NEW METHOD TO ASSESS SERVICE QUALITY IN CARE HOMES FOR THE ELDERLY

Jori Reijula [1§], Toni Rosendahl [2], Kari Reijula [2,3], Paula Roilas [4], Heikki Roilas [4], Raimo Sepponen [1]

[1]Applied Electronics Group, Helsinki University of Technology, Otakaari 7A, Espoo, 02150, Finland

[2]Good Indoor Environment Theme, Finnish Institute of Occupational Health, Arinatie 3, Helsinki, 00370, Finland

[3]Tampere School of Public Health, University of Tampere, Tampere, 33014, Finland

[4]Department of Public Health, South Karelia Health Services, Lappeenranta, Finland

[§]Corresponding author

Emails: jori.reijula@tkk.fi

Abstract - A simple but dependable electronic device, Con-Dis, has been developed to gain reliable information on elderly persons' perceptions of their well-being. The device has been tested and proven to be technically functional and dependable. It was tested in two care homes for the elderly and two private homes to evaluate whether it provided reliable information about the service quality. This report illustrates the practical usage of the device and shows its efficiency in gathering reliable service quality information from the focus group. The results suggest that Con-Dis is suitable for measuring the perceived service quality and seems to reduce the risk of too-positive evaluations.

**Index terms*: Monitoring system, service quality, electronic device, care home for the elderly, Con-Dis*

I. INTRODUCTION

The number of aging people in developed countries is rising dramatically [1]. The percentage of elderly people is also growing as a result of improvements in the quality of life and low birth and mortality rates [2]. Thus the number of elderly patients and chronic illnesses is also increasing, along with the pressure exerted on the nurses and other staff members in care homes for the elderly to provide satisfactory care for their clients [2]. If the nursing staff are not able to meet their elderly patients' needs, the patients may feel violated and ignored [3, 4]. Therefore understanding the needs of the elderly in care homes is of great importance in order

to provide them with a better service [5, 6]. Having a patient thoroughly involved in the care process is likely to lead to improved compliance, a return for follow-up care, and better outcomes [7, 8, 9, 10].

Using paper-based questionnaires or personal interviewing to assess service quality among old patients may pose a risk of misleading answers, because they may fear upsetting the care staff with answers that indicate dissatisfaction. Some research has been carried out to evaluate the reliability, validity, and efficiency of patient questionnaires [11, 12, 13], but no conclusive studies on this topic have been carried out thus far. Elderly patients are consequentially dependent on the nurses, both physically and mentally [14, 15], and this could explain this behaviour.

Service quality in social and health care has earlier been assessed in hospitals [16, 17]. Some studies have questioned inpatients' ability to assess service quality in hospitals [18, 19, 20]. These studies have suggested that most currently used assessment methods and instruments often prove to be unreliable and may provide misleading information [18, 19, 20]. Thus there is a need to develop more dependable methods to assess the quality of service in hospital environments. The most commonly used methods to assess patient satisfaction and service quality have been self-report questionnaires, structured interviews, and face-to-face questions [20]. Unstructured or semi-structured interviews have also been frequently used [20].

A simple electronic device – Con-Dis – was originally developed to assess elderly people's perceptions of their well-being [21]. It has later been tested in care homes for the elderly to assess elderly patients' perceived well-being [22]. Now it is being used to assess service quality in care homes for the elderly. Con-Dis records the service quality assessments as data on a memory card so that the answers cannot be seen by the local staff responsible for bedside treatment.

II. METHODS

STUDY POPULATION

The present study was carried out in the Social and Health District of South Karelia, Lappeenranta, in a city located 250 km east of Helsinki, Finland. A total of ten elderly test

subjects (6 of whom were women) aged 74-89 years old (mean 80.1) were selected for the present study. Three test subjects lived in a municipally owned care home for the elderly (named Tuomikoti) and six of the test subjects came from a care home for the elderly (Taikinamäki) that was owned by a private foundation. One test subject lived in a municipally owned care home for the elderly (Lehmuskoti).

