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What significance does physical activity and sedentary behaviour have for members of online health promoting communities? Learning from Australia's HeartNET community

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What significance does physical activity
and sedentary behaviour have for
members of online health promoting
communities?
Learning from Australia's HeartNET
community

By
Gloria Askander
Post Graduate Certificate in Indigenous Health
Post Graduate Diploma in Public Health

This thesis is presented in partial fulfilment of the
requirement of the degree of Master of Public Health

Faculty of Health, Engineering and Science
Edith Cowan University
2015

Abstract

My study used the HeartNET (HN) community to investigate the significance of physical activity and sedentary behaviour for members of online health-promoting communities by using online surveys and netnography. It found concerns about heart health and general health can be both a barrier and an enabler to increasing physical activity or reducing sedentary behaviour.

Gentle efforts to address sedentary behaviour could build confidence to increase physical activity. By offering role models and encouraging friendly rivalry, peer support via an online community (or other type of social networking sites) can increase physical activity and reduce sedentary behaviour. Fun, laughter and peer support can assist in challenging and reducing the tendency to underestimate sedentary behaviour and its health hazards as well as the fear and uncertainty and the perceived constraints to engage with physical activities.

My study highlighted both the value of netnography as an analytic tool and its potential use for strategic and tailored health promoting interventions in online communities and for interventions in other online environments to promote desired behaviours stipulated by community guidelines. Such gentle and respectful interventions would need to take careful account of factors such as age, gender and the individual's role within the online community.

This study has particular relevance for users of online health-promoting communities and organisations engaged in health promoting activities, especially those operating online and seeking to minimise risks to their members' health. This research may also encourage online communities and other social networks not focused on health promotion to consider developing strategies to reduce prolonged sitting time and encourage healthier behaviours. Follow-up studies are needed to determine the sustainability and applicability of my conclusions and recommendations in emerging online communities, where smartphones and 'apps' are the primary means of internet access, and where wristbands can conveniently and unobtrusively monitor physical activity and sedentary behaviour.

The declaration page
is not included in this version of the thesis

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Firstly, I would like to thank the wonderful members of the HeartNET site for allowing me into their online world. Your openness and honesty enabled me to conduct and complete this study. To my supervisors, Dr Leesa Costello and Dr Julie Dare, I thank you both from the bottom of my heart for your encouragement, advice and friendship. Your support throughout this entire process has been unwavering, and I can't express the gratitude I have for you both. Please know that you were critical in me achieving this goal and I feel very privileged to have been given the opportunity to be able to work with two fantastic mentors.

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Chapter 1. Introduction and background

Increasing everyday reliance on cars, computers and the internet fosters and supports sedentary lifestyles and prolonged sedentary behaviour. This research is a response to both the growing recognition of the health risks associated with the developed world's increasingly sedentary lifestyles and behaviours and the increasing use and popularity of online communities.

Even a basic search on Google or social networking sites (such as Facebook, Twitter and YouTube) now locates thousands of online communities, including some online health-promoting communities specifically developed and operated to promote the health of their members. These health-related communities focus on a range of general health issues, such as pregnancy and children's health, and those related to specific disease or health conditions, such as arthritis, breast cancer, diabetes and cardiovascular disease. While Australia's 'BeyondBlue' (www.beyondblue.com.au) serves those seeking support and information about psychological conditions around depression, anxiety and bipolar disorder, the 'Patients like me' community addresses a range of diseases. Other online sites focus on health promoting activities such as efforts to stop smoking, to counter obesity or to increase physical activity.

Physical activity has long been seen as promoting health and reducing risk factors associated with sedentary behaviours. A compelling body of evidence (e.g. Hamilton, Healy, Dunstan, Zderic, & Owen, 2008; Katzmarzyk, Church, Craig, & Bouchard, 2009) has, however, now shown that prolonged sedentary behaviour generates health risks even for individuals meeting the recommended levels of physical activity. As prolonged inactivity is associated with cardio-metabolic risk, sedentary behaviour is of particular concern for people with existing heart-health conditions.

Paradoxically, the individuals gaining health and social support benefits from their engagement with online health-promoting e.g. communities (Costello, 2009) and other social networking sites may also be risking their health if they sit for prolonged periods while using these sites. These communities and other online environments concerned to 'do no harm' need to acknowledge, explore

and address the risk that engaging in online activities at work or at leisure may be encouraging and contributing significantly to prolonged sedentary behaviours.

Significance of this research

This study refrained from positioning participation in interactive health-focused websites as counter-productive. Instead, it accepts that the online world (which, for the purpose of this thesis includes all manner of social networking and online communities) is as an integral part of everyday life. It relies on the assumption that most health promotion programs in this day and age will incorporate an online component. Hence, this research investigated the significance of physical activity and sedentary behaviour in relation to online community participation in order to understand some of the implications for our increasing engagement with the internet.

More specifically, this research project investigated understandings, intentions and practices relating to physical activity and sedentary behaviour among members of one online health-promoting community, including the degree to which their online activities may be contributing to sedentary pastimes. Understandings from this research will assist future initiatives to introduce ways to better manage concurrent health risks relating to physical activity and sedentary behaviour by retaining the health-enhancing attributes of these communities and minimising the risks associated with sedentary behaviour and prolonged sitting specifically.

This study is, therefore, of particular relevance both to users of online communities and to organisations engaged in health promoting activities online who are seeking to minimise risks to their members' health. This research may also encourage broader online communities and social networking sites (e.g. Facebook and YouTube) not focused on health promotion to consider developing strategies to reduce prolonged sitting time and encourage healthier behaviours. Finally, this research is also relevant to health practitioners and researchers seeking to motivate individuals, groups, and online users to change behaviours regarding physical activity and sedentary behaviour.

Researcher's background

My work, my studies and my leisure experiences have made me only too aware of the many health conditions that benefit from increasing physical activity and reducing sedentary behaviour. I see increasing physical activity and decreasing prolonged sedentary behaviour as simple, cost-effective ways to significantly improve the health of both urban and remote communities.

Since commencing work as a young nurse at Perth's Princess Margaret Hospital for Children some 28 years ago, my nursing experiences included working in urban and remote communities and a focus on narrowing the gap in the health outcomes of indigenous and non-indigenous Australians. My experiences have heightened my awareness to the many health conditions that could be improved at minimal cost by increasing physical activity and reducing sedentary behaviour.

From 2008 to 2011, I lived and worked on Groote Eylandt, a small island off the Northern Territory coast and completed a Post Graduate Certificate in Indigenous Health and a Post Graduate Diploma in Public Health by online study. Since returning to Perth, I have worked as Health Promotion Coordinator for an Aboriginal medical health service.

I am all too keenly aware of heart patients being one of the many groups that can benefit from online and offline support to increase physical activity and decrease prolonged sedentary behaviours. Physical activity is an important strategy to reduce the incidence of cardiovascular conditions that The National Heart Foundation of Australia (2010) highlighted as the major cause of death for Australians and an even greater threat to the health of indigenous Australians.

My own health service holds a weekly Heart Health group, where Aboriginal people can come together, find support and advice, access essential services and have a yarn (chat) with other heart patients. Our Heart Health group, which had only 10 members a few years ago, now has between 50-70 members and walking is one of its most popular activities. While the current members of this group have little interest or enthusiasm regarding the online world, this could soon change as smart phones and WiFi make internet access more convenient

and affordable. Online support and interventions are already becoming expected elements of health interventions and younger Aboriginal people are now even more enthusiastic users of social networking sites than other young Australians (B Carlson, 2013; B Carlson, 2014).

Prior to commencing this research, I was not a member of any online community, nor involved in social networking beyond my online studies. My studies and work have however required me to sit at a computer for extended periods of time each day. While considering my work and leisure behaviour is generally more active than sedentary, I still have difficulty remembering to get up and take a break from seated screen-based work. Walking meetings still seem a novelty even in my workplace, where workstations encourage sitting rather than standing. I thus have personal experience of the challenge of finding ways to work and relax that encourage physical activity and minimise sedentary behaviour.

By allowing me to explore the significance of physical activity and sedentary behaviour for members of online health promoting communities, this research project has therefore brought together many of my personal and professional interests. Having begun my research well before the emergence of any widely accepted guidelines on minimising the health hazards of sedentary behaviour, I am delighted to be part of the growing number of researchers seeking to use online communities and resources to maximise physical activity and minimise sedentary behaviours.

Research aims

This study investigated whether and how members of a heart health community could gain benefits through online support and advice regarding physical activity and sedentary behaviour without risking their health through prolonged sitting.

The purpose of this research was therefore to:

- use qualitative methods to gain a deeper insight into the lived experience of members of an online health-promoting community regarding any limitations in achieving their physical activity recommendations, their tendencies to engage in

prolonged sitting, and how these factors might be linked to participation in their community and use of social networking sites,

- gain insight and understanding into how online communities and social networking sites can contribute to prolonged sitting,
- raise awareness of the risks potentially incurred by online activities involving prolonged sitting, even when physical activity recommendations are met,
- identify and advocate strategies that online communities and networks can use to address the health hazards of sedentary behaviour, and
- promote the inclusion on the public health agenda of potential health risk arising from the use of online communities and social networking sites that fail to recognise and address the health hazards of sedentary behaviour.

Research questions

My overarching research question was: 'What can the study of a single online community focused on heart health reveal about the significance of physical activity and sedentary behaviour for members of online health promoting communities?' The specific sub-questions are included in Chapter 3.

Chapter outline

This chapter has provided initial background into the health risks associated with sedentary behaviour, irrespective of physical activity adherence. Chapter 2 outlines the available literature in order to position the significance of the research. Chapter 3 discusses the research approach and methods used to collect and analyse data from the online survey and netnography. Chapter 4 presents the findings of the research and chapter 5 discusses the findings from the data collected. Finally, Chapter 6 draws conclusions and makes recommendations from the research and for further research studies.

Conclusion

This chapter has provided background to my research project, outlined the questions to be addressed and the chapters to follow. The next chapter provides a review of the relevant literature.

Chapter 2. Literature review

Introduction

My review of the literature relating to my overarching research question, 'what can the study of a single online health-promoting community reveal about the significance of physical activity and sedentary behaviour for its members?' has three parts:

- Part 1 - Review of the current knowledge regarding the measurement and significance of physical activity and sedentary behaviour,
- Part 2 - Review of the general online community literature and methods used to study them, and
- Part 3 - Review of the specific literature on online health-promoting communities and methods used to study them.

Part 1 - Review of the current knowledge regarding the measurement and significance of physical activity and sedentary behaviour.

Physical activity is defined as any body movement that works muscles, uses energy and improves the cardiovascular system (Saxton, 2011; Warburton D, 2006). Overall, it is considered a 'good thing' given it is linked to better health and quality of life (Reiner, Niermann, Jekauc, & Woll, 2013) . For example, exercise and other forms of physical activity assist with the uptake of glucose metabolism in the body, help reduce body fat, and protect against undesirable health conditions (Warburton D, 2006). A significant body of epidemiological evidence (e.g. Haskell et al., 2007; Reiner et al., 2013) shows that physical activity reduces the risk of debilitating chronic health conditions such as heart disease, type II diabetes, osteoarthritis, obesity and some cancers. Hence, maintaining adequate levels of physical activity helps to manage and prevent chronic disease such as diabetes and heart disease, which are now regarded as 'lifestyle' conditions (Health, 2014).

Participation in regular or daily physical activity offers other health benefits such as improved mood and mental health (K. Fox, Stahi, McKenna, & Davies, 2007) and easier maintenance of an ideal body weight (Skidmore & Yarnell,

2004). Steinmo, Hagger-Johnson, and Shahab (2014) found that greater physical activity from midlife to old age is associated with better mental health and vice versa. Though older adults are more sedentary than other adults and even active older people have high levels of sedentary time, cultural norms (ie; typical behaviour patterns that take place in the context of their own specific culture) influence whether the sedentary time is seen as pleasant and a positive contribution to well-being (Withall et al., 2014).

Some researchers have focused exclusively on physical activity impacts on men's health. Hakim, et al. (1998) found that non-smoking retired men who walked two-to-three kilometers every day had less risk of developing heart disease than men with a less physically active lifestyle. Studies examining the impact of physical activity on women's health include a recent randomised control study by Kelley, Kelley, and Kohrt (2013) who found that premenopausal women who exercised daily had better femoral neck and lumbar spine bone density. For children and adolescents, Armstrong, Hills, and King (2007) found that physical activity supports their growth and development.

Fotheringham, Wonnacott, and Owen (2000) and Lees and Frank (2004) regarded inactivity as an actual cause of death. Warburton D (2006) reported a reduced incidence of both premature morbidity and mortality in populations who were physically active and suggested people needed to participate in at least 30 minutes of daily exercise to improve health outcomes. Thirty minutes of moderate intensity activity is now widely accepted as desirable for good health in both men and women (Health, 2014) and organisations such as the World Health Organisation and the National Heart Foundation of Australia promote the benefits of living a physically active lifestyle.

Extent of inactivity and sedentary behaviour

Despite the consensus amongst health experts on the importance of exercise, lack of physical activity remains a global health issue impacting all age groups (Australian Bureau of Statistics [ABS], 2012; Chen, Zheng, Yi, & Yao, 2014). This is particularly worrying for future generations. For example in the UK, 4.5 million children and young adults aged between 11-25 years were not achieving the recommended level of daily physical activity (Evans, 2014). In

Australia, around 62% of adults did not meet the recommended physical activity guidelines in 2007-08, with a slightly higher proportion of women (64%) not meeting the guidelines than men (60%) (Australian Bureau of Statistics [ABS], 2009b). It would seem, therefore, that Australians are still leading relatively sedentary lifestyles. For example the Medibank (2009) *Stand Up Australia* study found that 131 call centre workers spent 77% of their work day sitting down. The same study also showed that individuals who sat for a considerable amount of their work time were also likely to engage in sedentary pastimes when not at work. More recently a workplace study by Healy et al. (2012) found that the incidence and severity of musculoskeletal complications for employees would be reduced by taking breaks from prolonged sitting. Furthermore, while sitting time is also linked to obesity, the association may be bidirectional (Pedisic et al., 2014).

