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INFORMATION NEEDS IN COMMUNITY AGED CARE

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***Abstract.** This paper focuses on the information needs and behaviours of senior citizens and their carers in the community. Two case studies concerning elderly stroke patients and their carers are described and discussed. Analysis of the case study data reveals a number of themes including the actual information needs and information behaviours of the senior citizens, the importance of proxy information seekers and advocates and the need for usable, accessible and useful tool to support the needs of care recipients. A preliminary framework is developed that highlights important aspects of supporting the information needs of care recipients and carers in community aged care. Finally we suggest opportunities for technology interventions that address various information needs of senior citizens in the community.*

Keywords: health informatics, information needs, information behaviours, aged care

1. INTRODUCTION

The recent Productivity Commission Inquiry into Aged Care (2011) noted that aged care is an important component of Australia's Health System. It described the challenges for an older and increasingly diverse population including: an increased preference for independent living arrangements and choice in aged care services; reduced access to carers and family support due to changes in social and economic circumstances; and the diverse geographic spread of the Australian population. The commission, among other proposals, recommended that older Australians have the ability to choose, where feasible and appropriate, to receive care at home. This recommendation supports the current trend of older Australians choosing to receive care at home for longer. It is within this context that this paper presents findings from our recent research conducted with a view to gaining a deep understanding of the information needs of the senior citizens who live in the community. Based on this understanding, we suggest ways to integrate technology interventions within community aged care services to address information needs and improve the quality of life for senior citizens.

Our research was motivated by the need to address the ageing population challenge and particularly the growing trend of community aged care. The total number of Australians receiving support from aged care systems is projected to increase by about 150% over the next forty years with almost 8% of the population using aged care services by 2050 (Commonwealth Treasury cited in Productivity Commission (2011) sub 482). Moreover, the trend towards community aged care has risen from 2% to 20% of the overall aged care subsidised places between 1995 and 2007 (Productivity Commission, 2008). The community aged care trend has been growing to address the needs and interests of many senior citizens who wish to maintain their independent living in the community. For example, Senes (2006) quoted from an ABS survey of 2003 that more than 80% of stroke victims lived in private dwellings and of these only 25% approximately lived alone. Of the rest 20% lived with a principal carer. Information and Communications Technology (ICT) and assistive technology are potential tools for improving the quality of life of the elderly as well as improving aged care services (Soar *et al.*, 2011). The current e-Health implementation coordinated by National E-Health Transition Authority (NEHTA) in Australia suggests that we need to investigate how best to utilise technology in community aged care. A previous focus group comprising several senior citizens, their family carers and aged care staff (Nguyen *et al.*, 2010) confirms the need for a better understanding of the information needs of senior citizens who reside in the community and for their support using ICT.

The paper is structured as follows. Section two discusses existing research about the information needs of senior citizens and highlights gaps in addressing their needs using ICT. The following section describes the exploratory case study research approach used in this study. Section four describes two case studies concerning elderly stroke patients. The following section presents key themes that emerged from the case studies and finally we conclude the paper and outline future research directions.

2. INFORMATION NEEDS OF SENIOR CITIZENS

In this section we discuss existing research about the information needs of health consumers in general, senior citizens in particular, and issues in ICT adoption by senior citizens. We argue that our understanding of these information needs in the context of family care and community aged care is limited.

1.1 Information needs of health consumers

Human information needs may be described as a sequence of behaviours including information needs identification, information seeking, information interpretation, evaluation and use (Wilson, 2006; 2000; Adams and Blandford, 2005). First, information needs are

identified. These are grounded in the life world or work tasks of the information user and can be triggered by physiological, psychological or cognitive needs (Wilson, 2006). In healthcare, patients' information needs can be active and triggered by their specific illness and care needs, or passive and triggered by news and announcements, for example an outbreak of disease in their local community (Attfield *et al.*, 2006). Second, the information user searches for information. A number of factors, such as the availability of information sources and ways information can be transmitted/delivered may affect their information seeking. Next, the information user makes sense of the received information, evaluates and uses it, or undertakes further iterative information behaviours. Factors such as the presentation, relevance and quality of the information are important.