All three care homes for the elderly were staffed by nurses. All the test subjects had a single room with its own kitchen and bathroom and normal living conditions.

CON-DIS DEVICE

A detailed description of the Con-Dis device (Figure 1) has been provided elsewhere [21]. Briefly, Con-Dis is a monitoring system that records patients' evaluations of their situation as they perceive it and stores the information for later access. Con-Dis consists of three buttons – happy, neutral, and unhappy – each illustrating the patient's perception of their condition. In the present survey this device was used for evaluating general service quality in care homes for the elderly.

Figure 1. A picture of the Con-Dis device

PAPER-BASED QUESTIONNAIRE

The device was tested in the present field study by comparing it to a paper-based questionnaire especially developed for the present evaluation. The questionnaire comprised four questions that assessed the perceived quality of services concerning food (restaurant and delivery), cleanup and housekeeping, medication, and the general level of assistance provided by the nurses and other staff caring for the elderly. These questions were selected by professionals in the field of caring for the elderly who widely collect information concerning the overall service quality of local care homes for the elderly. These questions can be used as a reference to the Con-Dis monitoring device. Each of the test subjects reported on their received overall service level once per day, each evening. They were asked to report if they perceived the food service they received (restaurant and delivery) as being unsatisfactory, tolerable, or satisfactory. The same three categories applied to the cleanup and housekeeping service they received, deliveries of medication, and the service level provided by the staff caring for them in general. After reporting these parameters, the test subjects reported their overall perception of the service quality by pressing, only once, one of three Con-Dis buttons (happy, neutral, or unhappy – explained above). The collected results were then analysed. Thus, during the two-week time period each test subject was supposed to use the Con-Dis device a total of 14 times and answer 56 paper-based questionnaire questions altogether.

TEST PROTOCOL

Overall, the 10 randomly selected test subjects in the three care homes for the elderly reported their perception of the quality of the service they received using the Con-Dis device and completing the service quality questionnaire form once per day (late evening) over the two-week test period. This adds up to a total of 14 service quality evaluations per test subject. Before the test period, the test subjects were trained by a nurse to use the Con-Dis device and to fill out the service quality questionnaire. The test subjects were asked to push the buttons in the manner described below.

The "happy face" button was meant to be pressed at the given time intervals if the test subjects considered the overall quality of the service they received to be satisfactory. They were instructed to use the "happy face" if they were fully satisfied with the general service level of the care home for the elderly.

The "neutral face" button was meant to be pressed if the test subjects considered the overall quality of the service they received to be tolerable. They were instructed to use the "neutral face" if they perceived the general service level of the care home for the elderly as being adequate.

The "unhappy face" button was meant to be pressed at the given time intervals if the test subjects considered the overall quality of the service they received to be unsatisfactory. They were instructed to use the "unhappy face" if they were unhappy with the general service quality provided by the care home for the elderly.

The patients were informed that both the Con-Dis and the paper-based questionnaire results would be kept private and would not be seen by the staff. The test subjects were asked to contact a selected researcher or nurse if they needed further instructions or assistance in operating the Con-Dis device. The data were collected from the Con-Dis device by using a (SD) memory card. The memory card included a simple utility program that displays the perceived quality of service measurements when inserted into a PC.

The present study has been approved by the ethical committee of the Pirkanmaa Hospital District, Tampere, Finland.

STATISTICAL METHODS

The probability errors in Figure 2 were measured using the Matlab "Anova" function. Statistical differences in the levels between the groups were tested using the SAS System version 9.1.

III. RESULTS

No problems were found concerning the technical functionality of Con-Dis. All 10 devices were fully functional throughout the test period. All test subjects answered at least 90% of the total number of questions. Eight test subjects seemingly understood the instructions that were given and answered the questions in such a way that there was significant daily variation in their answers. Two test subjects did not fully understand the instructions that were given or were otherwise very happy with the service provided in the care homes for the elderly: subject

1 answered "good" to 69 out of 70 service-related questions and subject 10 answered "good" to 67 out of 70 questions. However, these answers were included in the present study.