Over 10 years ago, Fotheringham et al. (2000) regarded computer use as “an increasingly common sedentary behaviour potentially displacing physical activity” (p. 269). Their study of a large group (n= 700) of men and women aged between 18 and 30 years, examined whether time spent on computers was a barrier to actively engaging in physical activity. Their results, indicating that participation in online activities took time away from physical activities, provided early evidence of the degree to which computer use, online activities and screen-based entertainment may displace physical activities, especially outdoor physical activities. Since then, the health impacts of screen time has remained an active area of research (Davies, Vandelanotte, Duncan, & van Uffelen, 2012).

Too much sitting or too little exercise?

Studies which focus on inactivity and sedentary behaviour are now distinguishing between the problems of ‘too much sitting’ and ‘too little exercise’. The body’s adverse reactions to prolonged sitting do differ from its reaction to physical activity such that sedentary behaviour has its own unique effects on health outcomes (Bauman, Brown, & Owen, 2009; Hamilton et al., 2008). As a result of this knowledge, a significant body of recent epidemiological evidence (e.g. Owen, Sparling, Healy, Dunstan, & Matthews, 2010; A Thorp, Owen, Neuhaus, & Dunstan, 2011) has documented the health risks associated with

sedentary behaviour even where daily physical activity recommendations are adhered to.

While most of the research currently underpinning the bio-medical and physiological evidence around prolonged sitting hazards tends to be quantitative rather than qualitative, the study of inactivity and sedentary behaviour has increased. As such, my study which utilises a qualitative netnographic design adds methodological diversity to this growing body of research.

Of the quantitative studies, however, Hamburg, McMackin, Huang, and Shenouda (2007) found that healthy adults ($n=22$) who volunteered for five days of complete bed rest (23.5 hours a day) experienced significant increases in total cholesterol, triglycerides, glucose and insulin resistance. This extreme example highlights the negative impacts of prolonged inactivity on metabolic health. Other physiological and bio-medical studies (D. Dunstan et al., 2004; A Thorp et al., 2010) confirmed the relationship between sedentary behaviours and deleterious effects in metabolic function and vascular health. Even respiratory problems have been linked to prolonged sitting, with Peeters, Lips, and Brown (2014) reporting that middle-age women developed subsequent breathing difficulties and chest pain.

Prolonged uninterrupted periods of inactivity due to desk-bound jobs (Healy et al., 2012), an increasing reliance on vehicles (Warren et al., 2010), television viewing, and other screen-based activities have a negative effect on metabolic health (D. Dunstan et al., 2005) and cardiovascular health (e.g. Crichton & Alkerwi, 2014; Jakes, Day, Khaw, & Luben, 2003; Martinez-Gomez et al., 2010). Several studies (e.g. Davies et al., 2012; D. Dunstan et al., 2010; Healy et al., 2008; Jakes et al., 2003) examined the relationship between viewing time and cardio-metabolic health and Ford, Kohl, Mokdad, and Ajani (2005) found associations between television viewing and metabolic syndrome. Research by Hu, Li, Colditz, Willett, and Manson (2003) for example, noted that an increase of two hours of television viewing time per day meant a higher risk of type II diabetes in men and women. Similarly, Gardiner et al. (2011) found a detrimental association between television viewing time and abnormal glucose metabolism.

This association could reflect the direct consequences of sitting or of habits such as snacking that often accompany the activity of sitting to watch television.

As Altenburg, Lakerveld, Bot, Nijpels, and Chinapaw (2014) note, most studies on the health impacts of sedentary behaviour have “focused on TV time, few also included other sedentary behaviours such as computer use and reading, and most studies had a cross-sectional design (p. 1)”. Despite these deficiencies, television viewing can act as a reliable indicator of an overall pattern of sedentary behaviour (D. Dunstan et al., 2010; Sugiyama, Healy, Dunstan, Salmon, & Owen, 2008).

The study conducted by Katzmarzyk et al. (2009) of 17,000 Canadians demonstrated an increased risk of death from all causes (excluding cancer), and found this causal relationship was stronger for individuals who sat for longer periods than for individuals who did less sitting. It is thus not the computer use, car travel or the television viewing per se, which creates the health risk, but rather the prolonged uninterrupted inactivity which usually accompany these activities.

With recognition that the health risks from sedentary behaviour persist even after physical activity recommendations are adhered to, prolonged inactivity has become a new public health concern (D. Dunstan, Howard, Healy, & Owen, 2012; Hamilton et al., 2008; Owen et al., 2010). That is, it is equally important to promote efforts to achieve 30 minutes of exercise, say by cycling to and from work, as it is to advocate the need to reduce sedentary behaviour throughout the remainder of the day. Furthermore, the health risks associated with prolonged uninterrupted inactivity are likely to be exacerbated for those individuals (e.g. individuals recovering from heart events) who sit for long periods and do not meet physical activity recommendations.

Dunstan et al. (2008) examined prolonged sedentary time and the practice of taking regular breaks in relation to cardio-metabolic and inflammatory biomarkers in physically active adults. They found sitting for longer than two hours increased levels of glucose and triglycerides in blood plasma and suggested individuals needed to break up their sitting time to prevent production of harmful enzymes. Age and gender may, however, influence the health benefits associated with reduced sitting time or increased physical activity. For example,

work by Peeters et al. (2014) showed the combination of increased physical activity and low levels of sedentary behaviour may contribute more substantially to women's physical function before the age of 75.

Reducing inactivity and prolonged sedentary behaviour

During the 1970s, the 'Life be in it' health campaign (<http://www.lifebeinit.org>) encouraged Australians to 'live more of your life' and become more physically active. However since then, Australia's population has however become older, more sedentary and more obese (Australian Bureau of Statistics [ABS], 2012, 2013). Calls to increase levels of physical activity are therefore unlikely to adequately reduce health risks associated with sedentary behaviour. Hence, the leading researchers on health hazards of inactivity (D. Dunstan et al., 2012; Owen et al., 2010) have advocated for new public health strategies and relevant interventions.

Owen et al., (2011) described an ecological model highlighting the potential for settings - the places in which people live, work and play – to increase physical activity and reduce sedentary behaviour. However, the important but not overwhelming influence of environment in this model is evident when the Australian situation is considered: a nation with a favourable climate for outdoor activity, a population living for the most part in close proximity to the coast and with access to a wide range of facilities for sport and activity, continues to host a largely sedentary, car-dependent and increasingly obese population (Australian Bureau of Statistics [ABS], 2008, 2009a, 2012, 2013; Australian Institute of Health and Welfare [AIHW], 2008).

Although, the capital cities which house most of the Australian population still encourage travel by car over walking, cycling and public transport. Perth and Sydney have higher rates of public transport use (Mees & Groenhart, 2014). Fishman, Washington, and Haworth (2012) report that while the incidence of bicycle commuting is only around 1-2% in most Australian cities, cycle commuting is higher in Darwin (3.4%) and Canberra (2.6%). Australia's sport and activity facilities include parks, public swimming pools and a wide range of commercial and non-profit fitness centres and programs, offering activities ranging from Tai Chi (Lan, Chen, Wong, & Lai, 2013; Wang, Bannuru, Kupelnick, Tammy, &

Schmid, 2010), yoga (Netz & Lidor, 2003) to trademarked programs such as the Les Mills fitness classes (Khan, Marlow, & Head, 2008) and Zumba (Benham, Hall, & Barney, 2013), now popular throughout the Western World's leisure centres. Clubs, community organisations and retirement villages offer outdoor recreational activities such as golf, tennis and indoor activities such as keep fit classes, dance classes and carpet bowls (Nathan, Wood, & Giles-Corti, 2013).

Alongside Australia's regular sporting competitions, there is growing interest and participation in charity challenges and mass participation events such as 'City to Surf' runs in Sydney (<http://www.city2surf.com.au/>) and Perth (<http://www.perthcitytosurf.com>) and open water swimming events such as Sydney's Cole Classic (<http://www.coleclassic.com.au>), and Perth's Rottnest Channel swim (<http://rotnestchannelswim.com.au>) and bike rides such as Perth's Santos Great Bike Ride for Charity (<http://www.greatbikeride.com.au/>) and Ride to Conquer Cancer (<http://www.conquercancer.org.au>). Focusing on cycling, Coghlan (2014, p. 87) notes:

...charity challenge events can play a role in introducing individuals to the physical health benefits of cycling, and encourage mental health and well-being through the creation of new social relationships, development of a sense of achievement, and experiencing positive emotions.

As Lamont and Kennelly (2012), note neither small hopes of finishing in the top three nor the physical and mental anguish linked to contesting endurance sport events deter thousands of amateur athletes from competing in these charity challenges and endurance events. While these events may only be staged annually, participants may spend many months training for them using training regimes so strenuous, that they can be difficult to combine with full-time work (Lamont & Kennelly, 2012). The extent to which preparation and training for these events can dominate participants' lives means that this form of amateur sport constitutes what Stebbins (2007) labels 'serious leisure'. Lamont and Kennelly (2012) found the mix of intrinsic motivations (competence, enjoyment) as well as extrinsic motivations (wellbeing, ego involvement, external rewards, sociability, self-transformation, enduring commitment, and consolidation) varied with

participants' length of involvement in triathlon and their level of ambition. While likewise identifying themes of transformation and 'pushing limits', Bridel's (2013) study of ironman triathletes queried the healthiness of many practices in this form of extreme sport.

Walking nevertheless remains the most popular physical activity (Australian Bureau of Statistics [ABS], 2009a, 2012; Briffa et al., 2006; Nathan et al., 2013). Many other types of non-exercise physical activity such as house work, gardening, washing the car or physically active work contribute significantly to individual's total physical activity (Hamilton et al., 2008). However, few Australian workplaces now require workers to engage in significant amounts of physical activity (Healy et al., 2012). As Yates et al. (2011) note "the widely promoted "Lean Business" approach where human motion is explicitly viewed as "waste", has resulted in a workforce increasingly enslaved to their desks and computers" (p. 294). Workplace cultures which implicitly inhibit incidental physical activity reflect structural barriers (Fanany, 2012) which are often beyond an individual's capacity to modify, and suggest that while settings such as workplaces offer the potential to promote health they often fall far short (N. Owen et al., 2011).

Similarly, structural barriers such as inflexible work schedules including shiftwork and 'fly-in, fly-out' patterns, lack of available time, financial constraints, safety concerns, and limited infrastructure such as parks, lighting and secure bike storage facilities at train stations, may discourage or prevent individuals from being physically active, even where they are motivated. For example, Giles-Corti and Donovan's survey of 1773 people living in Perth revealed, walking as a form of physical activity is influenced by a complex mix of individual and structural determinants, including easy access to attractive open spaces, and having others to walk with (Giles-Corti & Donovan, 2003).

Table 2.1 below classifies the perceived barriers and enablers regarding physical activity reported by various researchers (Giles-Corti & Donovan, 2003; Napolitano, Papandonatos, Borradaile, Whiteley, & Marcus, 2011; Rosenkranz, Kolt, & Berentson-shaw, 2013; Withall, Jago, & Fox, 2011), into individual and structural determinants. Similar cataloguing of the barriers to reducing sedentary

behaviour would assist in the development and implementation of strategies to promote increased physical activity and reduced sedentary behaviour.

Table 2-1. The barriers and enablers of participation in physical activity

Individual Determinants	Structural Determinants
<ul style="list-style-type: none"> • Self-efficacy / confidence • Knowledge about benefits of physical activity for health and wellbeing • Fear of falling / injury • Reluctance to try new activities • Poor tolerance of discomfort (e.g. minor aches and pains) • Body image issues • Lack of interest or enjoyment in physical activity • Positive or negative outcome expectations • Health goals • Planning, organisational and time-management skills • Self-discipline • Fatigue • Poor health or injury • Literacy skills • Functional ability • History of sedentary behaviour • Lung capacity 	<ul style="list-style-type: none"> • Neighbourhood crime levels (or perceptions of crime) • Safety concerns (e.g. fear of crime, stray dogs etc.) • Culturally appropriate support for physical activity • Opportunities for active transport (e.g. availability of dedicated pedestrian and/or bike paths; public transport options) which are supported in the community • Heavy work commitments • Inflexible work schedules (including shiftwork and FIFO) • Long commuting times • Level of domestic and/or caregiving responsibilities • Access to support and guidance from health professionals • Positive social environment (e.g. supportive family and friends; having a companion to walk or exercise with (e.g. friend or pet) • Weather conducive to outdoor exercise, or access to indoor exercise facilities

	<ul style="list-style-type: none"> • Easy and affordable access to sport/recreation/exercise equipment and activities • Access to attractive outdoor spaces • Income
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(Giles-Corti & Donovan, 2003).

Table 2.1 serves as a reminder that while many barriers relate to individual factors which are relatively simple to address through health education programs, many others, such as limited financial resources, or inflexible work schedules, are less amenable to change at the individual level. The balance between an individual's capacity or self-efficacy to change (agency), and the degree to which their ability to do so is influenced by broader social structures (structure), reflects the debate between structure and agency (Sewewll, 1992). In relation to physical activity, an individual may understand the need to be more physically active and be motivated to do so, but lack the necessary resources or opportunities to translate their motivation into action. In this context, health promotion interventions need to acknowledge these broader determinants which constrain individual choices and behaviours, and, where possible, develop interventions which extend the focus beyond the individual to consider the broader social context. Such an approach was recommended by Giles-Corti and Donovan, who concluded that:

if there are to be increases in walking among the general population, a comprehensive strategy must be in place that influences individuals as well as creates more supportive social and physical environments. Such a strategy will require a multilevel approach that involves both the health sector and transportation, planning, and local government agencies (Giles-Corti & Donovan, 2003, pp. 1583-1589).

