administration can have serious effects on data quality. J Public Health (Oxf) 2005;27:281-91.
17. Pruchno RA, Hayden JM. Interview modality effects on costs and data quality in a sample of older women. J Aging Health 2000;12:3-24.
18. Fox TA, Heimendinger J, Block G. Telephone surveys as a method for obtaining dietary information: a review. J Am Diet Assoc 1992;92:729-32.
19. Aquilino WS. Telephone versus face-to-face interviewing for household drug use surveys. Int J Addict 1992;27:71-91.
20. Geller EJ, Barbee ER, Wu JM, Loomis MJ, Visco AG. Validation of telephone administration of 2 condition-specific quality-of-life questionnaires. Am J Obstet Gynecol 2007;197:632.e1-632.e4.
21. Jäckle A, Roberts C, Lynn P. Assessing the effect of data collection mode on measurement. 2008-08 Feb. ISER working paper series.
22. Wilcock A, Kobayashi L, Murray I. Twenty-five years of obstetric patient satisfaction in North America: a review of the literature. J Perinat Neonatal Nurs 1997;10:36-47.
23. Jäckle A, Roberts C, Lynn P. Telephone versus face-to-face interviewing: mode effects on data quality and likely causes. 2006-41. ISER working paper series.
24. Holbrook AL, Green MC, Krosnick JA. Telephone versus face-to-face interviewing of national probability samples with long questionnaires: comparisons of respondent satisficing and social desirability response bias. Public Opin Q 2003;67:79-125.
25. Pinto-Meza A, Serrano-Blanco A, Penarrubia MT, Blanco E, Haro JM. Assessing depression in primary care with the PHQ-9: can it be carried out over the telephone. J Gen Intern Med 2005;20:738-42.
26. Greenfield TK, Midanik LT, Rogers JD. Effects of telephone versus face-to-face interview modes on reports of alcohol consumption. Addiction 2000;95:277-84.
27. Fenig S, Levay I, Kohn R, Yelin N. Telephone vs face-to-face interviewing in a community psychiatric survey. Am J Public Health 1993;83:869-98.
28. Carr ECJ, Worth A. The use of the telephone interview for research. J Res Nurs 2001;6:511-24.
29. Bajos N, Spira A, Ducot B, Leridon H, Riandey B. Sexual behaviour in France: feasibility studies. Abstract from Int Conf AIDS 1991;7:405.
30. Leinbach RM. Alternatives to the face-to-face interview for collecting gerontological needs assessment data. Gerontologist 1982;22:78-82.
31. San Augustine AJ, Friedman HH. The use of the telephone interview in obtaining information of a sensitive nature: a comparative study. Proceedings of the Survey Research Methods Section, American Statistical Association; 1978:559-61.
32. Lungenhausen M, Lange S, Maier C, Schaub C, Trampisch HJ, Endres HG. Randomised controlled comparison of the Health Survey Short Form (SF-12) and the Graded Chronic Pain Scale (GCPS) in telephone interviews versus self-administered questionnaires. Are the results equivalent. BMC Med Res Methodol Available at: http://www.biomedcentral.com/content/pdf/1471-2288-7-50.pdf. Accessed 23 April 2009.