Health informatics is a discipline that lies in the intersection of health and medical science, information systems and computer science. Within this discipline, consumer health informatics (Logan and Tse, 2007; Eysenbach, 2000) has emerged and focuses on health consumers who can be patients, their families and communities, and the public, as opposed to clinicians. This field investigates patients' information needs and develops technology-enabled solutions to support patients in their health self-management. In a comprehensive, multidisciplinary consumer health informatics framework developed by Logan and Tse (2007), the patient's information needs and behaviours are placed within a context of information channels, multiple information sources, and environment factors including socio-economic, global, and other resources. In addition, the individual characteristics of patients including cognition, attitudes, knowledge and skills, family and background culture play an important role in their information needs and behaviours. This framework is useful when exploring information needs of the senior citizens.

1.2 Information needs of senior citizens

The information needs of senior citizens who live in the community are related to their health and pharmaceutical needs, interests and hobbies, and contact information of support and care service providers (Barratt, 2000; Chong and Theng, 2004; Williamson and Asla, 2009). These needs are based on their desire to maintain daily independent living, their health and well-being, and to socialise with others (Nguyen *et al.*, 2010). The information seeking behaviour of the elderly can be characterised as incidental through social activities rather than formal training (Williamson and Asla, 2009). The elderly tend to rely on their family carers and their close social network for information acquisition. In palliative care and chronic care, family carers are recognised as a source of help as well as a proxy information seekers (Docherty *et al.*, 2008; Nguyen *et al.*, 2008). In aged care, it is important to support the elderly as well their family carers. There is a need for a deep understanding of the information needs of the carer as well as the cared-for, how they seek and share information, and how they adopt or do not use ICT. Furthermore, it is important to understand these information needs in the context of growing demand for support to maintain the independent living of senior citizens at home.

1.3 Issues in ICT adoption by the senior citizens

Usefulness, usability, and Internet safety were found to be significant determinants of use intention amongst the elderly (Phang *et al.*, 2006; Chong and Theng, 2004). Usefulness, in particular, was perceived as resource savings and self-actualization (Phang *et al.*, 2006). Physiological age factors, including eyesight, hand-eye coordination, loss of memory, and cognitive impairments, are additional obstacles to using computers for aged people (Czaja, 2005). Mobile health applications, designed to target younger generations, are not tailored to address the needs of the senior citizens (Gao and Koronios, 2010). In the context of web-based information services in Singapore, Chong and Theng (2004) identified a mismatch between the available information and the information needs of the elderly, and suggested further studies to examine information needs of the elderly. Nguyen (2010) found the common limitations of various consumer health informatics technologies supporting aged patients with chronic illness included the lack of an appropriate user interface and the lack of

specific information content customised to support their information needs and information behaviours.

1.4 Research objectives

A common limitation of previous studies is the lack of understanding of information needs of the elderly and their family carers and their adoption of technologies in the context of family care and community aged care. Consequently, this research aims to gain a deep understanding of:

- the information needs of senior citizens and their family carers in the context of family care and community aged care, and
- the experiences of senior citizens and their family carers in adopting and using or not adopting and using ICT.

Such an understanding will inform us about how best to integrate ICT support tools within community care services to support the information needs and information behaviours of senior citizens and their family carers.

3. RESEARCH APPROACH

In this study, we use an exploratory case study research approach. Case studies are particularly useful for in-depth studies of contemporary phenomena within their natural context (Yin, 2002). They provide a rich and detailed description of the phenomena and can be used to explain how and why outcomes occur. An interpretive position is adopted so we can make sense of the actions and behaviours of participants from their perspectives (Neuman, 2003).