In addition, the relative importance of barriers and enablers will be influenced by each individual's present state of health, fitness, activity and prior experiences of physical activity, as well as by their environment and culture,

including views of healthy aging. For example Dionigi, Horton, and Baker (2011) found inactive older Canadian women embraced old age and prioritised “being helpful to others, maintaining a positive attitude, allowing for continued stimulation, and adapting to changes” (p. 415) over regular exercise and physical activity. By contrast, the moderately active older Canadian women prioritised ‘keeping busy’ or engaging in non-exercise activity or light exercise (Dionigi, Horton, et al., 2011). These moderately active women “typically believed that healthy aging could be maintained by keeping busy and active through gardening, travel, socialising, housework, mental stimulation, and inactive leisure such as reading, watching movies, and listening to music” (Dionigi, Horton, et al., 2011, p. 415). The older active Canadian women believed “keeping active and busy were means to generate, maintain, and signify health and success” (Dionigi, Horton, et al., 2011, p. 415). Physical literacy and personal history of sport and exercise will also influence the types of activity individuals find doable and pleasurable. Learning to swim or ride a bike are for instance skills many Australians master in childhood.

Further research on the benefits of incidental exercise, including use of active forms of transport such as walking (Audrey, Procter, & Cooper, 2014) and cycling in increasing physical activity (and subsequently reducing sedentary behaviour) is needed to inform health promotion programs. Efforts to increase physical activity and reduce sedentary behaviour in workplaces, (Carr, 2008; A. Thorp et al., 2009), schools (Chia & Suppiah, 2013) and public health programs (Baker, Francis, Soares, Weightman, & Foster, 2011; The National Heart Foundation of Australia), clearly need to address many different kind of barriers. Some of these efforts have employed sit/stand desks and seated active workstations (Neuhaus et al., 2014; Tudor-Locke, Schuna, Frensham, & Proenca, 2014) or use of phone or computer-mediated communications to provide information or support behaviour change (Gorczynski & Patel, 2014; Vandelanotte et al., 2014). Both the recent *Unplug and Play* campaign supported by Australia’s National Heart Foundation, and the *Switch-Play* trial (Salmon, Ball, Hume, Booth, & Crawford, 04/2008) addressing obesity and physical inactivity in Australia’s school-aged children did, however, position use of modern screen-based technology as problematic for health. While this thesis recognises that

these new technologies tend to go hand in hand with prolonged sitting and inactivity, technology is not inherently bad for health; the solution lies in how we seek to use it in the future in a way that minimises risks and enhances the many benefits provided.

While no official guidelines specified how much sitting time constituted ‘minimal’ risk at the commencement of my study, Australia’s National Heart Foundation issued a fact sheet on ‘sitting time’ in 2011 recommending that uninterrupted sitting time should last for no more than two hours. The Australian Department of Health has now released new national physical activity and sedentary behaviour guidelines based on systematic reviews of relevant research (Health, 2014). The guidelines stipulate that prolonged sitting should be broken up by regular breaks for 13-17 year olds, and electronic media should be limited to two hours a day. For those aged between 18-64 years the main priority is to break up their sitting time as often as possible to reduce potential health risks (Health, 2014).

Even with such guidelines, people are often poor at monitoring their own physical activity (Prince et al., 2008) and sedentary time. *The Stand Up Australia* study (Medibank., 2009) highlighted the human tendency to underestimate overall sitting time which means that most people will not be taking breaks when they should. This is a significant problem given underestimations of time are considerable: The Australian Diabetes, Lifestyle and Obesity Study found that accelerometers objectively recorded sitting times of up to 500 minutes per day for participants who self-reported that they spent only about 300 minutes per day sitting (Tanamas et al., 2013). The increasing affordability of accelerometers (which are now embedded in many smartphones) and the introduction of wearable technology such as fitness bands, has expanded the opportunity to monitor sedentary time (Griffiths et al., 2012). While these new gadgets are promising, other internal and external factors ultimately affect an individual’s decision to increase activity and reduce sedentary behaviour. Therefore asking people to monitor their sitting time may still not be adequate to change behaviours.

Bandura's (1997) theory of self-efficacy can be used to investigate and understand an individual's propensity to increase physical activity or reduce sedentary behaviour. This theory is based on the premise that performing a particular behaviour is hinged upon their perceived ability to successfully perform the required behaviour, as well as the importance or value the individual places on the outcome of the behaviour performed.

Likewise, one's readiness to change a particular behaviour is addressed through application of the stages of change theory (Prochaska & DiClemente, 1983), which treats behaviour modification as a process rather than an event. As Napolitano et al. (2011) point out, cognitive processes are predominately engaged in the earlier stages of change, while behavioral processes are predominately engaged in the later stages of change. The process can be applied both to individuals who self-initiate behaviour change, and to those responding to external encouragements, such as advice from health professionals or health promotion campaigns (Carr, 2008; Mochari-Greenberger, Terry, & Mosca, 2010). The stages of change theory has already been applied successfully in programs to quit smoking, modify addictions, increase exercise and manage stress and diseases (Arthur et al., 2009; Burbank & Riebe, 2002; Marcus et al., 1992).

The stages of change theory seeks to progress individuals attempting to change their behaviour through a series of steps which reflect differences in their readiness to change. It does, however, acknowledge that readiness may regress once the next stage is reached. Harris et al. (p. 19) describe five specific stages (and see Figure 2.1 below) :

- 1) Pre-contemplation, where individuals are not ready or not considering changes to their behaviour;
- 2) Contemplation, where individuals are considering making changes to modify their behaviour;
- 3) Determination, where individuals are ready for change;
- 4) Action, where individuals have begun to make changes to their behaviour; and

5) Maintenance, where the individual maintains the desired behaviour and changes are reinforced through perceived health gains, benefits and accomplishments.

In addition, to the five specific stages there is 'relapse' which is not always referred to as a stage in itself; instead it refers to the risk of returning (relapsing) from either the Action or Maintenance stage to an earlier (non-active) stage.



Figure 2.1 Stages of Change

While each stage of change can address specific barriers or circumstances, other influences may prevent progression. For example, adherence to recommended levels of physical activity is known to be reduced for people with existing chronic diseases such as heart disease, particularly if they are concerned (or fearful) that exercise or other forms of physical activity may trigger a heart event (Costello, 2009). However, if these types of barriers can be overcome and the new behaviour 'mastered', there is a higher likelihood that individuals will adopt the behaviour as routine (Bandura, 1997). Hence, Bandura's self-efficacy, which is also relied upon as a theoretical underpinning for this research, may progress people to the next stage of change. In particular, feedback on progress towards goals can enable mastery and learning (resulting in higher self-efficacy) which is important for physical activities in childhood (Salmon et al., 2005) and for behaviour changes in adults (Artinian & Franklin, 2010).

Part 2 - Review of the general literature on online communities and methods used to study them

Because the internet is not limited by distance and can be accessed by people at all hours, it facilitates encounters between strangers who might never encounter each other in the offline world. In the early days of the Internet, Rheingold (1993) noted online interaction between strangers were creating 'virtual communities':

Social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace (p. 3).

Many early studies of online communities sought to establish whether these could be considered legitimate communities and how they differed or compared to offline communities. Once Web 2.0 technology further enabled delivery of services to address the unmet needs of those bound by geographical remoteness (Pink, 2006), many websites moved away from merely *providing* information to users to *sharing* user-generated content. Web 2.0 enabled people to use social networks (such as My Space, Facebook, LinkedIn, Twitter and YouTube) to connect, find friends, converse with others, and search and retrieve relevant information (Simonson, 2008).

Social networking sites typically allow users to create personal online profiles so that they can connect and interact (i.e. network) with others - primarily family and friends - via the internet (Kozinets, 2010), and the public display of connections to others is a key feature of these sites. Kozinets therefore distinguishes between social networks as usually characterised by strong bonds between friends who are already known to each other, by contrast with the online communities that more often result from people seeking out new friends and social support due to a shared interest or circumstance (such as an addiction, illness, injury or disability). For the purposes of this research, however, the distinction between online community, social networks or social networking sites was less important; although their differences are noted and respected.

Because they offer a plethora of information about the interests and purchasing habits of members, online communities have been of immense significance for commercial and marketing purposes (Kozinets, 2002, 2010; Lamb & Johnson, 2007). The growing use of smartphones and tablets has increased the accessibility, appeal, and significance of online communities. Hence, research now tends to be less focused on their establishment or legitimacy and more focused on their sustainability and the value derived by their members.

As Sun, Rau, and Ma (2014) noted, investigations of the activity and structure of online communities have consistently shown that a small proportion of their members/users generate most of their content. It has become traditional to distinguish between posters or contributors of content and lurkers, the silent consumers of this content. Rather than focus on converting all lurkers to posters, Sun et al. (2014) suggest a need for better methods to “evaluate the health of online communities” (p. 116) and the appropriate number of lurkers (compared to posters) that an online community can support or sustain. However, guidelines on the management and use of online communities have remained firmly focused on addressing issues around bullying and other forms of abusive behaviour, invasions of privacy, and infringements of intellectual property, rather than cultivating appropriate lurker-to-poster ratios as an indication of the ‘health’ of online communities’ (Sun et al., 2014).

Techniques used to study online communities

Techniques used to study online communities include online surveys, interviews, focus groups and lifecycle studies plus a range of ethnographic techniques which have produced rich, thick descriptions of the lived experiences of the individuals or groups which use them (Crotty, 1998). Most often, ethnographic researchers immerse themselves into the group or community being investigated so they can develop authentic descriptions of the cultures they experience.

Ethnographic studies of online communities are typically underpinned by either an interpretivist or a constructionist perspective. As Crotty explains, interpretivism explores the beliefs, values and attitudes that influence people to

act in a certain manner, while constructionism recognises that ‘meaning’ is constructed, rather than discovered, by individuals’ own perceptions or realities. Thus ethnographic research is concerned with exploring “the meaning of actions and events to the people we seek to understand” (Spradley, 1999, p. 5). Often this occurs through extended observation, but for some ethnographic researchers, participation is a critical aspect. As Hine noted, “the researcher does not just observe at close quarters, but interacts with the researched to ask questions and gain the insights into life that come from doing as well as seeing” (2000, p. 47).

Netnography

The emergence of online communities has provided opportunities for ethnographic researchers to participate in innovative and exciting ways. Netnography, developed by Robert Kozinets in the 1990s specifically for the study of online cultures and communities, is a form of ethnography because it is naturalistic, immersive, descriptive, adaptable and uses multiple methods. His intention was that both the researcher and the participants engage in dialogue that is shared, created, interpreted and constructed online. Netnography therefore represents an ideal methodology to explore the dynamics of online communities from a ‘bird’s eye’ perspective.

More specifically, a netnography offers a way to “study the cultures and communities emerging through computer-mediated communications” Kozinets (2002, p. 2) and provides researchers “with a window into naturally occurring behaviour” (p. 3). In his most recent text, Kozinets (2010) emphasises the need for the researcher to engage frequently with online community members in order to understand and distinguish between any fresh, novel, or commonplace dialogue generated. In order to guide researchers embarking on this approach, he established five key principles which ground the netnographic process:

- 1) *entrée* stage or process of initial entry into a new culture or community to assist in determining a suitable target population,
- 2) gathering and analysing data,
- 3) ensuring trustworthiness,

- 4) ensuring ethical research, and
- 5) providing opportunities for feedback from participants.

The netnographic methodology relies upon the online setting to gain insights about social realities and demands that the research be relatively 'free' from theories and any predisposed notions of thinking that might prevent or conceal underlying insights to be revealed and considered (Ward, 1999). This allows findings to be derived from a real world setting where the "phenomenon of interest can unfold naturally" (Patton, 1990, p. 39).

For Kozinets, the two major ethical issues for conducting netnographic study relate to the questions: "Are online forums considered a private or a public site?" and "What constitutes 'informed consent' in cyberspace?" (Kozinets, 2010). His principle of trustworthiness, cited as step 3 in the list above, can also be considered an ethical issue, usually undertaken by the checking of data and resulting interpretation.

One particular challenge with netnography is that the quantity of electronic texts produced in online settings can inadvertently create the problem of surplus material resulting in information overload. Kozinets believes researchers can overcome this by identifying and becoming familiar with the amount of online traffic and postings by members and understanding the nature of interactions between members.

While netnography was developed in contexts relating to marketing and branding, it has been used in fields as varied as health promotion and tourism. For example, a study of by Ismail (2010) utilised a netnographic methodology to investigate the product loyalty of British consumers within the context of tourism in Egypt. In terms of public health, it has been used to investigate sensitive research topics such as cosmetic surgery (Roy & Suzanne, 2005) and problem gambling (Mudry & Strong, 2013). This broad application demonstrates that netnography has come of age and indicates that it is a reliable and respected methodology.

Part 3 - Review of the specific literature on online health-promoting communities

Health promoting organisations were quick to adopt the use of websites and online communities as a cost-effective means to reach large networks of individuals. Despite health professionals remaining the most preferred information source, “online resources, including advice from peers” have become significant as a source of information on health matters in the USA (S. Fox, 2011) and other countries with large populations of internet users. As well as fostering information seeking and provision, online health-promoting communities have demonstrated their capacity to facilitate positive behaviour change, especially in relation to physical activity, quitting smoking and adopting healthier diets (Bonniface, Omari, & Swanson, 2006; Centola & van de Rijt, 2014; Costello, 2009). The American Heart Association created Go Red Heart Match, a free and secure women-only online program that enabled female heart patient to connect with other women caring for heart patients (Arslanian-Engoren, Eastwood, De Jong, & Berra, 2014). That program helped 75% of its participants to adopt more heart health behaviors such as improving their diet, exercising more often and losing weight, or quitting smoking.

The social support offered by online communities and networks, and the opportunities provided for creativity and constructive engagement with others, have been found to impact positively upon members’ sense of well-being and their quality of life (Lieberman & Goldstein, 2005), promote improved psychosocial wellbeing (Bonniface & Green, 2007a; Green, Bonniface, & McMahon, 2007), and enhance users’ sense of self-efficacy in managing acute health conditions on a day-to-day basis (van Uden-Kraan, Drossaert, Taal, Seydel, & van de Laar, 2009), which links to improved health outcomes (Bandura, 1997). Such communities can support positive behavioural change such as weight reduction, increased exercise and smoking cessation, and can also serve an educative function (Bonniface et al., 2006). As Centola and van de Ritj (2014) note, there is growing interest in how social networking sites influence both “the spread of health information and behaviour change” (p. 1). New technology has meant that online communication tools have advanced from simple bulletin board structures to sophisticated virtual platforms, such as the one described by El Morr

and Kawash (2007). It comprised a personalised self-management module enabling patients with chronic kidney disease to track and report on their symptoms, journal about their health or communicate directly with health care providers. A social networking platform for a fitness-improvement program likewise provided a personalised dashboard, showing user profiles and real-time exercise and health information for the participant and for that person's health buddies (Centola & van de Rijt, 2014).