According to the paper-based questionnaire, none of the test subjects were unhappy with the food and restaurant service (Table 1). Only one test subject gave the food and restaurant service an overall score of 2.0 (tolerable), while the others were happier with the service provided. The same applied to the cleanup and housekeeping service. One test subject was unhappy with the medical service, but others saw it as being tolerable or satisfactory. According to the paper-based questionnaire, the test subjects were most satisfied with the general level of assistance provided by the staff (overall score of 2.69), while the overall service level measured with Con-Dis was clearly the worst, with an overall score of 2.14. The other three parameters were practically identical, between 2.53 and 2.56 (Table 1).

Table 1: Mean values and standard deviations

Service parameter	Food	Cleanup	Delivery of medication	Staff	Overall
Mean value	2.52857	2.54286	2.55714	2.68571	2.14286
Standard deviation	0.59304	0.57990	0.67080	0.49582	0.65230

Table 1 shows a chart of the mean values and standard deviations gathered from the test subjects' answers for food, cleanup, delivery of medication, staff, and overall service parameters.

On the basis of the collected results from the 10 test subjects and their 70 individual scores during the test period, the overall service quality – measured with Con-Dis – did not have a statistically significant correlation with either services concerning food (delivery and restaurant) ($r=0.194$, $p=0.021$), cleanup and housekeeping ($r=0.155$, $p=0.0677$), the delivery of medication ($r=0.096$, $p=0.258$), or the general level of care provided by the care assistants and other staff ($r=0.296$, $p<0.001$) (Table 2). The only statistically significant correlation was found between the delivery of medication and the general level of care provided by the care assistants ($r=0.509$, $p<0.001$) (Table 2). The results given in Table 2 are supported by the findings shown in Figure 2.

Table 2: Subjects' r- and p-values

Service parameter	Food	Cleanup	Delivery of medication	Staff	Overall
Food		0.0005	0.4233	0.0167	0.0217
Cleanup	0.28929		0.7192	0.0825	0.0677
Delivery of medication	0.06821	0.03065		< 0.0001	0.2577
Staff	0.20203	0.14727	0.50864		0.0004
Overall	0.19395	0.15487	0.09630	0.29553	

Table 2 shows a chart of the test subjects' Pearson Correlation Coefficients and p-values between food, cleanup, delivery of medication, staff, and overall service in the homes for the elderly. Pearson Correlation Coefficients are shown in the bottom left triangle and the p-values in the top right triangle of the table.
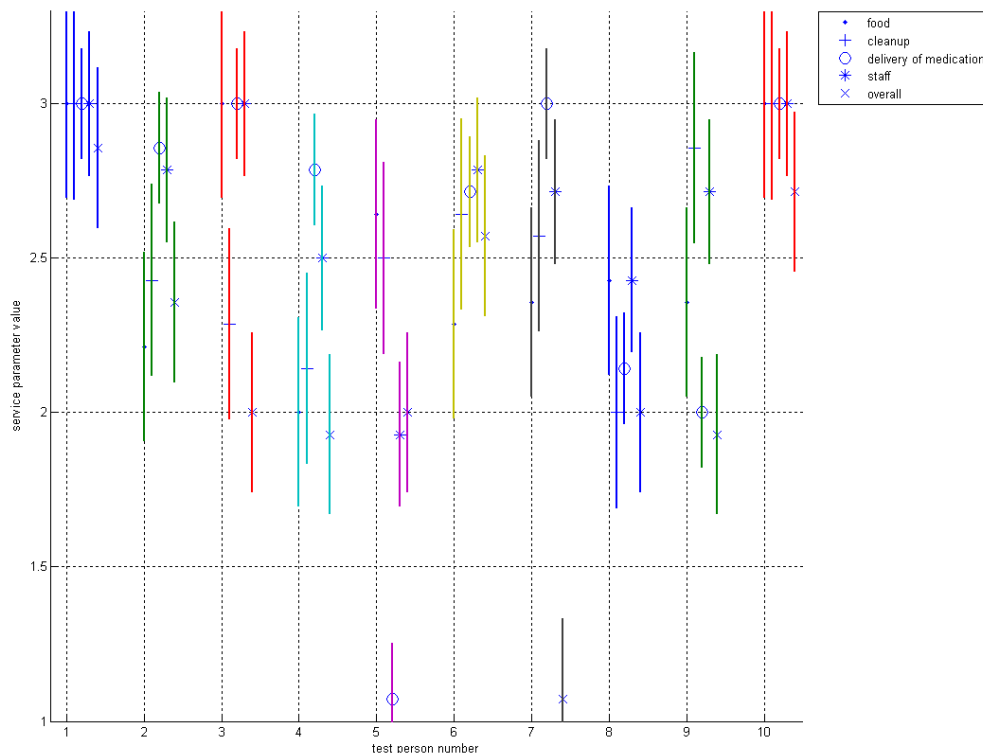