We conducted two case studies. Each case concerns one client of an aged care provider, and involves three participants: the aged care recipient, their family carer and a member of the professional staff of the aged care provider. The first case involved current use of information and communication technologies (ICT) while the second case did not involve any use of ICT. This enabled a cross case comparison to better understand the impact of ICT.

Participating care recipients and their carers were visited and interviewed in their homes by one of the researchers. The professional staff were interviewed separately. Each interview lasted approximately one to one and a half hours. All interviews were recorded and transcribed. The care recipients and their carers had previously participated in a focus group. Relevant data from the focus group was included in analysis of case study data. We used data condensation, coding and thematic analysis to identify common patterns and themes emerging from the data (Kvale, 1996; Miles and Huberman, 1984; Strauss, 1987).

4. CASE STUDY DESCRIPTIONS

This section describes two case studies concerning elderly stroke patients. The description of each case is structured around context, aged care needs in terms of daily living activities, communication and social needs, and healthcare.

4.1 Case One: Coping with dramatic changes after a recent stroke

4.1.1 Context

The CR1 (care recipient) had a “*massive stroke and (is) still in a grieving process*” (CS1 – care staff), is paralysed on one side of his body and has affected speech. He was discharged from the hospital after six months and now lives with his wife (FC1) in the community. Care staff CS1 was assigned to this case. Both CR1 and FC1 are of the baby boomer generation. They came to Australia from South America over ten years ago, worked hard and ran a family

business which they sold after the stroke. FC1 was separately employed so their situation became even worse when she also lost her job. The combination of these events had a huge impact on their quality of life and social network.

4.1.2 Care needs

This couple have experienced dramatic changes to their daily living. They are a highly social couple, accustomed to companionship and independence, the loss of which CR1 feels as deeply as his physical pain. Loss of his sense of taste and anxiety of being alone at home due to limited mobility and the possibility of falling over are amongst the other consequences of the stroke. These have coincided with the deep depression, disappointment, anger and shock occasioned by the initial stroke diagnosis. Due to the severity of the stroke, CR1's recovery has been slow and additional anxiety has been caused by medical advice that further improvements in his condition would be unlikely after the first year, advice which FC1 refuses to accept. CR1 receives "encouragement" in the form of mandatory daily exercises dictated by FC1 (CR1 affectionately refers to her as Stalin) in the hope of regaining as much muscle control as possible: "*to be as normal as I can*" (CR1). Their self-care activities include daily medication management (six different tablets per day), home exercises, and regular visits to the GP, physiotherapists, and specialists. CS1 declares that FC1's strong determination, persistence and devotion to provide care for her husband are very impressive.

Their social needs are also complex. As previously stated, both CR1 and FC1 are very social people: "*We see people. We like to see people*" (CR1). Due to his conditions, CR1 spends most of his time watching TV and sleeping, indeed, TV has become their social 'information centre'. FC1 spends most of her time caring for him and performing other home duties. But due to lack of time, FC1 fears she will lose social and work friends, although, using a respite care service, FC1 manages to go out and see her friends occasionally. FC1 feels she might benefit from meeting with other carers, at the same time she wants to feel 'normal' and to get away from the 'disability topic'. She also wants to be part of the wider community. Since she is a fluent Spanish speaker, "*she has tossed around the idea, not long after she was made redundant, of going to get the qualifications to be able to do interpreting, official interpreting*". (Care staff CS1 about FC1).

While CR1's and his wife's decisions about providing suitable care are strongly influenced by their emotions, they need information about medical care, self-care and available services as well as information to improve their quality of life and social life. Meeting their care and information needs is not straightforward. There are two challenges: how to 'handle' service gaps and how best to support the information needs and information behaviours of CR1 and FC1.