Müller and Khoo's (2014) systematic review of non-face-to-face interventions highlighted that sustained improvements in physical activity were associated with simple, low-cost, convenient interventions that applied some type of theoretical framework. Most, were "home-based or informal, enabled individual tailoring and self-monitoring" ("Introduction," para 4) and promoted practice of moderate intensity, lifetime forms of physical activity (such as walking and swimming) a few times a week. Their review highlighted the scope for expanding beyond traditional telephone and print-based programs to capitalise on preferences around emailing, social media and other internet-based communications.

Since the rapid 21st century take-up of smartphones, interest in e-health has expanded to include mobile health (mHealth) interventions using mobile devices such as phones and tablets and the apps that run on them (Fiordelli, Diviani, & Schulz, 2013; Klasnja & Pratt, 2012) to assist in management of chronic disease, providing support for health-promoting behavioral change, and the monitoring of critical events and symptoms (Klasnja & Pratt, 2012). Smartphones, for example, have been shown to deliver "novel and engaging intervention strategies" (p. 196) incorporating social networking, user profiles, goal setting, real time feedback, and online expert consultation. Blackman et al, (2013) reported finding over 15,000 (free and paid) health-related apps including apps linked to external technology devices such as fitness bands. Apps aid recording and analysis of physical activity and other health-related behaviours and may use stylised 'glanceable' displays to provide easily decoded but privacy-preserving reports on engagement in physical activity and on progress to weekly goals (Klasnja & Pratt, 2012).

Recent mHealth interventions also aim to facilitate social support by, for instance, linking newcomers with buddies so they can share and compare data such as daily step counts and encourage each other in health-promoting behaviours, share tips, images, and stories and social messages (Klasnja & Pratt, 2012). The Cardiac Rehabilitation (CR) website proposed by Dale et al. (2014) will for instance include a graph with which participants can monitor their physical activity by texting their pedometer counts, which will then be automatically uploaded. Use of competition between individuals and teams as a motivating device has had such mixed results, that Klasnja & Pratt (2012) suggest it should never be more than an optional element. Instead some apps facilitate learning from peer role models about health-related stories, tips and resources.

The forms of entertainment which are used to keep individuals engaged with health goals include provision of light-hearted content as well as health-related information and games, some are designed to be short enough to play in brief periods of free time (Klasnja & Pratt, 2012). Exergaming approaches based on technologies that track body movements or reactions (Arriaga, Esteves, & Fernandes, 2013; Larsen, Schou, Lund, & Langberg, 2013) encourage the playing of indoor or outdoor digital games that involve physical activity of light, moderate or vigorous intensity. Such approaches have particular relevance for sedentary, elderly, or less mobile people. As Klasnja and Pratt (2012, p. 195) note, using location data from mobile devices in conjunction with social networking sites such as Facebook or Twitter could enable creation of ad hoc social networks of people with similar health goals or concerns, helping individuals to connect with others and to get health-related information and advice that is highly customised to their locations, cultural backgrounds, and health situation.

These developments have led to provision of support from online health promoting communities being reconceived as part of more complex health promoting interventions. van Dantzig, Geleijnse, and van Halteren (2013) explored the use of text messaging and an 'app' called *SitCoach* to reduce sedentary behaviour in workplaces, and concluded that raising awareness of the health benefits which result from taking breaks from sitting *and* increasing self-efficacy would enhance the effectiveness of such interventions. While content of

the text messages proved less important than their timeliness, they concluded that interventions to reduce sedentary behaviour needed to be “appealing, respect people’s autonomy and give them control over their behaviour” (p. 1244).

The proposed Canadian e-Platform to promote behavioral self-management in chronic heart failure will involve a package of 28 emails over 12 months to link participants online to accessible multimedia materials and interactive e-tools (Nolan et al., 2014). Dale et al. (2014) proposed trialing a mHealth cardiac rehab program in New Zealand involving text messages, website access and the provision of a pedometer and follow-up phone calls as well as standard cardiac rehabilitation services. Fjeldsoe et al. (2014) propose to trial a ‘Get Healthy Information and Coaching Service’ involving text messages, phone calls, self-report and accelerometer measurements for physical activity.

However, systematic review revealed that these interventions rarely used theory based approaches (Bort-Roig, Gilson, Puig-Ribera, Contreras, & Trost, 2014; van Dantzig et al., 2013). Despite deficiencies in research designs and reporting, mHealth interventions appear effective in promoting physical activity at least over the short term (Blackman et al., 2013). There is however little information available on how well these interventions influence physical activity over periods of time longer than six months (Blackman et al., 2013).

Compared to business-oriented online communities, health promoting communities tend to operate as gift economies (Boulet, Healy, & Helton, 2008) with active members volunteering their time and expertise on an ad hoc basis to mentor and support fellow members, and in the process provide information and support to lurkers or guest users. Fox (2011, p. 3), commented on the “pockets of highly-engaged patients and care givers, who are taking an active role in tracking and sharing what they have learned”. Doyle’s (2014) study of an online community found that participants appreciated the chance to interact with those who had been diagnosed with the same condition, and enjoyed providing support and mentoring.

As Kim and Sundar (2014) noted, it is however, commonplace for non-contributing information seekers in online health-promoting communities to significantly outnumber those who actually offer help to fellow members. They

demonstrated potential to overcome the “lack of social responsibility for contribution” and apprehension by systematically developing ‘online buddies’ imploring users to contribute feedback provided as ‘bandwagon clues’ (p. 319). The stronger the online community, the stronger the bandwagon clues (ie: number of posts by the participants, the number of responses, the number of views and how many times a thread is shared in the online community and the more likely users/members will interact (Kim & Sundar, 2011). Similarly, Stearns, Nambiar, Nikolaev, Semenov, and McIntosh (2014) used social network analysis to inform strategic interventions to increase user engagement in online health forums. While online forums may not technically be acting as communities, credible and positive feedback seems to encourage contributions. Hence, it seems especially important that newcomers to an online community promptly receive such feedback in response to their initial contributions.

Matzat and Rooks (2014) found the effectiveness of online health promoting communities depended on the active support of their members. They also highlighted the need to use “active nurturing and moderation” to address “typical problems of community interaction, such as lack of trust and active engagement” (p. 65). They also found members responded best to indirect positive moderation styles that relied on “relational interests and normative obligations” (p. 65). This implies a netnographic understanding and potential for netnographic interventions to facilitate behaviour changes.

Netnographic study of online health-promoting communities

By using a netnographic approach to immerse herself in one online community to understand the development and culture of Australia’s HeartNET (HN) community, Costello (2009) showed that heart patients found support and encouragement from others online, even where these people were geographically distant and/or living remotely. In their Shuffling Buddies paper, Costello, Omari and Swanson (2006) reported how HN Members posted their physical activity achievements on the Physical Activity forum in the hope it would ‘empower’ and ‘encourage’ others to do the same; what resulted was a buddy-type exercise initiative which, at one stage, was highly effective in motivating

members to increase their physical activity, largely because a spirit of friendly competition, and a type of cheer-squad, emerged among members.

Acknowledging and minimising the harms from online health promoting communities

Given that increasing numbers of people are searching online for health-related information, and in recognition of the Hippocratic Oath ‘to first, do no harm’, organisations involved in providing and promoting health-related information through the internet have an ethical responsibility to minimise harms which users may incur as a result of their use of such sites. Further, health promoters have an incentive and an ethical responsibility to embed strategies to enhance users’ levels of health literacy and comprehension (Parker, 2000), particularly because researchers have reported that users may lack the comprehension level needed to benefit from any specific online interventions (Kemp & Eagle, 2008).

To date, the principle of ‘do no harm’ has been understood in relation to content and online interactions with community members. Other concerns relating to provision of incorrect or unprofessional advice have been addressed by a variety of means including provision of online access to health professionals as well as peers. Members of Australia’s Breast Cancer Click site (www.breastcancerclick.org.au) were, for instance, able to obtain online advice from a qualified and experienced breast cancer nurse (Bradshaw, Witney, Green, & Costello, 2012). A subsequent finding from this site highlighted other harms pertinent to such communities when one member presented a suicide note which left others feeling vulnerable and inadequate in their ability to provide support (Costello, Witney, Green, & Bradshaw, 2012). Similar crises have been reported on HeartNET when a dispute broke out between members (Bonniface & Green, 2007a). They describe how one member’s overly confident and ‘able-bodied’ online persona left another feeling so inadequate that his emotional wellbeing was significantly impaired.

While the vulnerability of online interaction, including bullying and invasion of privacy, have been regarded as causes for concern, the increasing awareness of health risks associated with sedentary behaviour means that the notion of

'harm' needs to be re-conceptualised and expanded in online contexts. If individuals stay seated for long durations while accessing online communities and other social networking sites, awareness of such risks places responsibility on those who administer health-promoting sites to take steps to minimise potential harms incurred by members as a result of their participation. To date, as my colleagues and I have pointed out elsewhere (Costello, Dare, Askander, & McDermott, 2014) this has received negligible attention.

Conclusion

As discussed in this chapter, television viewing plus an expanded range of screen-based activities such as networking, blogging, computer gaming, reading e-books, and online shopping now appear to contribute significantly to prolonged sitting. Despite the benefits of limiting interaction with technology in favour of outdoor activity, prolonged sitting time needs to be treated as a significant and stand-alone public health priority (D. Dunstan et al., 2012; Owen et al., 2010). What is really needed is a greater awareness about the dangers of prolonged sitting complemented by encouragement and support for any physical activity which breaks up prolonged periods of sedentary behaviour, as well as multilevel approaches to address broader structural barriers. Hence, efforts to both reduce sedentary behaviour and encourage physical activity are a health promotion priority, particularly for those groups already in poor health or at risk of poor health.

As the uptake of online interactions in everyday life has the potential to increase prolonged sedentary behaviours, even among users of health-promoting communities, my research is an important first-step towards protecting the benefits that these websites offer whilst minimising the risks associated with their use. In order to achieve this, it was necessary to explore sedentary behaviours and physical activity in the context of a specific online community. The next chapter outlines the way in which this was carried out and the methodology chosen to guide the process.

Chapter 3. Research methodology

Research approach

While several published quantitative studies have investigated the health impact of sitting time, my research uses mixed methods to investigate the significance of sitting time for members and managers of online health-promoting communities, in order to gain behavioural insights regarding sitting time and other sedentary behaviours. Mine appears to be the first study to use a health communications perspective to investigate the relationships between participation in an online community and sedentary behaviour.

Given the limited knowledge available about internet usage contributing to the risk of prolonged sitting, my research was designed to be exploratory in nature. By seeking to understand how sitting time relates to the use and management of one health promoting community, it provides a basis for further research. Studying one specific site afforded the best opportunity to see how the health impact of sitting time associated with sedentary behaviour compares, contrasts and relates to sitting time associated with television viewing and other computer pastimes in relation to sitting.

Choosing to research the HeartNET community

I chose to work with heart patients, a group whose sitting time can significantly impact on their health. Newly diagnosed and chronic heart patients not only have to adjust to physical symptoms, but perhaps more significantly, re-negotiate their own sense of self (Green et al., 2007). A diagnosis of heart disease may therefore act as both a barrier and facilitator to physical activity.

Heart patients who do minimal or no physical activity, heighten their risk of a secondary heart event. These same heart patients compound their health risks, including their risks of a secondary heart event, if they also sit for long periods. Yet, even heart patients who are aware that becoming or remaining physically active can help prevent another heart event often still fear that undertaking additional exercise may provoke another heart attack or event. Such fears and concerns were therefore expected to be a point of discussion for heart patients engaged in an online community.

HeartNET (HN) was selected as an ideal online community for this study. It was created in 2004 by Dr Leesa Costello in partnership with Australia's National Heart Foundation as part of a broader research project funded by the Australian Research Council (ARC). It was designed to support heart patients seeking support, advice, information and friendship from other heart patients. It proved beneficial for heart patients living in urban regions and particularly valuable for heart patients living in geographically remote locations with limited access to advice, care and support (Bonniface & Green, 2007a). Members of HN, whether heart patients, carers or their family members, reported health benefits from their participation on the site, and its value was recognised by both heart patients and health professionals.

Costello's (2009) study was able to draw on an abundance of netnographic data gathered from the HN site. Between 2004 and 2009, HN had a large group of active members (aka HeartNETers = HNs), demonstrated by the number of daily posts to the site in regards to a wide variety of topics of interest to the community (see Costello, 2009). When my study was conceptualised at the end of 2010, the site administrator (Lynsey) at the time (who registered new members, monitored posts, and encouraged online discussion) still regarded the community as relatively active, but less active than when Costello ran the site. My research project was nevertheless seen as an opportunity to breathe new life and interest into the site which was nearing the end of its funded lifespan.

HNs are made aware that their site was created and is used for research purposes when they first join. To become a member of HN a registration process is completed that includes acceptance of the terms and conditions and consent to participate in the research project. The fact that HNs use pseudonyms on their website and know that any research data they provide is also de-identified, enhances the likelihood of such data being accurate and reliable. For example, a 2007 study by Tanis and Postmes found that people who were given greater control to remain anonymous were more likely to provide honest, reliable information (Tanis & Postmes, 2007).

The popularity of physical activity topics on the HN website, (which dedicates one entire forum to this subject) showed that members were already

engaged with the issue of physical activity. Since HN's inception in 2004, the Physical Activity forum has always been the most active on HN. In the first two months of 2006 alone, there were 102 postings on this forum.

Ethics approval was sought from Edith Cowan University's Human Ethics Research Committee prior to commencing this research. This took the form of an ethics approval in addition to what was already in place for the broader ARC-funded HN research project. Considering that permission to use HN for this thesis had been granted by the existing research team, the issue of privacy has already been dealt with and is covered by ECU ethics. This also ensured that the confidentiality of the research (Green et al., 2007) was understood by participants and maintained by the researcher.