Figure 2. Data collected from 10 test subjects during a 2-week survey using the Con-Dis device and a paper-based questionnaire

IV. DISCUSSION

To the authors' knowledge, only a few studies have been carried out to assess the truthfulness of the answers to patient questionnaires [11, 12, 13]. One of the hypotheses for the present study was that people living in care homes for the elderly tend to be afraid of giving honest answers to questions about the service quality in the care homes, fearing that negative answers would affect the relationship between the staff and the patients. This is seen to be especially true if the respondents believe their responses can be traced back to them [23]. Total anonymity – or at least a perception of it – is pivotal to the securing of truthful responses to behavioural and affective self-report devices dealing with sensitive subjects [23]. Furthermore, strong emotional bonds are often formed between the nurse and the patient [24, 25], which may additionally inhibit the patient from answering honestly. In fact, some studies have even suggested it is crucially important for patients to form emotional bonds with their nurses [26]. This could also explain why some studies have suggested that most questionnaires about service quality are unreliable [18, 19, 20].

If the above-mentioned hypothesis were false, the overall service quality measured with Con-Dis would most probably have had statistically significant correlations with at least some of the measured parameters of service quality. However, on the basis of the results, the overall service quality did not have a close correlation with any of the measured service quality parameters (Table 2). In fact, the answers measured with Con-Dis differed considerably from those gathered by means of the paper-based questionnaire (Table 1).

Answers about the general service level of the care home for the elderly (recorded by means of the Con-Dis device) were generally unhappier than the paper-based questionnaire answers (Table 1). Additionally, the standard deviation of the answers recorded by Con-Dis was greater than the standard deviation of e.g. paper-based answers to questions about the service level provided by the care staff. Even though the test subjects were informed that both the Con-Dis device and the paper-based questionnaire answers would be kept private, the paper-based questionnaire was, in all cases, placed on a table and was thus visible to the care staff providing services to the test subjects. Since the Con-Dis device answers were not visible to the nurses, it would indicate that the test subjects answered the Con-Dis device more freely than they did the paper-based questionnaire. Thus our study seems to support the hypothesis of paper-based questionnaire answers being dishonest.

Food, cleanup, medication, and the service provided by the staff are all parameters of the overall service and do not necessarily have to have statistically significant correlations with each other. This was the case in this study. Only medication and personnel service were seen to have a statistically significant correlation (r=0.509, p<0.001). This could be predicted, since it is mostly the nurses' duty to provide medication to people living in care homes for the elderly. Other parameters had no statistically significant correlations. The food service was practically evaluated on the basis of the food delivered to the subjects' apartments and the restaurant service of the home for the elderly. The cleanup service was assessed on the basis of the cleanliness of the homes' shared areas and apartments. Thus both the food and cleanup service were independent parameters of the overall service quality and it was expected that these parameters would not have statistically significant correlations with other parameters.