4.1.3 Service gaps in addressing care needs

Service gaps exist at different levels. As neither CR1 nor FC1 have reached the Australian pension age (sixty five), they do not qualify for aged care. CS1 came up with a flexible solution to provide support for FC1 as the carer client. Using a carers' support program, they are able to organise respite care for FC1 and well as physiotherapy and occupational therapy, and social support (men's shed) for FC1. This solution is subject to periodic reviews with an Australian government aged care assessment team. Still, there are challenges in social support provision. Firstly the activities in the men's shed program are designed for people in their seventies and eighties, not age-appropriate to match CR1's interests. Secondly, there are travelling difficulties due to CR1's physical limitations (wheelchairs, parking etc). Thirdly, with their cultural background, CR1 and FC1 are very "*social friendly people*" (CS1). This could hint that they may expect a personal touch and relationships with others including the care staff. For example, CR1 cannot share his interest in history with care workers, therefore finds respite care sessions *boring*. FC1 said that some doctors "*are not expressive enough. I cannot read them*". Social and communication skills of care staff are important.

4.1.4 Information needs and ICT adoption to address their needs

The information needs of the care recipient and family carer are complex and associated with care needs. Their information behaviours are not adequately supported. Further, there are similarities and differences between CR1's and FC1's information behaviours. Although they need clinical information to provide care for him, both CR1 and FC1 feel negative and discouraged when receiving depressing diagnoses and test results from doctors. His fear of 'bad things' has affected CR1's information seeking behaviour. His wife, therefore, acts as his proxy information seeker and is more active in asking and talking with the doctors. But their information behaviours are largely information seeking and are limited in information interpretation and evaluation for decision-making. Both CR1 and FC1 have difficulty in understanding medical terminologies in discharge referrals and other clinical notes. From time to time FC1 receives leaflets and brochures with contact details of different service providers but doesn't know what questions to ask. From a different perspective, since FC1 remains very optimistic about her husband's further recovery she is constantly searching for medical breakthroughs which may improve his condition. Stem cell research is her recent interest. CS1 often searches for information and visits this couple. *"My role is to find as much information and variety as I can and bring that to them for them to choose what's going to best suit their needs"*. She also acts as their advocate in selecting care services, for example, carers' support for FC1 and men's' shed for CR1, i.e., *"do a referral, do the paperwork, do the legwork I guess, to get them in"*. Although CR1 is the stroke patient who needs care in this case, FC1 is, in fact, the client for CS1 and receives information and care services from CS1 for them both. CS1's understanding of her clients' needs and care arrangement for both CR1 and FC1 demonstrates the importance of triadic communication and information flows as practiced in this case.

Their primary information infrastructure is quite typical and consists primarily of TV, telephone, and paper-based media. In addition, they have a PC with an Internet connection, and FC1 possesses basic PC and Internet skills: she actually learnt basic computer skills from her previous employment. Clearly, CR1 is not in a position to use the computer himself. They adopt basic Internet applications, such as Web browsing, emails, and limited transactions. They have bought theatre tickets on-line, albeit with hesitation due to the trust issue: *"I bought tickets for the theatre... But I avoid it if I can"*. CR1 and FC1 said they would be interested in learning and exploring more uses of the Internet. CS1 (Care staff) also sees technology as an opportunity. CS1: *(virtual communities can be useful) "because one of the big problems in aged services is isolation and lack of transport to attend any kind of support group"*. However she also sees that interpersonal communication is important: picking up on moods, body language, seeing how the carer and care recipient present that can be limitations of emails and attachments. Both CR1 and FC1 agree that the Internet can be useful in searching for hobby and health information and for communication with family relatives (especially those still in South America) but hesitate to use it for social networking with 'strangers' or business transactions. The reason is around trust, security and privacy. They prefer face-to-face communication when it comes to healthcare services. CR1 sees language as a barrier: *"It's very hard for me, see English is my second language, then it's very hard for me sometimes and I prefer face to face"* (FC1). On-going connection fees and helpdesk support are two other issues. Technology advancements lead to frequent computer upgrades, software updates and require associated learning. They struggle to cope with technology issues and rely on some support from their sons. In fact, at the time of interviewing their computer had been out of commission for some time and they were still waiting upon their son's promised visit to fix it.