In addition, consent was sought from HNs for any research activities that were considered above and beyond their participation on the site. For example, consent was requested from HNs who responded to an online survey which was specifically needed for the purposes of this new research. To ensure that this additional permission was granted, the process of sending information sheets (see Appendix A) and getting signatures on consent forms (see Appendix B) was managed electronically prior to them completing the survey.

Continuous consultation between the HN community and me, as the researcher, ensured all relevant procedures and protocols were adhered to. Before engaging with HNs during the *entrée* phase of the netnography, the information sheet about the new research was also provided as a URL on the HN site.

My netnography of HN

As noted in chapter 2, netnographic methods have been used to study a range of online communities. My study sought to explore the use of netnographic techniques as both a methodology and an intervention for behaviour change. Specifically, it aimed to investigate:

- members' use of the HN community and other social networking sites,

- the relationship between sitting time, other sedentary behaviours, and physical activity for these members, and
- formulation of recommendations to reduce the health risks of prolonged sitting associated with the use of online communities and similar platforms.

In accordance with standard netnographic practice, I planned to immerse myself in the HN community to construct my own understanding of the meanings, beliefs and attitudes influencing members' online activities in relation to their sedentary behaviour and physical activity. This immersion in the HN community involved establishing a sense of connection with members and having regular interaction and communication with them. This not only ensured that any new data could be interrogated, it also made me authentic and visible to members in my researcher role, and strengthened the interconnection between participation and analysis of the site. Covert observations were not only completely impractical, but would also have been considered a breach of privacy and fraught with ethical dilemma.

While respecting and observing netnography's 'free-ness' from research rhetoric (Ward, 1999), my study also used Crotty's scaffolding framework to position the netnographic approach within a broader research philosophy. In addition, I applied some of the behaviour theories discussed in the previous chapter. The self-efficacy model aided analysis of members' confidence about carrying out specific forms and amounts of physical activity. The stages of change theory aided the analysis of members' physical activity goals and accomplishments. Collectively, these theories provided a useful framework for analysing the dialogue within the selected community.

HeartNET data collection and analysis

This research relied on HN's self-reports of sedentary behaviour and physical activity, for which individuals have been known to subjectively over-report (Prince et al., 2008). Bentley, Khan, Oh, Grace, and Thomas (2013) for instance acknowledged the "potential for social desirability bias to cause an exaggeration of physical activity levels when compared to more objective measures" (2013 p. 100). Self-reports are nevertheless still considered an

accepted, affordable, practicable and reliable form of data collection (Chan, 2009) and are still preferred to objective measurement methods of physical activity and sedentary behaviour for large cross - sectional studies on logistical and cost grounds (Bentley et al., 2013). Online communities, particularly ones which focus on health issues, are perhaps more likely to reflect the 'real lives' of their members. Still, knowing that they are being observed may affect how individuals behave; this is known as the 'Hawthorne effect' which can bias results even when participants give their permission to track routines and behaviours (Walter, 2010).

In collecting data for this study:

- online written dialogues in the form of posts and discussion threads from the HN website were captured and analysed in a small scale netnography.
- an online survey was developed and distributed using the Qualtrics software program (Appendix C). This survey incorporated both quantitative and qualitative questions designed to collect demographic data and information about sedentary behaviours, physical activity and social networking practices.
- a single supplementary question was distributed via HN's email accounts to collect extra data on their pastime activities.
- de-identified preliminary results of the survey were fed back to the community, via the online discussion board to encourage netnographic discussion. Member's feedback on these results were stored in a repository and used for triangulation with any additional netnographic data generated. This feedback loop provided a mechanism to clarify any early-stage interpretation of the findings with HNs.
- I recorded my insights and reflections throughout the research process in a research diary. Regular reviews of this diary served as a valuable checking mechanism on other aspects of the data collection and analysis.

Figure 3-1 below shows the interconnection of the data collection methods used in this study; particularly to ensure that emerging data could be triangulated. The following section discusses each of these data collection approaches in more detail, with a particular focus on how the netnography unfolded.

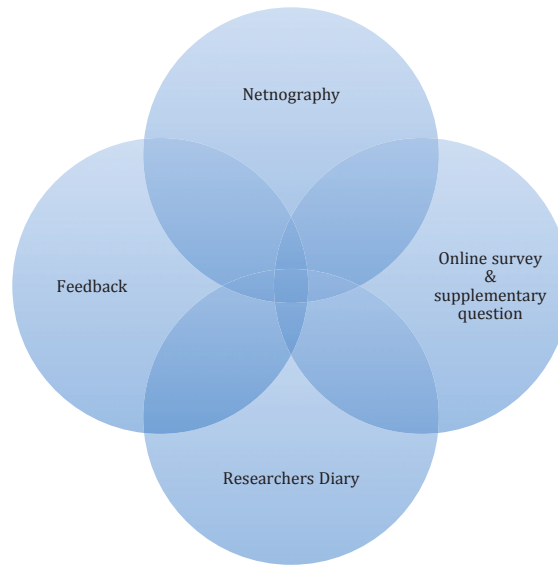


Figure 3-1. Four part methodology

The project incorporated the following sub questions in order to inform and interrogate the overall research question introduced in Chapter 1:

- SQ1 – What understandings do community members have of the health impacts of physical activity and sedentary behaviour?
- SQ2 – What are the members' current levels of physical activity and sedentary behaviour?
- SQ3 – What are the members' current intentions regarding their levels of physical activity and sedentary behaviour?
- SQ4 – What incentives, barriers and enablers impact on members' abilities to maximise physical activity and minimise prolonged sedentary behaviours?
- SQ5 – How does online participation in their community and other social networking sites contribute to prolonged sitting, including the total time spent in sedentary pastimes?
- SQ6 – How often do members take regular breaks while participating in their community or any other social networking site and what type of activities do they engage in when taking a break?

Netnography and HN

The netnography undertaken helped to explore how both online participation and social networking relates to sitting time and sedentary behaviour, and whether communication on the HN site could be leveraged to increase awareness around prolonged sitting time. If HNs regarded sitting time as problematic, then a dialogue with them could help initiate the contemplation stage and move them to the next stage of change. As discussed in the previous chapter, netnography was identified as a useful methodology to understand how members of an online community co-create understandings about the significance of physical activity and sedentary behaviours to heart health, and exchange messages of peer support for members who may not have access to empathetic support in their everyday life. In this context, the adage ‘the whole is greater than the sum of its parts’ reflects the synergy that can be created in such communities.

When I began to engage with HN, it had approximately 900 registered members, but far fewer active users with both a valid email address and an onsite posting in the past 12 months. My research project excluded approximately 150 HNs who had joined the community but never actively posted on the website. While the demographic data of the entire community was not made available for this study, HeartNET members were typically aged between 45 and 65 years, with a fairly even distribution of male to female users (slightly skewed towards females). This is indicative of the ‘baby boom’ generation which was the original target for the HeartNET study conducted by Costello (2009).

As I do not have a heart condition and did not want to be seen as an intruder to the community, it was important that I quickly built rapport and trust with fellow HNs. Although Dr Leesa Costello, founder of the HN site, did not herself have any heart condition, she had successfully negotiated this *entrée* phase. In her case, the *entrée* phase was not about fitting into an existing community, but rather about *establishing* the culture of the site newly formed by her and her research team. She found that her *entrée* process changed from a strategic, research-driven process to one which was more natural and meaningful “in a relatively short period of time” (see Costello, 2009, p. 34).

My own *entrée* was a carefully planned and orchestrated process. Before joining the HN community, I met with Dr Leesa Costello (my primary supervisor and the founder of HN) and Lynsey to discuss the best tactic to ensure a successful *entrée*. After we agreed that Lynsey was in the ideal position to introduce me to the online community, Lynsey placed an initial post on the discussion board to inform and welcome me as the new researcher.

My *entrée* strategy commenced with a participatory ‘introduction and orientation’ within the HN site to help me understand the daily routines and interactions of the HNs. My active participation at this *entrée* stage also helped to alleviate any negative perceptions associated with lurking, which HNs had previously noted as unauthentic and a sign of an illegitimate user (Leedy & Ormrod, 2010). While not concealing the purpose of my research, I needed to introduce the topic of my research in a non-threatening way, which did not bias open and transparent discussion about the issues under investigation. Discussions could then be generated naturally, without any preconceived ideas, as per Ward’s (1999) commentary on the ‘free-ness’ of netnography discussed earlier.

From the *entrée* stage, the written dialogue, posts and threads that occurred naturally between HNs and myself were captured as electronic text and copied to Word documents, which were saved on my computer. In the past (particularly when Costello and colleagues created and investigated the site), the extensive volume of such data was a problem for the HN researcher. However, seven years on, any marked decline in HN participation now posed the risk that the netnography might lack sufficient data.

Researcher’s HN diary entries

Keeping my own notes on this research project and my participation in HN in a diary allowed me to reflect on any preconceived opinions and bias at any time throughout the study. My research diary recorded the technological challenges and frustrations I faced living on a remote island and depending on an unreliable internet service for my connection with my principal supervisor. During this time, she and I communicated mainly via Skype and email. On my return to Perth, I met with her and my secondary supervisor regularly, so that they

could check on progress, make general observations, play devil's advocate and challenge my interpretations/analysis.

The online survey

As discussed previously, any decline in HN's postings onsite would affect the volume of netnographic data produced. Hence, the online survey would be of paramount importance for collecting enough data for the analysis and subsequent response to the research questions. The online survey consisted of 22 questions and was created using both qualitative questions (i.e. open-ended questions) and quantitative questions (i.e. to generate descriptive statistics) and incorporated questions to collect basic demographic data such as employment status, age and type of participant (e.g. heart patient, family/friend, carer or professional).

Both the 'stages of change' and 'self-efficacy' theories (see Harris et al., 2010) formed part of the theoretical platform of this research and were included in the design of the online survey. To understand and interpret HN's readiness to change their sedentary habits, I needed to establish what they already knew about the dangers of prolonged sitting. HNs with no knowledge of these risks would be less likely to contemplate changing their behaviour. Questions around knowledge (along with self-efficacy and stages of change) were therefore incorporated into the design and development of the online survey.

The survey was also designed to investigate the lifestyle issues that reflect HN's sedentary practices (including sitting time), and their current physical activity levels. In order to determine which stage of change was applicable, HNs were asked how many days per week they participated in physical activity, how long they engaged in any one 'session,' and if they were intending to increase their current levels of activity. These types of questions served to specify where HNs 'fitted' in the stages of change framework.

To gain a deeper understanding of HN's self-efficacy, the survey asked HNs about how confident they felt about engaging in particular forms of physical activity. Other questions were designed to enable the analysis of how their sitting

time related to computer usage, in particular, their use of other social networking sites. HNs were, for example, asked to identify:

- how much time they spent on HN and on other online social networking activities in any one period,
- whether they sat throughout their entire period of computer use,
- whether they took a break from sitting, and
- what they did in order to take a break from sitting.

Before distributing the online survey, it was piloted by enlisting five peers to read and check the questions for coherence. They each suggested a few minor changes to the wording and order of the questions. This peer checking strategy helped to ensure that the questions were clear, concise and easy to understand. After receiving feedback, some minor changes were incorporated to add clarity. The survey was then finalised and ready for distribution (see Appendix C).

HNs were sent a private message via their email address (see Appendix A), inviting them to complete the online survey (see Appendix C) developed using Qualtrics software. It was hoped that this would prompt active HN users to commence or continue interaction and discussion about the topic on the site. A link to the survey via the Qualtrics website was then emailed to the 773 'active' users and a link to the survey was also posted on the site in the hope that a sufficient response rate would be achieved.

Analysing survey data

The quantitative data collected from the survey was analysed using the Qualtrics software program. This software generated descriptive statistics about current behaviours, readiness to change (stages of change), self-efficacy levels, social networking activity and sedentary behaviour, including sitting time. I also used Microsoft Excel to undertake further analyses when required; for example Qualtrics provides reports on frequency data for each survey question and does not allow for data to be combined, reviewed and tabulated.

The qualitative data from the survey was used to gain a clearer understanding of the context within which responses to other survey items were made. This assisted analysis of the comments to identify recurrent or opposing patterns and themes.

As noted by Kozinets (2010) allowing online community members the chance to challenge interpretations enables an online researcher to gain clarification and a deeper understanding of the phenomenon being investigated. This serves to increase the reliability of interpretations of the data. In accordance with standard netnographic practices, a sample of de-identified responses from the survey was therefore posted on the HN website as a thread titled 'Gloria's Forum'. This approach provided:

- an opportunity to clarify any misinterpretation or ambiguities and check consistency with any relevant discussions offered online,
- some feedback for HNs regarding the behaviours being investigated,
- a means to promote further discussions and interactions on the HN site and motivate more interactions, discussion and feedback from HNs from any initially findings, and
- the opportunity for HNs to post opposing views, opinions or explanations about these findings, particularly if they felt that their 'voices' had been misinterpreted in anyway.

Emailing of a follow up question sought to gather richer data on HNs daily sedentary behaviour and clarify whether sitting time for online and social networking contributed significantly to the problem of prolonged sitting. The follow up question investigated sitting-related pastimes, such as reading, watching television, driving or commuting, and desk-bound activities.

Data analysis

Together, the quantitative and qualitative survey responses and the follow up question were designed to help seed the discussions on the site for the netnographic analysis. The analysis and interpretation of the netnographic data was guided by Kozinets's (2010) principles for conducting netnographic research.

The data coding process outlined by Strauss and Corbin (1990) was adopted to ensure reliable and rigorous analysis. Their three coding processes – open, axial, and selective coding are explained in the table below:

Table 3-1. The coding process used for analysis of the netnographic data.

Coding	Description
Open	Identifying loosely framed categories. At this stage, there is no connectivity between the codes, but key words and phrases are grouped around similar ideas and concepts.
Axial	Helped to restructure and refine the data to reveal specific themes
Selective	Involved developing theoretical themes from the axial categories. Although, this coding sequence was beyond the scope of this study.

Coding of the netnographic data was conducted manually by hand-coding the electronic transcripts captured via the discussion board. The numerous key phrases identified were highlighted using coloured pens during the open coding process of netnography. Any qualitative data from the survey was then identified and labelled under broader categories, which eventually resulted in themes.