However, one interesting finding was that the overall service quality, as measured by Con-Dis, did not have a statistically significant correlation with any of the service quality parameters (Table 2). Even though the Con-Dis answers were unhappier than the other service quality parameters (Table 1), it was unexpected that Con-Dis did not have any statistically significant correlations with any of the parameters. An explanation for this could be that the elderly were so afraid to answer the paper-based questionnaire honestly that the Con-Dis answers differed significantly, as can be seen in Fig 2 and Table 2. Another explanation could be that the patients had difficulty in understanding the meaning of smiley faces or were otherwise unhappy with using the Con-Dis device.

This study was performed on a group of volunteers from three care homes for the elderly in Lappeenranta. Nevertheless, the fact that some elderly patients declined to participate in this study may bias the results. Additionally, having elderly patients as test subjects poses a risk of there being confusion with using technical devices such as Con-Dis. Elderly people – who are often not used to computers and technical devices which are commonplace for younger generations – may have trouble understanding the concept of smiley faces. Two test subjects gave a "happy face" answer to virtually every question. The reason for this might have been difficulty in separating, for example, the "happy face" and "neutral face" smiley from each other. This might have been the case if the test subjects had poor eyesight or were confused about the smiley faces and failed to clearly understand what they meant. One patient had

exceptionally bad eyesight and a nurse had to help her answer the paper-based questionnaire. This may also bias the results.

However, several aspects of the analyses give the authors confidence in the validity and reliability of the results. Even though a small chance of bias in the results is possible, it is highly unlikely. Among the subjects who volunteered for the study, some were at first hesitant to participate. Some complained about the strain and burden the study was going to cause them. Thus not all of the test subjects were among the most active, energetic, and social patients living in the care home for the elderly. This should even out any possible bias in the results. Additionally, thorough informative conversations about the Con-Dis device were carried out with the test subjects in order to reduce the chance of confusion about the smiley faces. Furthermore, some of the test subjects had used the Con-Dis device earlier and thus already knew the functionality and meaning of the buttons.

V. CONCLUSIONS

On the basis of the collected results, the overall service quality measured with Con-Dis did not have a statistical correlation with any of the service quality parameters measured with a paper-based questionnaire (food service, cleanup service, delivery of medication, and service provided by the staff). The results from Con-Dis indicated less satisfaction than those from the paper-based questionnaire and may provide more reliable information when service quality in care homes for the elderly is being assessed among elderly test subjects. Therefore Con-Dis can easily be recommended as a tool for monitoring overall service quality in care homes for the elderly.

COMPETING INTERESTS

None of the writers have competing interests to declare.

AUTHORS' CONTRIBUTIONS

Jori Reijula, MSciTechn, was the corresponding author of the manuscript. He was responsible for collecting and processing the test information. Toni Rosendahl, MSciTechn, was responsible for designing and building the Con-Dis device and providing help with the Con-Dis device. Paula Roilas, RN, was responsible for organising the test in Lappeenranta and collecting the data and test information. Heikki Roilas, MD, PhD, and Kari Reijula, MD, PhD, were responsible for providing help in planning the project and with medical expertise. Raimo Sepponen, DTechn, was the director of the project and came up with the idea of Con-Dis.

REFERENCES

[1]   UN. United Nations Report of the Second World Assembly on Ageing in Madrid. A/CONF.197/9. 2002, United Nations, New York.

[2]   Dåniş MZ, "Community based care understanding and social services: A case model proposal for Turkey", Turk Geriatri Dergisi 2008, 11(2):94-105.

[3]   Kihlgren M, Thorsén H, "Violation of the patient's integrity seen by staff in long-term care", Scandinavian Journal of Caring Sciences 1996, 10(2):103-107.

[4]   Harrefors C, Sävenstedt S, Axelsson K, "Elderly people's perceptions of how they want to be cared for: An interview study with healthy elderly couples in Northern Sweden", Scandinavian Journal of Caring Sciences 2009, 23(2):353-360.

[5]   Hancock GA, Woods B, Challis D, Orell M, "The needs of older people with dementia in residential care", International Journal of Geriatric Psychiatry 2006, 21(1): 43-49.