Clearly, in this case ICT should be introduced as an additional information tool, not a replacement for current communication and information services. Potential application areas include: health, healthcare and aged care service information provision, and communication with service providers. This case demonstrates that an appropriate user interface, training and on-going support are required and should be included in service packages.

4.2 Case Two: Looking after stroke-patient husband for many years

4.2.1 Context

CR2 had a stroke about fourteen years ago which paralysed half of his body. Additionally, he has had two heart attacks, is a diabetic patient and wears a hearing aid. FC2 is his wife and was a legal secretary before becoming a fulltime carer for her husband. They have two children and two grand children who often visit them. The relationship between the couple is extremely fraught since CR2 is very vocal and demanding. The nature of his stroke also includes a certain loss of inhibition which precludes CR2 being left alone with the grandchildren due to him making possibly inappropriate comments. They receive different community services including respite care, men's shed, physiotherapy, and carers' support from two service providers. CR2 is provided with primary care by a general practitioner and several health specialists (due to his stroke). Both CR2 and FC2 are of the pre-boomer generation. CR2 is qualified for aged care and is the client of the service provider. One of their community service providers was involved in the research and provided us with contextual and service information. There is no case manager assigned to this couple.

4.2.2 Care needs

Their activities of daily living are quite contrasting. CR2 is active, going out four days per week with different social and sport interests and hobbies *"I go to football, I go to tennis, I go to the air show... I feel good getting into the pool"* (CR2). However, his wife FC2 spends the majority of her time caring for him, as housewife, cook, secretary and chauffeur. *"Remind him take his wallet, remind him to go to the toilet and like and just organise those things, take him to Strathton, take him to Villa Maria we actually drive"* (FC2). CR2 said that he enjoys meeting with people but then qualified this statement: *"I'm sick of sick people. I'm around them all the time...Social groups, socialization I love"*. According to his wife: *"I've got to egg him on to go... if I wasn't here he wouldn't do it."* She is tired and stressed *"I'd love also a day at home of not rushing"*. She is lonely and finds the carers' group helpful but she doesn't have enough time to socialise with other people. She described her life: *"every aspect is stressful... it's very hard to find someone who understands being a carer of a brain damaged person."*

CR2's healthcare activities include medication management, regular visits to the general practitioner, physiotherapists and other specialists due to his chronic conditions associated with stroke, heart attacks, and diabetes. Although after fourteen years, no clinical improvements are anticipated, CR2 still needs care services to prevent *"getting worse"*. He is required to go through periodic assessments to be entitled to respite and other care services. CR2 is not independent and requires daily help: *"usually when he falls over .. he can't get up"* (FC2). He is on daily medications (thirteen tablets per day). According to FC2, he adheres poorly to his diabetes self-management plan: *"I give them (the pills) to him and remind him about ten times."* They value their long-term relationships with their general practitioner and local chemist and trust them.

4.2.3 Service gaps in addressing care needs

CR2 seems to be happy with the level of service and feels he's well looked after while his wife feels exhausted after fourteen years providing care and looking for resources and support: *"we really don't get paid much to care for people, I mean the fifty dollars a week I get really goes on taxis for him"* (FC2). Conflict exists in terms of type of care services: CR2 doesn't want to go on respite care but FC2 needs time out to have rest. As there is no case manager assigned to this case, FC2 has to 'deal' with different bureaucratic levels, healthcare and community care providers herself. *"There's so many tiers"* she opines, which disadvantage shy family carers in receiving movement funding and care services. She finds the situation confusing as to where and when cases such as hers are entitled to money from the various providers and is, therefore, compelled to investigate herself. *"(The council case*

manager) doesn't know half of the things, I find them out and tell her and then she looks into it". FC2's fourteen years of experience of being a family carer has taught her the need for assertiveness and to be proactive in searching and asking for care services: "if you don't go and get it or ask the right question you never get it" (FC2). Her story suggests that there are gaps in the service provision chain between service providers (in both sectors healthcare and community care) and care recipients and their families. With professional knowledge and negotiation skills, a case manager acting as an advocate, similar to CS1 in Case One, would be helpful in such problem solving situations.