Conclusion

The chosen ‘mixed method’ methodology was considered appropriate in order to answer the research questions, provided sufficient data could be gathered. Analysing the combination of data from both the online survey, the supplementary question and the netnography clearly had the potential to produce some rich information and insights regarding sitting time/sedentary behaviour, physical activities and online participation, including other social networking sites. Should either data collection method prove inadequate then the other data collection method could still yield useful indicative results.

The critical assumptions underpinning the chosen methodology related to the collecting of sufficient data for the analysis, namely:

- a critical mass of active HNs to produce material for the netnography,
- sufficient response to the survey, and

- adequate discussion board data to aid interpretation of data collected through the survey.

At the time this study commenced, all of these assumptions appeared viable. As discussed in the following chapter, some of these assumptions proved less realistic as the study progressed.

Chapter 4. Findings

Introduction

This chapter draws on both the netnographic data, the data generated from the online survey and the simple supplementary question, in order to address each of the research questions. In doing so, it provides deeper insights into the social networking practices of HeartNETers' (HNs), their patterns of physical activity and sedentary behaviours, including their prolonged sitting. This chapter also reveals how declining engagement on the HN site impacted on the chosen methods of data collection and analysis.

Netnography stage 1. The *entrée*'

The *entrée* stage, designed to aid the researcher's introduction to and integration with the netnographic guidelines provided by Kozinets (2010) were followed. All postings are presented verbatim. Below is Lynsey's initial posting to the HN community regarding my impending involvement in the site:

Lynsey 2011: I have some great news; we will soon be welcoming Gloria to the site as she undertakes her Master research... with some new blood and different insights and ideas we will hopefully see new members joining and participating. But as has been said in the past, it is the members who make the site and your active participation makes HeartNET what it is. I will keep you posted on when the new person arrives.

Within a few days Lynsey posted:

Lynsey: I would like to introduce Gloria Askander to the HeartNET Community. Gloria is currently undertaking her Masters by Research in Public Health at ECU where she has been studying for the past 6 years. Broadly, her study interest is in physical activity. While Gloria will be undertaking some research with HeartNET in the near future... Gloria would like to feel part of the community, get to know you all and understand a little more about what we are about. I'm sure that you will all agree that it will be nice to have a new 'face' on the site. I am also keen to help her with her future research. In fact, you'll

remember Leesa Costello (former boss lady!!)?? Leesa is Gloria's supervisor and she has already convinced Gloria about how wonderful our group is!! For now, please watch out for Gloria as she begins to join us, make her feel welcome, and show her the ropes as much as you like! In time, Gloria will be keen to share her research interests with you and invite participation from anyone interested in contributing their knowledge about heart health!

Once Lynsey had posted onsite about the new research that was being conducted, she introduced me to the HNs as Gloria, the researcher carrying out this new project.

Lynsey: Please welcome Gloria on board as she commences her research on HeartNET. She will be joining us sometime next week, but it would be great if we could make her welcome before she arrives.

This introduction prompted friendly and welcoming posts to me from HNs, such as:

Mrs D: Hello Gloria, welcome aboard hope to see you around soon.

Mr H: Hi Gloria, I hope you find your research enlightening. See you around here from time to time.

Mrs T: Hi Gloria welcome to the motley crew known as HeartNET. Look forward to seeing you online and/or your posts!

Mr H: G'day Good day Gloria. I won't bore you with too much detail sufficed to say. I am one of those "fools" who decided to do ridiculous amounts of exercise following a little misadventure called the HEART ATTACK. You will learn that those of us who attempt to motivate the others have more than a few screws loose, but welcome aboard nonetheless.

Gloria: Hi Mr H, Yes I have been reading some of the past physical activity posts on HeartNET and I must say I am feeling quite lazy after

reading these! I look forward to reading/hearing more of these adventures and who knows, dare I say motivate me to do more.

In the same spirit, I thanked the other HNs for the welcome they were extending to me:

Gloria: Thank you everyone for your very warm welcome. I look forward to chatting with you soon and getting to know the HeartNET family better.

This first stage of the research continued for a number of weeks with some HNs engaging with me around conversations and topics important to them. This meant that I was involved in 'off topic' discussions on the site, as well as ones which were considered 'on topic' (i.e. those which were more closely linked to the research objectives).

Had HNs raised issues about sedentary behaviour at that time, the netnographic approach would have required a natural progression and continuation of such 'conversations'. Apart from Mr H's previous post (above) welcoming me to the site and touching slightly on his exercise regime, no other such discussions actually emerged during this early *entrée* stage.

Within weeks of my *entrée*, Lynsey took a short break and left me to take charge of the HN site in her absence. This is when I really started to feel like a member and less of a stranger, and appreciate the value of a successful *entrée*.

My first indication that I had made successful *entrée* to HN was when I felt relaxed enough to make jokes with my fellow HNs. Despite having experienced an initial sense of impatience and awkwardness around 'off topic' discussions, this was the mechanism that best allowed me to build trust and rapport to enter the research phase. The comments below show how this occurred:

Gloria: Hey guys, I don't know if you have read the Lynsey's post, but she is away for a week in Sydney and guess what?? She has left me holding the fort! So, I am wondering what type of mischief or trouble I/we can get into during this time Therefore, I need suggestions???

Maybe we could throw a big cyber party by spending all of moderators coffee money, Ha!

My light-hearted post to the discussion board prompted Mrs T, who appeared to be a frequent visitor to the site, to post a reply on the discussion board.

Mrs T: I think we are being led down that garden path...ohhh well in for a penny in for a pound!! We could have a chocolate party...or...

Gloria: Well that would have to be dark chocolate as it is apparently better for our heart health...We could put our feet up and sip cocktails outside on Lynsey's office balcony, overlooking the rolling hills and valleys... Unfortunately, her office doesn't have a balcony, rolling hills or valleys!!

Mrs D: the thought of the balcony was good while it lasted

Gloria: I can picture the scene! Sitting comfortably, chatting, with cocktail in hand or beer for others. All of us women wearing pretty wide-brimmed Melbourne cup style hats, while the sun beams down onto the balcony... Ha

Mr N: Oh all you girls are all in big, big trouble when Lynsey gets back or gets on the site ha ha

Mrs T: Yep ALL 866 HeartNETTERS, cocktails/beer/wine/baileys in hand on their imaginary huge Balcony!! Ohh are we having fun yet??? I can't see the view for your hat Gloria. Mrs D get off my foot (I'm height challenged to you know!) Once I'm on Mr S's shoulders I will give u a leg up ok.

Mr S: I was going to turn the music down but I slipped on a lamington & went into cardio arrest, must be due to having Mrs T on my shoulders so she could see more of the rolling hills & valleys whilst giving Mrs D a leg up drinking champers at the time didn't help matters either.

This ‘fun’ continued between those involved for quite some time, and although it was somewhat ‘silly’, it did help to introduce and establish me as a legitimate and active user of the site. Sharing jokes and laughter with fellow HNs was evidence both of my participation and acceptance in the HN community. The concept of having fun in online communities is perhaps understood in a classic psychology study by (Parsons & Bales, 1955) who discussed the instrumental and expressive communication roles of parenting. For this thesis, the instrumental role could be akin to the functional or informational role that being in a heart-health community provides, whereas the expressive role may be similar to the companionship and sharing roles they describe. Further, the fun referred to in the entree stage of this research may indicate the value of entertainment and the beginnings of friendship that is referred to by (Ridings & Gefen, 2004) in their study of ‘why people hang out online’.

Less vibrant and viable community

It quickly became evident to me that the HN community into which I was making my *entrée* had aged and changed since its inception in 2004. After nearly seven years of successful operation, HNs’ golden age appeared to have passed. Previously-active HNs were no longer returning to the site, the levels of postings on the site had waned and HN was supporting and caring for fewer members than at its peak. It was also apparent that even those *still* active HNs felt their online community was in decline.

One member, who appeared to yearn for the HN of old, posted:

Mrs K: I used to love logging on and following the events of others who I only knew online. So I suppose once people weren't posting there was less reason to visit. Maybe others found the same thing and it became self-perpetuating!!

Mrs Ts corroborated the vibrancy of the HN site by recalling that there was a time when the site had “866 HeartNETers”. Lynsey’s frustration with the apparent decline in numbers attempted to motivate a return to posting by HNs:

Lynsey: Please those people that come in and visit it would be great if you would make a comment. So many people come in and look

around but no one says anything. The site is meant to be interactive and without people posting the site becomes quiet. This could also be seen as an anti-lurker message.

That post elicited a number of responses:

Mr H: I have noticed that the rate of new HeartNETers to HeartNET seems to have diminished. I can offer no plausible reason for this.

For both Mrs D and Mrs T, Lynsey's sentiments seemed similar to how they were feeling about the present 'quietness' on the site compared with HN's far more vibrant past:

Mrs D: Good advice, often you come into (HeartNET) and think you are the only one that comes here.

Mrs T: It is hard to be interactive when everyone is being so quiet and you think like Mrs D says you are the only one of a few who do continue to post! Let's hope this 2012 brings a load more of "sharing is caring" back to the HeartNET forum!

A HN member who hadn't posted for some months also commented on how HN had changed:

Mrs B: I too miss the way HeartNET used to be but of course accept it will continue to change. Looking back I can see why I stopped coming onto to HN. Not much was happening on the site and I was having a busy time.

One concerned HN, Mrs D, called for others to return to the site. She was convinced that even previously dedicated HNs had begun spending more time in other online communities focused on 'gaming' than on promoting and supporting heart health:

Mrs D: Facebook is not as helpful as HeartNET so please come back here all you that left us to farm [referring to another online game phenomenon]

Even the research team, who had been involved with HN from its outset, was perplexed by the evident change in participation. They suggested that momentum was falling away due to the impending end of formal funding, which required Lynsey (the PhD researcher overseeing HeartNET at the time) to focus on writing up her research, rather than driving the community. As a researcher with her sights set on an exciting netnographic quest, this was both deflating and alarming. Despite my growing concerns about whether a less active HN community would generate sufficient material for a netnographic study, I decided to proceed with the study. I believed the use of an online survey might compensate for any deficiencies in the netnographic data.

My research diary entries

Issues with insufficient traffic on the site continued after my successful *entrée* into the online community. The diary excerpts below reflect how anxious I had become about acquiring enough data to produce a satisfactory netnography.

Why aren't there more HN's posting messages on HN? I really want to engage with HN's and I don't want them to feel that I am trying to push my way into their community. Not sure if I will be able to gather enough data. I hope HN's return to site soon. Maybe HN was not the best choice for this netnographic study.

Both these excerpts demonstrate my sense of concern at the early stage of this research. Once I communicated this to my supervisors, their re-assurance, advice and encouragement helped to alleviate some of my fears. They also suggested I assist HNs to get to know me by practicing a more intimate and transparent style of interaction by revealing more of my personality and personal life which was not at all linked to my need to conduct the research.

While this strategy made me much more comfortable and strengthened the relationship I was developing with the few HNs who participated, it did not help to rejuvenate discussion with 'lost' members; seemingly they were just not logging in!

It is also possible my *entrée* into HeartNET was compromised by concern I had limited time, in the context of a Masters timeline, in which to establish trust

and rapport with HN members; this may have played some part in restricting responses to the online survey and discussion. In hindsight, it may also have been valuable to share more openly my own experiences working with a heart health group for Indigenous people. While I couldn't identify personally as a heart patient, my professional experiences working with people with heart conditions has given me a good understanding of what it means to be diagnosed with a potentially life-threatening condition. Drawing on these insights through my online exchanges may have been a useful strategy, particularly in terms of seeding discussions around barriers and enablers to physical activity and sedentary behaviours.

Revising my methodology

My difficulties with collecting adequate amounts of netnographic data demonstrate the challenges that Strauss and Corbin (1990, p. 96) discuss in terms of researching in 'real-world settings'. The number of posts on the discussion board, which would have previously provided extensive netnographic data relating to HN's social networking practices, sedentary behaviour and other general topics was now extremely limited. All subsequent discussion board data remained valuable in terms of adding weight and assisting interpretation of data collected through the survey which now functioned as the primary data source. This approach allowed me to become immersed in the data, being careful to review and compare the quantitative and qualitative responses in the survey with any additional netnographic data collected.

Following crisis meetings with my supervisors, we concluded that if my research could generate new and exciting discussions, HNs might be motivated to re-engage with their website. We believed that posting information about the research via an online announcement and emailing HNs who had fallen away might pique HNs interest and motivate them to re-engage with the site.

One strategy was to use questions, which might reveal information about sitting behaviours in a more indirect or less judgmental manner. Rather than posting questions or comments on the site about sitting time or sedentary behaviour, HNs were asked to comment on how often they used the site along with other social networking platforms. This might have allowed me to deduce

information about social networking use, which could be used later to seed discussion around physical activity, sitting time, and other sedentary pastimes. Unfortunately, this approach didn't produce any significant interaction.

Gathering survey data

Because there were few postings to HN from the time of my *entrée* the online survey supplied the much needed data in relation to HN's physical activity practices, and their beliefs and understanding of the health hazards posed by sedentary behaviour. Of the 773 surveys emailed, 80 surveys were returned but only 67 surveys were either fully completed or had the majority of questions completed and thus were also included in the sample. This constituted a response rate of approximately 9%. It is highly likely that HeartNET participants had been over-researched at this time; having been the site established for Costello's (2009) research which was then utilized as the setting for another PhD project and a subsequent Masters project. It was also utilized by a team of medical students at the University of Western Australia, for semester-long research projects over the course of three years. At the time of my research, participants may have been reluctant to continue their involvement as 'research subjects'. Despite this, the 9% response rate still enabled the analysis to be reliably undertaken given a small sample size is generally considered acceptable in an exploratory study such as this (Gray, 2009).

In order to attract even more HN's, a reminder email (see Appendix D) about the new research was sent inviting members to login to the site and comment on the sample of initial results from the online survey posted on HN. As well as providing the checking mechanism, it was hoped that this would increase traffic on the site.

Sadly, this strategy motivated only one returning member to post on the discussion board. However, two of the already 'active' HNs provided their opinions and feedback. It was hoped that this member feedback/checking would further seed the netnography and produce candid discussions about the way in which social networking relates to sedentary behaviour and any barriers to change which could be addressed via a netnographic intervention on the HN site, but the lack of activity limited the effectiveness of this strategy.

