*MEDINFO 2010*
*C. Safran et al. (Eds.)*
*IOS Press, 2010*

*doi:10.3233/978-1-60750-588-4-545*



# Clinical users' perspective on telemonitoring of patients with long term conditions: understood through concepts of Giddens's structuration theory & consequence of modernity

**Urvashi Sharma, Julie Barnett, Malcolm Clarke**

*Department of Information Systems and Computing, Brunel University, Uxbridge, United Kingdom.*

**Abstract**

*This study involves conducting focus group discussions with clinical users (nurses and technicians) prior to the launch of telehealth service in Nottingham, UK, to elicit their initial perceptions about the service. It describes the findings from preliminary phase of otherwise a larger longitudinal study. Using Giddens's concepts from structuration theory and consequence of modernity, we were able to acknowledge trust and sense of security as two very salient aspects that govern adoption of new technological innovation. Unattended, these aspects contribute to arousal of conflict and contradiction within a system. In order for successful telehealth implementations in health care setting, providers of the service, need to focus on ways in which clinical users' trust can be gained and sense of security can be promoted while using the telehealth service and technology.*

***Keywords:***

Telemonitoring, Structuration theory, User perception.

## Introduction

Integrating telehealth with nursing case management has potential to improve patient health outcomes, clinical outcomes and allow clinical user to work more efficiently [1, 2]. However, despite its evident and noticeable advantages, telehealth has not been widely adopted. Although a search of literature reveals reasons for low espousal to range from technical difficulties to financial constraints and political motives [3, 4] , not much has been explored in relation to clinical users views on telehealth services especially in relation to nurses and technical staff involved. In addition, of those who have considered this aspect mostly questioned the users' motives behind the use of technology and extent of its integration in their routines, with users often being the stakeholders like GPs and managers [4, 5].

Taking the above argument on board, this qualitative study mainly aims to delve into main questions that need to be asked when implementing telehealth alongside case management such as: what does the user perceive the given technology as? and what issues surround its taking-up within a given context? We adopt Giddens structuration theory in combination with his work in consequence of modernity to guide data analysis and elucidate results presented in this paper [6, 7]. We found that telehealth by its very nature triggers conflict and contradicts the nursing practice, which depends on human contact and face-to -face interaction. This furthers the issues of trust and ontological security, previously not explored in its entirety. Understanding clinical users' perception and their concerns allows exploration of basic but dominating social aspects that govern successful implementation of technological interventions and at the same time provide an opportunity to resolve them [8].

The remainder of the paper unfolds as follow. We first present theoretical framework applied. After giving a brief overview of data collection and analysis method, we summaries the results and finally provide discussion on theoretical and practical implications of this study.

## Materials and Methods

### Theory

Our research uses concepts from Giddens's structuration theory (ST) and consequence of modernity to understand clinical users view on telehealth service when first introduced in their work setting. The main notion of structuration theory is that structures in terms of rules and resources are produced and reproduced by knowledgeable actors who continually monitor their actions [6, 9]. These structures are enacted through social interaction, and are therefore continually influenced by the agents' perception and in turn influence their perception. Giddens advocates use of specific constructs from ST to understand the duality of structure and expound their enabling and constricting effects [6, 9]. One study that presents an example of this is by Walsham and Han [10]. They use concepts of conflict and contradiction from structuration theory in order to depict reasons behind the resistance to introduction of new accounting system in an established accounting firm. According to Walsham and Han, contradiction is a "disjunction between different principles of system organisation" and conflict as "a struggle between actors and collectivities which tends to coincide with structural contradiction along its main 'fault

lines'" [10]. In our study, this concept helped in elaborating how inadequate training provision, support, and lack of information could lead to potential problems in up-take of service. Also, that the initial procedures of patient selection and education, and the monitoring of staff for their effectiveness levels by Primary Care Trust (PCT) contradict telehealths' original purpose of allowing clinical user to be more efficient with their time.

Although, Giddens does not consider technology in ST, in his later work- the consequence of modernity, he acknowledges the role that technology plays in modern world by "stretching" of social systems through disembedding mechanism [7]. By disembedding mechanisms he alludes to "lifting-out of social relations from local contexts of interaction and their restructuring across indefinite spans of time-space" [7]. Out of two types of disembedding mechanism, telehealth can be described as an expert system as it combines 'technical accomplishments' with 'professional expertise' that organise delivery of care for patients with long term condition in a modern healthcare system. According to Giddens, all disembedding mechanisms are based on trust due to absence of face-to-face interaction and hence lack of complete information available through facial expressions and body language [7]. In telehealth service various issues can be categorised under the main heading of trust, as it introduces dilemma of working with technology to monitor patients whom nurses use to visit at home prior to introduction of this service. It also questions the reliability of technology used, competence of new staff and managements' initiatives.