[6]   Worden A, Challis DJ, Pedersen I, "The assessment of older people's needs in care homes", Aging and Mental Health 2006, 10(5):549-557.

[7]   Cleary PD, McNeil BJ, "Patient satisfaction as an indicator of quality of care", Inquiry 1988, 25(1):25-36.

[8]   Bedell SE, Cleary PD, Delbanco TL, "The kindly stress of hospitalization", American Journal of Medicine 1984, 77(4):592-596.

[9]   Greenfield S, Kaplan S, Ware JE, "Expanding patient involvement in care: Effects on patient outcomes", Annals of Internal Medicine 1985, 102(4):520-528.

[10]   Mumford E, Schlesinger HJ, Glass GV, „The effects of psychological intervention on recovery from surgery and heart attacks: An analysis of the literature", American Journal of Public Health 1982, 72(2):141-151.

[11]   Wilson A, McDonald P, "Comparison of patient questionnaire, medical record, and audio tape in assessment of health promotion in general practice consultations", British Medical Journal 1994, 309(6967):1483-1485.

[12]   Buchman TA, Tracy JA, "Obtaining responses to sensitive questions: conventional questionnaire versus randomized response technique", Journal of Accounting Research 1982, 20:263-271.

[13]   Schaeffer NC, "Asking questions about threatening topics: a selective overview", Stone AA, Turkkan JS, Bacharach JB, Jobe JB, Kurtzman HS, Cain VS. – The science of self-report: Implications for research and practice 2000, pp.105-121.

[14]   Schell ES, "Nurses' perceptions of elderly patients", Age and Ageing 2001, 30(5):367-368.

[15]   Cooper SA, Coleman PE, "Caring for the older person: an exploration of perceptions using personal construct theory", Age and Ageing 2001, 30(5):399-402.

[16]   Miller M, Supranowicz P, Gebska-Kuczerowska A, Car J, "Evaluation of medical service quality by hospitalized patients [Ocena jakosci usług medycznych przez pacjentów szpitali]", Przeglad epidemiologiczny 2008, 62(3):643-650.

[17]   Cleary PD, Edgman-Levitan S, Roberts M, Moloney TW, McMullen W, Walker JD, Delbanco TL, "Patients evaluate their hospital care: A national survey", Health Affairs 1991, 10(4):254-267.

[18]   Williams B, "Patient satisfaction: a valid concept?", Social Science and Medicine 1994, 38(4):509-516.

[19]   Rubin H, "Can patients evaluate the quality of hospital care?", Medical care review 1990, 47(3):267-326.

[20]   Sitzia J, "How valid and reliable are patient satisfaction data?", International Journal for Quality in Health Care 1999, 11(4):319-328.

[21]   Reijula J, Rosendahl T, Reijula K, Linnavuo M, Sepponen R, "A simple and countable method for the assessment of perceived well-being among elderly people", International Journal on Smart Sensing and Intelligent Systems 2009, 2(2):279-292.

[22]   Reijula J, Rosendahl T, Reijula K, Roilas P, Roilas H, Sepponen R, "A new method to assess perceived well-being among elderly people – a feasibility study", BMC Geriatrics 2009, 9:55.

[23]   Popham WJ, "Appraising two techniques for increasing the honesty of students' answers to self-report assessment devices", Journal of Personnel Evaluation in Education 1993, 7(1):33-41.

[24]   Davhana-Maselesele M, Igumbor JO, "The impact of caring for persons living with HIV and AIDS on the mental health of nurses on the Limpopo Province", Curationis 2008, 31(2):67-73.

[25]   Lopez JA, Meyer C, "Caring for patients with cancer: How stressful is it for the physician?", Comprehensive Therapy 1985, 11(9):68-70.

[26]   Tomes AE, Chee Peng Ng S, "Service quality in hospital care: the development of an in-patient questionnaire", International journal of health care quality assurance 1995, 8(3):25-33.