Therefore, the follow-up question about daily sedentary habits and overall sitting time was sent to all 773 HNs via their private email accounts. The supplementary question (Appendix E) invited HNs to complete a simple table documenting the time they spent each day watching television, reading a book or sitting at work and the duration of each sitting session while engaged in these pastimes. Only 14 HNs responded to this supplementary question.

Who responded to the survey

While responding HNs were distributed across Australia, most were located in Western Australia, New South Wales, Queensland and Victoria. Of the 22 respondents from WA, four lived outside the Perth Metropolitan area. Similarly, one respondent lived outside metropolitan NSW and four respondents from Queensland lived remotely.

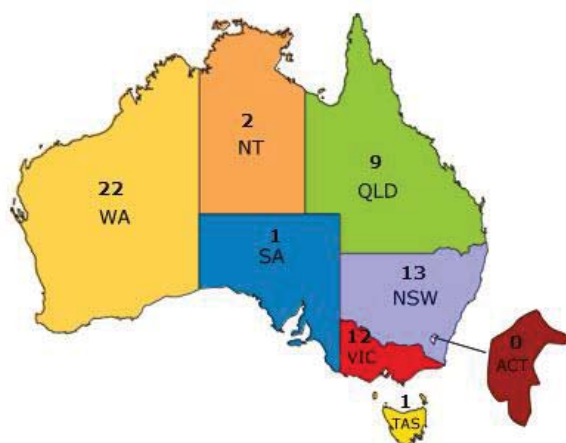


Figure 4-1. Geographic distribution of survey respondents

(n=60; 7 respondents did not disclose their location)

While HN had members across all states and Territories, these members were not distributed in proportion to the distribution of the Australia population – based on data from ABS 2014. While it is not surprising that the more popular states (NSW, VIC) were well represented on HN, the higher membership in WA reflects HNs origins, reputation and support within that state. Thus, in this instance the internet has moderated, but not eliminated the impact of geography.

As the figure below shows, 58% identified themselves as heart patients. Of the remaining respondents, 6% identified themselves as family or a friend of

a heart patient, and 4% identified themselves as a carer of a heart patient. Most of those identifying as family and friends were female, and all people who identified themselves as caring for someone with a heart condition were women. The inclusion of carers in the sample acknowledges not only that HN was established to support both heart patients and their carers, but also reflects an awareness that the caregiving role can negatively impact on carers' health and quality of life. For example, studies investigating carers of people with dementia have found they have less time to engage in activities such as physical activity, and neglect their health in other ways such as not getting enough rest (Orgeta & Miranda-Castillo, 2014). More specifically, female carers of people with heart conditions have identified a tendency to focus on their partner's health, often at the expense of their own health (R. J. Smith, DiGiacomo, Salamonson, & Davidson, 2010).

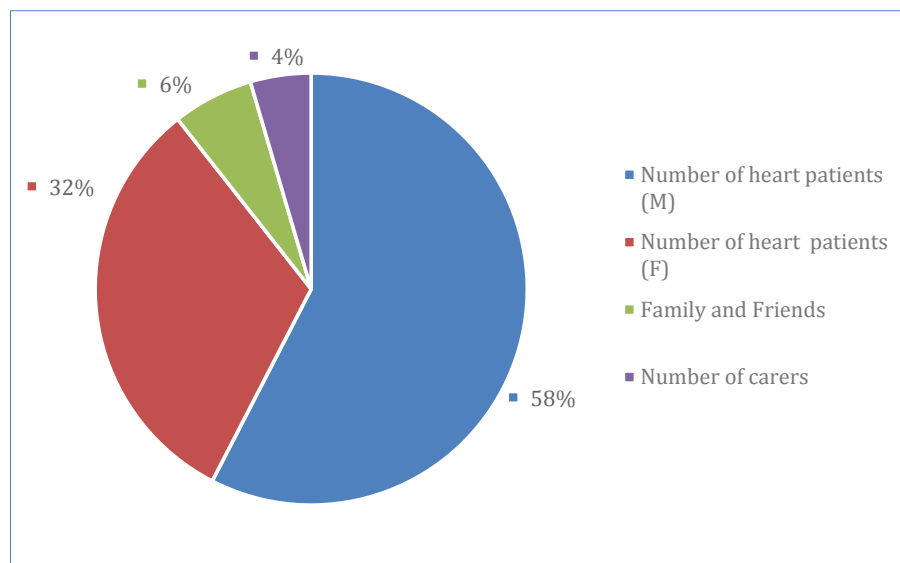


Figure 4-2. Survey respondents

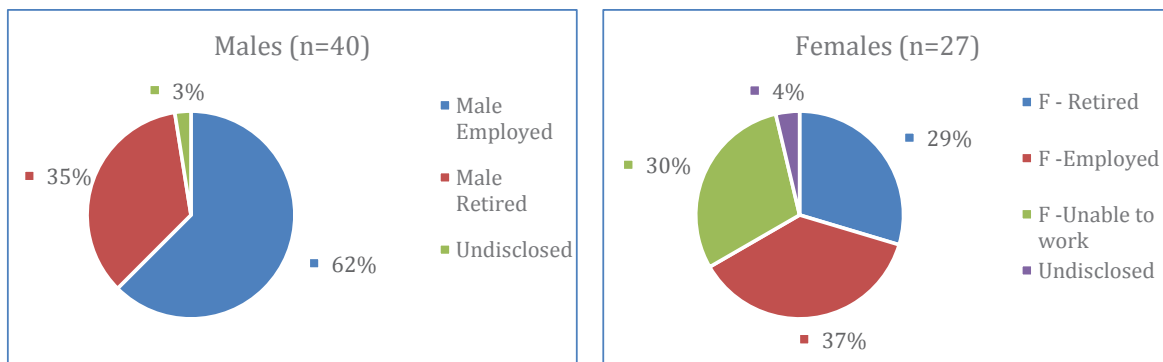
(n=67)

As the below table shows, many HNs were of working age.

Table 4-1. Age of respondents to the online HN survey

Demographic characteristics of the HN population (n=57)		
Age groups	Response	Percentage
18 to 30 years	4	6
31 to 43 years	7	10
44 to 56 years	17	25
57 to 69 years	29	43
70 to 82 years	0	0
83 years & over	0	0
Did not respond	10	16

Male and females differed in their employment status (see Figure 4.3). Of the 42 men in the sample, 62% were employed, while only 37% of the women in the sample (n=27) were employed. A significant proportion of the men 35% and women 29% consider themselves as having retired from the workforce. A further 30% of the women respondents considered themselves unable to work, presumably on health grounds. There may be relationships that exist between employment, gender and age, (see Figure 4.4) but this cannot be confirmed in this exploratory study particularly given the small numbers. Further quantitative studies would need to test for this specifically.

**Figure 4-3. Employment and gender of survey respondents**

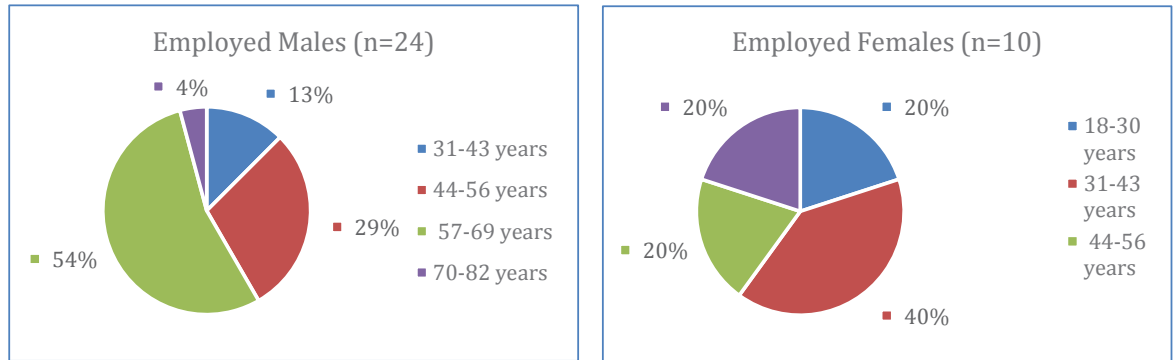


Figure 4-4. Age and gender of employed survey respondents

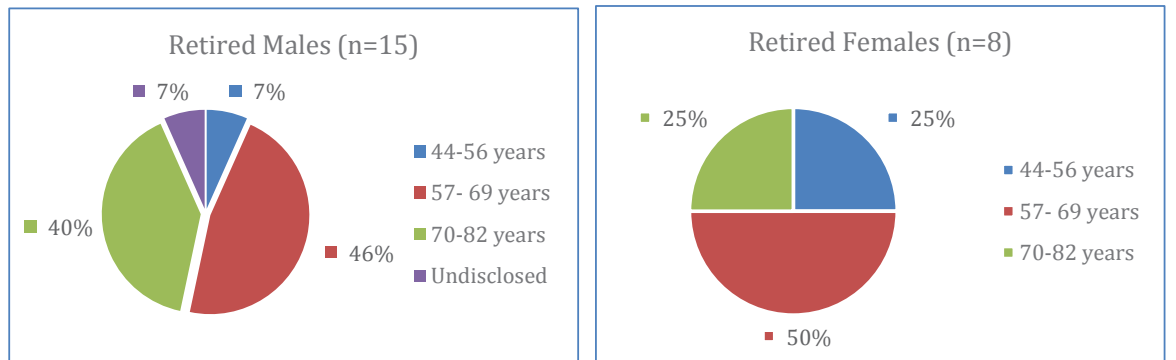


Figure 4-5. Age and gender of retired survey respondents

Turning to the sub questions

In discussing the findings regarding each of this study's research questions, I draw on and integrate data gathered from all three of the data collection methods used; that is from the netnography, the survey, and the follow-up 'stand-alone' question. Where quotes are used to exemplify the findings, some are identified with a pseudonym given they were generated from members online as part of the netnographic data; however other quotes are 'nameless' because they were drawn from the anonymous survey data.

SQ 1. What understandings do HNs have of the health impacts of physical activity and sedentary behaviour?

When this study commenced, the health risks related to sedentary behaviour were only beginning to gain traction in the public sphere. A survey question asking 'What do HNs understand about the dangers of sedentary lifestyles?' led one individual who hadn't previously "heard of sedentary behaviour" to "look it up on Google to see what it meant".

However, as shown in Table 4-2, most HNs (61 of 65) reported some awareness that sedentary lifestyles are detrimental to health. Only four appeared to have limited knowledge about the dangers of living a sedentary lifestyle.

Table 4-2. Survey respondents' reporting of the health impacts of sedentary lifestyles

Reported health hazards of a sedentary lifestyles	# respondents reporting this hazard (n=65)
Causes obesity/overweight	16
Causes problems with circulation, deep vein thrombosis, type II diabetes, cholesterol	13
Risk of cardiovascular disease (CVD), heart disease & heart problems	10
Makes you lazy and is not good for you	8
Decreased physical & mental stimulation & decreased social interaction	6
If we don't move it, we lose it	4
Poor posture & balance, muscle weakness, back & neck problems, unable to function properly, decreased lung function and a sedentary lifestyle will kill you	4
Don't know much about sedentary lifestyle	4
Total	65

Some of the more intriguing comments around sedentary behaviours by the respondents were that it was boring, meant “a lack of sunshine”, “could become a habit” and led to health issues that “cost the general community massive amounts of money”.

Survey respondents seemed to perceive a sedentary lifestyle as limiting the time for physical activity, rather than as a health hazard in its own right. One HN clearly saw time spent on the computer as reducing the time he had available for more physically active pursuits:

Mr D: There are those days when it easy to become bogged down in the hyper-world to the detriment of other more healthier pursuits.

Although some HNs appeared very motivated to be physically active, their comments suggested they had less appreciation of the risks associated with prolonged sitting specifically. A post by Mr H showed a general understanding about the advantages of moving more and perhaps sitting less, but did not acknowledge any specific dangers relating to prolonged sitting:

Mr H: I guess the simple message is... MOVE. Just simply MOVE as often as you can. Every little bit improves our overall health.

While these responses might represent a tacit acknowledgement that sitting time needs to be reduced, there is no indication these or any other HNs understood the seriousness of the health risks associated with prolonged sitting independent of the level of physical activity. HNs seemed to have trouble reconciling the fact that exceeding minimum levels of physical activity did not address the significant health risks incurred as a result of prolonged sitting in the workplace or elsewhere. Even Mr C and Mr H, who were amongst the most physically active HNs and whose discussion board posts showed them to be very motivated to promote their health through regular exercise, showed little awareness that the health hazards of extended sitting were independent of any physical activity achieved that day.

I devoted a lengthy post to explaining the health hazard of sedentary behaviour and how to best address them:

Gloria: New & compelling research has demonstrated that prolonged sitting can have a detrimental effect on one's health. The research indicated that cardio-metabolic enzymes are released in the body after about 2 hours of sitting. The other scary issue is that the research found that it didn't matter how much exercise people undertook that day - the prolonged sitting undid all the hard work of the exercise. The researchers are recommending guidelines for sedentary behaviour- just as there is already for physical activity, but in the meantime (as I am sure you are aware) they are suggesting people getup/stand up every hour or so after sitting. I wanted to know in the survey how long people sat while involved in social networking, as we all know how time can get away from us when we are online,

so that if it was found that people are sitting for long lengths, that we can hopefully offer strategies to help/encourage people to change this behaviour.

Nevertheless for Mr H, the idea of prolonged sitting as an independent risk to health still seemed too novel to have gained any scientific respectability or acceptance by employers:

Mr H: Has the research that you've referred to been corroborated by other research or is it a stand-alone study?. I think it will be a very hard sell to employers to accept that employees should not be chained to their computers etc.