4.2.4 Information needs and why still not adopting ICT

Similar to CR1, CR2 leaves health, healthcare and service information to his wife. When talking about his clinical information, such as test results and X-rays, CR2 said: "*she does all that; she keeps all that... all that financial stuff too.*" CR2 is the proxy information seeker. She rings and approaches different information sources and different service providers to find out what help is available. She encounters two difficulties. The first is translating their care needs and concerns into information sufficiently coherent to search for appropriate care, and the second is to find an appropriate solution from available services. FC2 was concerned that they needed "*more maintenance for (CR2) to stop him from deteriorating*" and "*it could be there*", but "*I just don't know how to get it*". Even when CR2 learned that she could arrange permanent accommodation for her husband, the decision to take advantage of such a facility was simply too emotionally difficult: "*I've got to live with myself*". FC2 accompanies her husband to the GP, dentist, and all the healthcare providers: "*I never know what he's told them and what they've told him unless I go*". Acting as a proxy information seeker and advocate is not simple because the care recipient needs to act upon the information received: "*I feel I understand it (doctor's information) but, but that's me not him*" (FC2). Referring to information leaflets and brochures, she said: "*that's all for me to read and for me to take in; he's never looked through it*". Clearly, in such as situation, the family carer plays a critical role in searching for and using information. Family also plays an important role in interpreting the information received from the doctor and in decision-making: "*Like his knee we sort of had a big talk about it and we decided... 'cause he's got no motivation and no idea of the amount of work he'd have to do and we decided that it's not worth risking it*".

Their primary information infrastructure is quite typical and consists primarily of TV, telephone, and paper-based media. In contrast to Case One, this couple does not have a PC, hence no Internet access. Their reactions to whether they would learn and use the Internet are quite different. CR2 who was a heavy mobile phone user and expressed his interest in adopting ICT said: "*I'm not scared of it. I've got to learn how to work it.*" He seemed to be interested in using technology to access information for entertainment and socialisation purposes rather than healthcare and care service arrangement. His wife, however, considered her lack of time and effort to learn and use it as challenges: "*I would if I had time*" and "*I can't face the thought of trying to learn it, it's just another problem!*" FC2 was more interested in accessing information about health, healthcare, and service information more than personal hobbies and interests. A friend found information about medicines and shared it with her: "*A friend who's got the Internet looked it up for me... I find it useful.*" However, FC2 took a much more sceptical view of CR2 actually using the technology even if it were available, opining that it would simply be an unused resource. She, herself, was aware of health information and healthcare and other government services available on the Internet. She seemed indifferent about information privacy but she shared her concern about her lack of accessibility. She repeated that time and assistance to learn were the two major obstacles to adopting the Internet.

5 CASE STUDY ANALYSIS

Through the 'stories' of the participating care recipients, family carers and the provider staff, a number of themes have emerged and form the key findings of our study.

5.1 Information needs and information behaviours of the senior citizens

From the perspectives of both the care recipient and carer, care needs are diverse and associated with physiological, psychological and cognitive needs. Both family carers in the two case studies require care and support services to maintain their husbands' health and prevent them from deterioration. While healthcare of the care recipients is always in the foreground, other needs are generally in the background. Indeed, care recipients and family carers in both case studies need to improve their well-being and quality of life through daily living, leisure and social activities. Hence, their information needs are complex and difficult to identify and formulate. This understanding enriches and extends the current classification of patients' active and passive information needs (Adams *et al.*, 2005).