In addition, Giddens also presents definition of an abstract system in consequence of modernity, thus adding another dimension that would provide and interesting view on how change in routines in abstract system threatens ontological security [10]. According to Giddens expert system together with faith (which forms trust) constitute abstract systems and the "routines which are integrated with abstract system are central to ontological security", where ontological security refers to 'feeling of security' [7]. This notion explains how disturbance in daily routines threatens security of an actor within that system.

The combination of above theoretical prospective permitted to establish link between conflict & contradiction, trust and security as very salient social aspects that affect clinical users in modern healthcare setting and their decision on whether to use technology provided or not.

**Research Approach**

This study follows an interpretative approach using qualitative data. It is an approach that "goes beyond understanding the meaning of the data because it points the researcher to "read" the social world behind the words of the actors" [11].

**Data collection method**

As this research aimed to understand initial thoughts of clinical users about the newly introduced telehealth service, focus group discussions were chosen as a tool for data collection. Barbour argues that these discussions guide and lay foundation for later data collection and therefore should be conducted in preliminary research phase [12]. She further describes that focus group discussions are often seen as a feminist research method "for eliciting the prospective of women-patterns of interaction and exchange", and in our case 87.5% (14) participants were females [12].

The clinical users participating in this study were involved in delivering care to patients who were taking part in a randomised controlled trial, evaluating clinical effectiveness of telemonitoring of patients with chronic conditions such as heart failure and obstructive pulmonary disease in the city of Nottingham, U.K. Four main groups of clinical users namely the Community Matrons (CM-registered and highly experienced nurses), Congestive Heart Failure nurses (CHF), Chronic Obstructive Pulmonary Disease nurses (COPD) and Community Support Workers (CSW-staff recruited to provide technical assistance to nurses) were involved with the use of telehealth service. A purposive Sample of staff participating in this project was used, and their equal participation was ensured by requesting a representative from each group in each meeting. In total, 3 focus group discussions were held at Nottingham Primary care trusts' settings in the month of July 2009 and total of 16 staff took part in the discussions. During these meetings, it became quite apparent that nurses were often on call and due to nature of work at times could not attend the meetings or were bound with time restrictions. In one meeting for instance, none of the nurses could turn-up due to an emergency. This can be considered as a design issue, that other researchers would like to take on board.

**Data analysis**

The qualitative data colleted through discussions was transcribed and thematically analysed using Nvivo8 version3 software package. Guidelines for thematic analysis were adopted fro Braun and Clarke 2006 [13].

## Results

Three main themes evolved after analysing the data collected from focus group discussions as shown in Table1.

*Table1-Main themes*

| Theme | Contributing factor |
|---|---|
| Conflict and contradiction | Telehealth as 'monitoring tool'<br>Management strategy<br>Research strategy |
| Trust | Technology<br>Patient<br>Support staff<br>Management |
| Security | Lack of control<br>Work routines |

These three of themes of conflict and contradiction, trust, and security often inter-mingle with each other and manifestation of one would lead to another. Following sections present detailed outline of each theme.

**Conflict and Contradiction**

The first concept mainly highlighted the concerns of clinical users due to the introduction of telehealth. Users discussed the impact of telehealth implementation in relation to working with technology, managements' strategy on granting support, and research ethics.

***Telehealth as 'monitoring tool' only***

Clinical users argued that telemonitoring of patients only allowed access to objective measurements of blood pressure, oxygen saturation level and weight gain related to main illness like CHF or COPD. However, theses parameters sometimes were inadequate to discover underlying infections such as urinary tract infection, which could be easily picked during personal visit.

Clinical users also feared that introduction of technology would lead to subtraction of human touch and face-to-face interaction and loss of 'Nursing Intuition'. In addition, clinical staff saw telemonitoring as contributing factor to social exclusion of elderly patients.

***Management strategy***

Telehealth was mainly seen as a service that would decrease clinical users' workload and allow them to work more efficiently. At least, this is partly how the project managers introduced the service to the users. Ironically, clinical users' workload, especially nurses increased and contributing factors included lack of appropriate support, patient assessment, equipment installation, and use of computer system to access data.

The issue with support revolved around promise to provide each nurse with a community support worker by the PCT. However, due to late CSW recruitment and training requirements, their assignment to nurses was severely delayed.