There are a number of factors affecting information behaviours. Information needs are emotionally associated and sometimes contradictory. For example, fear of negative clinical diagnosis/test results often hinders the information seeking behaviour of the care recipients. Therefore, family carers often become their proxies in this regard. Care recipients' immobility and family carers' lack of time for their own needs result in lack of social activities, which are essential for incidental information acquisition (Williamson and Asla, 2009). Care recipients and family carers need skills to interpret, evaluate and integrate information from multiple sources to inform decision-making. In Case Two, FC2 had to sort information received from different service providers by herself and found it confusing. Information integration has not highlighted as an issue in previous research (Williamson and Asla, 2009; Adams *et al.*, 2005). Further, simply sending information to a care recipient and their family carer does not necessarily mean they will act on the given information. Social interactions and trust between care recipients, family carers, and care staff are important in enabling effective information sharing.

5.2 Importance of proxy information seekers and advocates

In both case studies, the two family carers acted as proxy information seekers for their husbands. One of them is approaching her pension age and the other is an elderly person herself. Therefore, in addition to carers' support, they also need care and support as senior citizens. A special package comprising a mix of existing programs to provide care for clients who are carers and who also fit into the aged person category is needed. Current research tends to have separate foci on the patient (for example, Adams *et al.*, 2005; Chong and Theng, 2004) or the family carer (for example, Nguyen *et al.*, 2008).

In addition to service information needs, care staff also act as advocates and proxy information seekers for their clients. As demonstrated in Case One, with professional knowledge and skills, a professional carer can act as an advocate in integrating information from different sources, evaluating it and formulating a solution comprehensive and appropriate to the situation at hand. Their negotiation skills are important when they communicate with other providers to address service gaps. Staff social skills are also important in information dissemination, sharing and communication with their clients. Addressing staff information needs and supporting information flows between the care recipient, family carer, and service provider are key issues in implementing triadic communication and collaboration in community aged care as promoted in palliative care (Docherty *et al.*, 2008).

5.3 Usable, accessible and useful tools and a relevant support and training approach

The care recipient and carer in Case One used the internet for web surfing, information seeking, electronic communication with family relatives, and limited business transactions. This is consistent with previous research (Chong and Theng, 2004). Both CR1 and FC1 were interested in exploring more applications but experience barriers included the inappropriate interfaces of current applications, the on-going learning, support and maintenance required, lack of trust of the internet for business transactions and communication with service providers. Although opportunities exist for socialisation, neither of them felt safe to make new friends or communicate with people other than their family relatives on the internet. The above findings refine senior users' perceptions of usefulness, usability and safety of internet applications (Chong and Theng, 2004; Phang et al., 2006).

The care recipient and carer in Case Two had not adopted the internet and showed different levels of interest in the adoption of technology. Their common adoption barriers include accessibility and a large learning curve. Again, this is consistent with findings from previous studies (Chong and Theng, 2004). In addition, lack of time (and associated stress and tiredness) plays a significant role in the family carer's resistance to adopting technology. This is particularly important because she is the proxy information seeker for the care recipient and both of them are elderly non-adopters. The family carer's role of a proxy information seeker has been highlighted in the literature (Williamson and Asla, 2009). As discussed in Sections 2.2 and 2.3, a holistic view of a family context is important but often missing in current support for their information seeking and sharing in community aged care.

5.4 Framework to integrate ICT within community aged care

We have combined the themes that emerged from the case studies with concepts from previous studies to develop a preliminary framework that highlights important aspects of supporting the information needs of care recipients and carers in community aged care (see Figure 1).