It was also noticed that CSWS had problems of their own. They were promised instant engineering support for faulty equipment but as one CSW put it-

"..once its passed the easier to fix things we need engineer support, I have never seen one yet. I have never seen the engineer. We got some people waiting two months for the repair of their equipment"

***Research strategy: Randomized controlled trial***

Staff expressed apprehension towards the randomisation of patient and maintained that handpicking of patients would have been a desirable feature. They did not fully appreciate the aims and objectives of randomised trial taking place. According to clinical users, handpicking of patients would have avoided anxious patients from getting telemonitoring equipment.

"It is about how you assess the patient. It is the thing. It is good doing what we are doing. Research is good thing, because its worth waiting. You choose the right patient for that. I mean I have got a lady who's really hypertensive who I would really really look to put on it, but it actually sends her stir crazy because she would not know how to cope with it……It is about assessment and putting the correct people up"

Staff felt uneasy about getting patient's consent to taking part in the trial as they believed it would be unfavourable towards patient's emotional and mental well being.

"I don't understand why everybody has been consented. Because I feel there is a physiological element there…..I think that does affect them. I cannot understand why 250 patients were not picked and then we consent them"

**Trust**

This concept draws association between the interaction of various clinical users and their expectation from this service. Reliability of the data transmitted, guarantee of correct equipment use by patient and dependence on other staff were emphasised as key topics.

***Technology and Patient***

As patients are to take their own measurements using telehealth equipment, clinical staff questioned the reliability of these observations and questioned whether machines were calibrated routinely and were functioning accurately.

"I am not sure how long is this equipment in some body's house for before it is tested? Just a regular check, you don't know if there is a hole in the blood pressure or getting the wrong reading or what?"

In addition, nurses trained patients on how to use the equipment, for example not to run to machine and take measurements. However, despite ongoing efforts by the clinical staff, examples of inappropriate use came to light.

***New staff members: Community Support Workers***

Recruitment of Community Support Workers (CSWs) was a welcomed initiative. However, some senior nurses expressed anxiousness over handing over part of their responsibility to the new staff and trusting them.

***Management***

One of the biggest concerns that nurses had was being monitored by PCT for number of patient visits. This currently adds to their workload but as telehealth consultations are not accounted under the current scheme, nurses' workload might appear lighter.

**Security**

The third and final concept of security widened the understanding of clinical users' personal dilemmas that they were feeling due to introduction of telehealth service.

***Lack of control***

Staff especially nurses, were uneasy about their patient using the equipment and perhaps start depending on it in long term. In addition, they expressed doubts about relying on newly recruited community support workers for monitoring the patient observations and informing them in case of possible deterioration.

"its that little bit of vary of actually saying well we are gonna do it all over the telephone from now on, obviously that is an

exaggeration ...doing it all on the telephone... but whether its fear of my own loss of control I don't know?"

***Change in work routines***

Clinical users recognised the advantages of telehealth, but due to heavy workload were hesitant about possible changes in their work routines because of this service.

"there is this change and transfer period ….so during this time having to reconfigure I suppose the way we work will be very difficult"

## Discussion

This research contributes to the theoretical and practical consideration related to assessment of user perception.

Main **theoretical contribution** would be employing Giddens concepts, firstly to enable telehealth to be defined as an expert system and secondly explain features that need attention and require maturing for allowing this expert system to develop into a fully sustainable abstract system.

An abstract system involves 'faceless commitments' that are based on trustworthiness vested at access points which can be described as the ground where experts within an abstract system meet lay people (in our study the experts are clinical users and the lay people are patients) [7]. However, original nursing practice, involves trustworthiness established between different individuals based on "facework commitments' that relates to copresence. Introduction of telehealth creates access points, which lead to clinical users being overwhelmed by the feeling of loss control. In parallel to that, the level of expertise of experts with in a system is also an issue of concern. Many clinical users complained of inadequate training and support as this questioned their own expertise over certain issues such as equipment installation, computer system use and training of their patients.

It is also noticed that many clinical users questioned the reliability of telehealth equipment. This coincides with vesting trust in an expert system, and therefore, one could argue that unless full trust of experts is not gained; telehealth service could not become a self-sustaining abstract system.

From **practical view**, firstly it allows to understand the perceptions and feeling of clinical users as social beings' (view) then just abstract clinical users with defined mechanised roles and routines. Secondly, it permits to scrutinize conflict among groups and contradiction with managements' strategy associated with the launch of telehealth.

In a term 'bargain with modernity', Giddens describes the nature of trust that actors invest in an expert system to be *"governed by specific admixtures of deference and scepticism, comfort and fear"* [7]. Moreover, these are the feelings that are exhibited by participants in this study. Hence, they find it difficult to trust a technologically sophisticated patient monitoring system despite its much-appreciated success in other areas of healthcare delivery and other countries. Other cause of clinical users' trust being rattled is perturbing their daily work routines by introducing telehealth. Daily routines of an actor constitute their sense of security and when this is disturbed, trust in system is shaken. These various resultant conditions wreak direct insult on trust and security, and actors with such emotions continuously enact structures that are inherent with conflict and contradiction.

One of the lessons learned from this study is that clinical users tend to operate on very basic units of trust and security, like any other social beings. These feelings and emotions are much intense in instances where care of people is involved, as clinical users perceive themselves to be responsible for any outcome of their patients' health. Lapses in acknowledging these emotions can lead to differences in groups' interests and create misunderstanding with managements or systems' objectives. Which when stagnate lead to power practice as a direct result of conflict, for example, some nurses will refuse to use the service at all. This will also enact structure of domination due to the presence of contradiction for example where the management will use tactics such as firing staff for not using the telehealth service [6].

This study proposes to handle these issues by providing optimal training to the staff involved, giving clear information on what is required from each clinical user involved and offer technical support to nurses when and where required. It also calls for clinical users to be instructed on clinical trial methods so questions on patient randomisation and consent do not crop-up. Assurance that 1) telehealth will not replace nurse visits to their patient, 2) telehealth equipment is calibrated and safe to use and 3) telehealth would not impinge on daily routines of nurses is very crucial to win the trust and provide sense of security thus alleviating conflict and contradiction.

## Conclusion

Trust and security are very crucial and play an important part in clinical users' decision of using a new telehealth service. If not acknowledged, these feelings dwell in form of conflict among individuals within a group or different groups and contradicts overall system objective. For telehealth service to be free of conflict and contradiction, equipment providers and management of healthcare facilities should recognise clinical users as social beings with heightened sense of responsibility. Taking users' view on board and allowing them to participate in decision-making (implementation etc) would be the first step to ensure that their need to establish trust and security are met.

**Acknowledgement**

We thank MATCH (Multidisciplinary Assessment of Technologies Centre for Healthcare) for funding this research. We also thank Nottingham City PCT for allowing us to interview their staff (especially, Sally Parker for arranging the meetings).

## References

[1] Gonseth J, Guallar-Castillon P, Banegas J, Rodrıguez-Artalejo F. The effectiveness of disease management programmes in reducing hospital re-admission in older pa-

tients with heart failure: a systematic review and meta-analysis of published reports. Eur Heart J. 2004;25(18):1570-1595.

[2] Roccaforte R, Demers C, Baldassarre F, Teo K, Yusuf S, Effectiveness of comprehensive disease management programmes in improving clinical outcomes in heart failure patients. A Meta-analysis. The Eur J. Heart Fail. 2005;7(7):1133-1144.

[3] Nicolini D. Medical Innovation as a Process of Translation: a Case from the Field of Telemedicine. Br J Manag 2009; [DOI: 10.1111/j.1467-8551.2008.00627.x]

[4] Peddle K. Telehealth in Context: Socio-technical Barriers to Telehealth use in Labrador, Canada. CSCW 2007;16:595-614.

[5] Lehoux P, Sicotte C, Denis J-, Berg M, Lacroix A. The theory of use behind telemedicine: : how compatible with physicians' clinical routines? Soc. Sci. Med 2002 3;54(6):889-904.

[6] Giddens A. Central problems in social theory: action, structure and contradiction in social analysis. London (etc.): Macmillan; 1979.

[7] Giddens A. The consequences of modernity. UK: Polity Press in association with Blackwell; 1990.

[8] Kouroubali A. Structuration Theory and Conception-Reality Gaps: Addressing Cause and Effect of Implementation Outcomes in Health Care Information Systems. Proceedings of the 35th Hawaii International Conference on System Sciences 2002.

[9] Giddens A. The constitution of society : outline of the theory of structuration. Cambridge: Polity; 1984.

[10] Walsham G, Han K. Structuration Theory and Information Systems Research. J. Appl. Syst. Anal. 1991;17:77-85.

[11] Klein HK, Myers MD. A set of principles for conducting and evaluating interpretive field studies in information systems. MIS Quarterly 1999;23(1):67-94.

[12] Barbour R. Doing focus groups. London: Sage; 2007.

[13] Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psych 2006;3(2):77-101.

**Address for correspondence**

Lead authors e-mail: Urvashi.Sharma@brunel.ac.uk