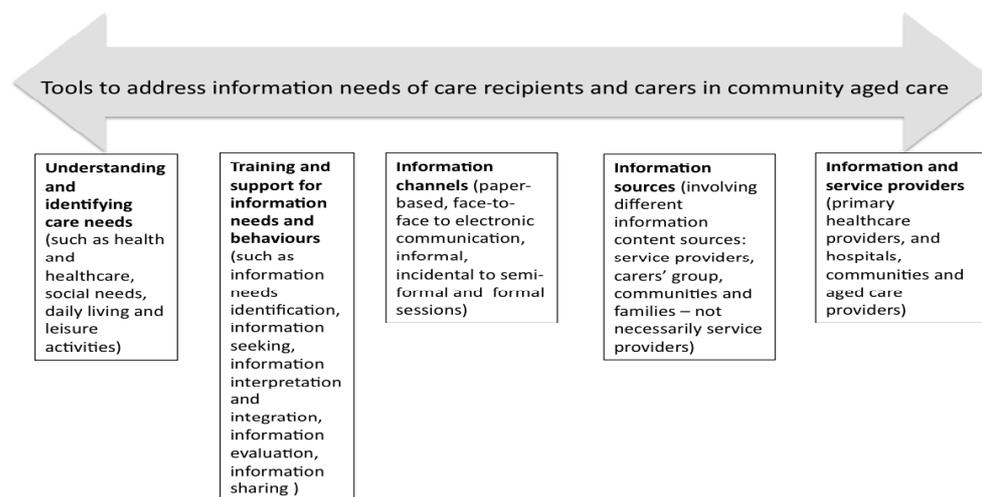


Figure 1. Supporting information needs of the care recipients and family carers

Care staff advocate the inclusion of technology to support communication, social connection, and information needs of the care recipients and family carers, but are concerned about their passive information behaviours and their lack of IT skills. This indicates that the possible inclusion of technology solutions, support and training within aged care packages would be important to investigate. In future research, support tools will be selected to accommodate

different care needs and information needs. Simple and relevant tools with an appropriate user interface can be introduced to elderly users. Social networking and communication tools need to be relevant to their practical needs, safe, and simple to learn and use. Training and support can be arranged to fit with their approach to information acquisition, for example included in social activities or on-site.

6 CONCLUSION

It is clear that federal cost imperatives, driven by an aging demographic in Australia society, are encouraging more medical care recipients to receive their care outside government funded institutions. This paper has highlighted two cases of stroke victims whose carers are their wives and who live at home. The care recipients have no contact with information technology largely because of physical disability, abandoning this to their carers, who therefore act as proxy information seekers. But the carers have little or no formal training. The information required falls into a number of categories. The first and major one is medical including clinical details, treatment options and available services. This is the area of greatest frustration. The second area is technology maintenance since the speed of technological progress imposes cost and comprehension burdens. The third is social which is a need occasioned by physical isolation. The stress factor visited upon the carers in this situation is extreme.

The case study findings have clear implications for community aged care providers and the need for them to fully integrate ICT within their service models. From a practical perspective this paper has identified a potential mismatch between current service delivery models in community aged care and the needs of the elderly and carers in the community. It is suggested that community aged care providers need to:

- Increase the provision of their services to their clients using ICT;
- Offer to communicate with packaged clients and carers using ICT;
- Assess the capacity of current and future clients/carers to use and be supported by ICT based solutions;
- Train professional care staff to be aware the benefits of engaging with clients using ICT.

In addition, this paper supports recommendation 8.1 of the Australian Productivity Commission (2011) that the Australian government should establish an Australian Seniors Gateway Agency to provide information, assessment, care coordination and carer referral services. Our research supports the need for a simple, free central gateway with specific information content customised to support the information needs and information behaviours for senior citizens in the community. Consequently our research supports the proposal to provide information on healthy ageing, future accommodation options, social participation opportunities, advice on age-friendly activities and information on the availability, quality and costs of care services from approved community aged care providers, with specific information on how to access those services. To create awareness and access, such a gateway could be consistently and universally marketed specifically by community aged care providers and all other health providers in the health and social welfare chain.

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