I elaborated further in another lengthy post to Mr H:

Gloria: Hi Mr H, thanks for the questions. There has been many numerous studies conducted in relation to this subject. However, the research is still in its infancy stage, but is starting to gain traction. If you are interested there is a couple of links you might like to have a look at (these links are a quick read on this topic, there is so many more academic articles). One researcher (David Dunstan) has wrote many articles and studies on sitting time.
<http://www.sciencealert.com.au/opinions/20111108-22489.html>
<http://www.heartfoundation.org.au/research/current-research/Pages/dr-alicia-thorp.aspx>

I know of a workplace study being undertaken that is researching the sitting time of its employees and the effects. Bloods tests are being collected, along with their exercise being monitored. We will hear more about this shortly. Perhaps employers will need to take heed once more workplace research is completed. Physical activity will always be a top priority (so keep up the GREAT WORK!) I think the more we know about what is detrimental to our health the better prepared we will be to change/modify it. Let me know your thoughts on the articles when you have time thanks. Gloria

To further 'tease out' HN's understandings of the connections between sedentary lifestyles, health risks, and prolonged sitting, I made a post on the discussion board mentioning that I spent more time than I would like on the computer trying to complete my study. This prompted a couple of the HN's to discourage me from this type of behaviour:

Mrs D: A break from the computer would do you a lot of good...not good to sit there too long.

Mr H: So true Mrs D.

Although this was a positive reaction, I wanted to know why these HNs suggested it was "not good to sit there too long". However, my prompts for more information elicited no further posts in relation to this topic, once again demonstrating the limitations of netnographic intervention when a site is in decline.

SQ 2. What are HN's current levels and types of physical activity and sedentary behaviour?

Heart patients are encouraged to be active every day to prevent a further heart event. As Figure 4-6 shows, nearly half the HNs surveyed 27% reported meeting physical activity recommendations by engaging in the recommended amount (30 minutes per day for 5 days or more), with 22% reporting that they engaged in physical activity every day. The flipside of this was that more than half the survey respondents were not achieving the recommended level of physical activity.

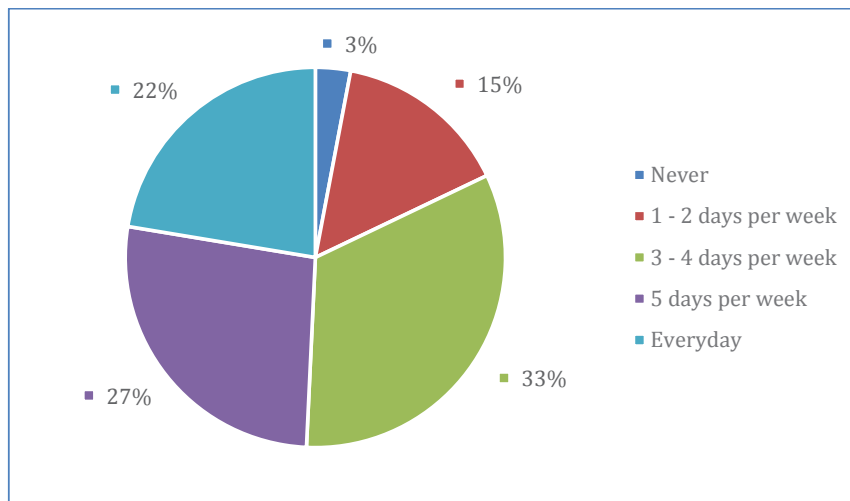


Figure 4-6. Frequency of survey respondents' physical activity
(n=67)

As shown in Figure 4-7, gender appeared to have no impact on the frequency of exercise. Gender may, however, have influenced the choice or intensity of exercise.

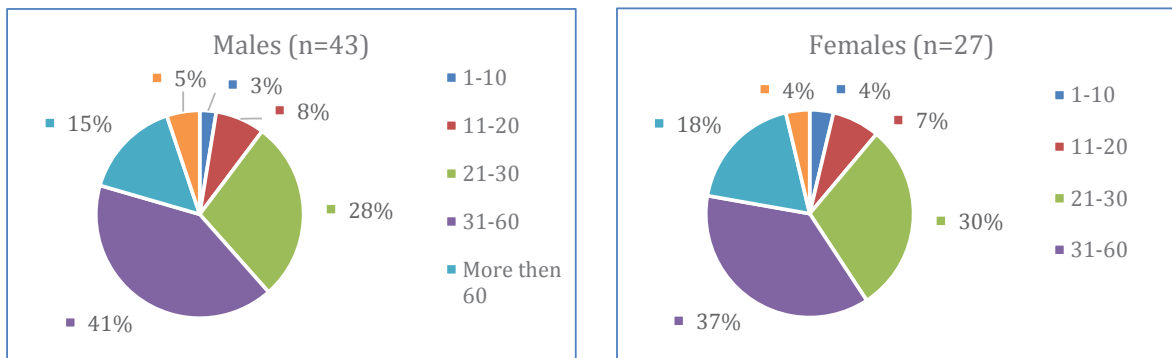


Figure 4-7. Gender and length of physical activity in minutes

Working as a personal trainer, house painter or as a property maintenance franchise owner involved some form of physical activity for HNs. A few cycled to work, but for others, physical activity related more to their leisure time, than to their work days or commuting time.

The feedback loop provided via the netnographic approach enabled me to question the seemingly high amount of physical activity reported by some HNs and helped to clarify the reliability of this data. Posts by Mr H and Mr T explained that the few HNs who reported doing four to five hours of physical activity, had

probably adopted a regime enabling them to maintain high levels whether on leave or at work.

Gloria: Hi Guys, the time reported spent undertaking physical activity in the survey varied from 30 minutes up to 4 to 5 hours or more daily. Is it possible that this has been over reported?

Mr H: It is possible that the 4-5hours daily might be over-reported, or alternatively, that may be a snap shot of a training regime that was due to time-off work. For example, recently I took three weeks leave, and during that time I averaged around the 4 hours per day training e.g. one day I swam 1600m (35mins), rode 76km (2hrs 30mins), and ran 21.1km (1hr 43mins) = 4hrs 48mins. So I don't think that it would have been incorrectly reported, however, this is not the amount of exercise that any of us would be able to do daily with all of the other daily life commitments that we all have to endure.

Gloria: Thanks Mr H for clarifying what you think could be the reason for the 4-5 hours. I think this is a really good way of checking and ensuring that the results are correct- by asking for feedback from HN's. I would love to hear what others also think?

Mr C: It could also mean that maybe they are doing double sessions. Something like a training session in the morning and then one in the afternoon. Or maybe they were like I was for quite a few months and had a job where they had time off during the day. For me it was from say 9am right through until 3 or 4 pm, so left me plenty of time to train for some time there.

Gloria: Makes sense Mr C. It is good that we can explore different ideas and theories to the responses and discuss them.

Types of physical activity

As Figure 4-8 shows, HNs engaged in a range of physical activities. Half of the 67 HNs reported walking as their preferred form of physical activity. Yoga, Tai Chi, cycling and gym each attracted 8% of the surveyed HNs. On a gradient

from light through moderate to vigorous and even extreme physical activity, yoga and Tai Chi would normally be regarded as falling at the light end of the spectrum; endurance events, such as triathlon and marathons, at the extremely high level of physical activity yet even yoga and Tai Chi can seem challenging to individuals who are inactive, unfit or who have low level of physical literacy. While most of those activities cater to a wide range of age groups, HNs also engaged in some activities specifically focused on the seniors age group, whether fitness classes such as PrimeMovers (www.primemovers-exercise.com.au), movement to music, fitness classes for seniors run by a non-profit organisations, or competitive sports such as Masters Swimming or Veterans Hockey.

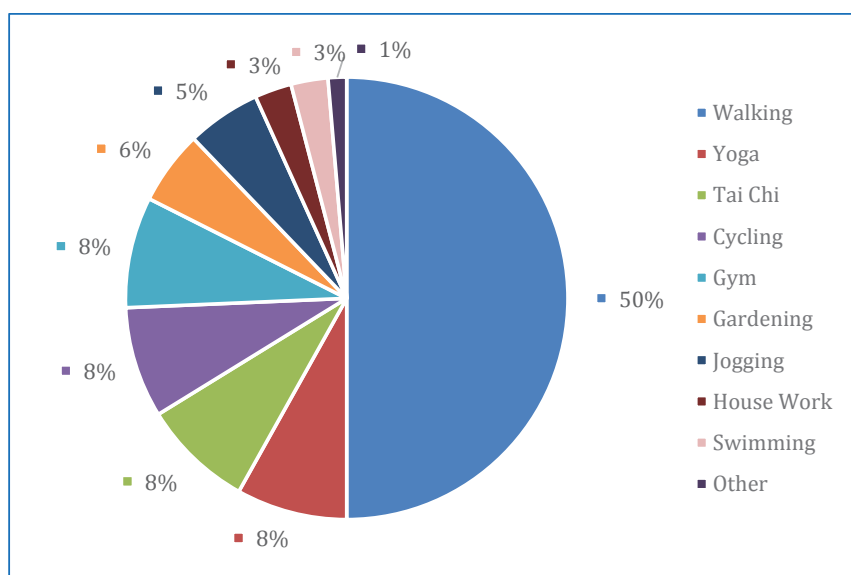


Figure 4-8. Different types of physical activity respondents engaged in

Some of the activities listed in Figure 4-8 could be performed indoor or outdoors. Some, such as gym and housework are indoor activities, while gardening and cycling imply an outdoor setting. While one HN preferred more lighthearted, less formalised activity such as ‘playing and walking the dog’ another nominated the broad category of ‘retail’, which presumably covered all forms of offline shopping. Only small percentages of HNs reported doing the gardening, housework or pool-based exercise as their form of physical activity.

Mrs T: I love walking laps of the pool (also swim) and it’s surprising how the laps build up over time and then when u walk around normally

it's just so much easier. Water aerobics I have done and enjoyed immensely

Some survey respondents could readily quantify their physical activity regimes:

As a Property Maintenance Franchise owner, I am physically active for at least 4-5 days per week. At the moment I also walk at a fairly fast pace for about 40 minutes, 3 times per week

bike riding, once a week, Tai Chi, when possible, 32 hours per week, gym work 3 times, only 30 minutes on the bike and treadmill

Cycling, twice per week, 1-2 hours walking several km/day

Running – 5 days per week Cycling – 3-5 day per week

Golf - walking 18 holes twice week; cycling - 20K once a week; gym – 60 minutes 3 times a week

Walking, most lunchtimes 20-30 minutes Tai Chi at least 3 times a week for 1-2 hours each time Gym 2 times a week 1 hour each time

Walking – most days 30 mins. Gym – 2/week

Walking about 4 times per week and a gym session for an hour on a Wednesday weekly

Walking 30-60 mins per day, Gardening 2-3 hours per week

Gardening - mowing, pruning, weeding - 30 minutes Walking – 30 mins Exercise – resistance band, hand weights, exercise ball, walking machine- 30 mins

In reporting on their physical activity, many respondents did not explain whether they performed activities such as gym work, yoga, Tai Chi, walking or cycling by themselves or with companions. However, one respondent mentioned “walking with a friend and her dog daily” and a few other members reported going to formalised fitness classes or organised sporting activities, rather than engaging in solo activities:

gym aerobic classes such as Body Step and Body Pump. I also do martial arts

walking most days, body pump (weight) weekly, cycling or zumba weekly, maybe some yoga or stretching

twice week to aqua aerobics for seniors (1hr session each) try to use walking machine 30 mins times a week

Prime Movers – twice weekly Lifeball once

Indoor Carpet Bowls twice a week min play time 2 hrs walking

Playing Veteran's hockey once per week (1hr) personal Training session (2x1 hr)

Swimming – minimum 2X1 hr sessions of Masters Swim Squad per week- some weeks over 3 hours of pool time – distance swum is 4-7 kms (Cycling (minimum of 3 rides per week of between 40-100km per ride, average week is 100-300km), running (5-6 session per week with distances ranging from 5km to 37 km; average week distance is about 70-80km). This training is all geared toward ironman 70.3, Olympic and long distance triathlons; and to running 10km, half marathon and full marathon races

The types of equipment mentioned most often were bikes, treadmills and weights. One survey respondent mentioned doing a workout “at the local gymnasium including treadmill, rowing machine, cross trainer as well as muscle building exercises”. While one HN had ‘purchased a home gym’ and other HNs may have lived in homes with access to gyms and pools, most of the gyms and pools that attracted HNs were probably public facilities.

Although no HNs mentioned using heart rate monitors, pedometers or the like, some HNs obviously monitored or estimated the durations of their physical activity and the distances they covered. Several HNs did refer to monitoring their breathing to ensure that their exercise was not too strenuous. For example, one respondent noted: walking each day, at a pace that doesn't leave me short of breath.

While Mr H and Mr C and many other HNs in this study achieved the recommended amounts of physical activity, their overall health may have been compromised by their periods of prolonged sitting, especially during the working day. Mr C highlighted the difficulties in reconciling health requirements for regular physical activity with a workplace demanding long periods of sitting at a desk:

Mr C: I try and start each day with a good hard run and that really makes me feel better. Now to go and sit in office for the next 10 hours..still not sure if that is good for me...

Posts to the discussion board by Mr C, Mr D and Mr H also mentioned that their work involved lots of sitting:

Mr C: My job involves sitting in an office and talking on the phone all day.

Mr D: My job involves basically sitting and doing IT work. No movement.

Mr H: ...my old and fatigued mind has gone (to the birds); too much staring at a computer screen all day wondering why I had been sent certain investigations to undertake... ahh bureaucracy...

A post placed on the discussion board by Mr H mentioned that while his job as a government worker had varied tasks, it could involve prolonged sitting time either at a desk or in a vehicle:

Mr H: It all depends on each day what tasks/investigations we are doing. I could patrol for 8hrs in a car and not have to do anything (very doubtful), or I could be riding a desk for the entire shift dealing with correspondence.

The 14 responses to the supplementary question (see Appendix E and Table 4-3 below) helped to clarify HNs overall daily sitting time.

Table 4-3. Forms of sedentary behaviour that respondents engaged in daily (n=14)

Pastime	Hours						
	1-2h	2-3	3-4	4-5	5-6	6-7	7-8
Watching Television	6	2	1	3	2	0	0
Reading	9	2	0	0	0	0	0
Using the Computer	7	2	2	0	0	0	0
Travelling in the car	4	1	0	0	0	0	0
Sitting at Work	3	0	2	1	0	0	2
Other	2	0	0	1	0	0	0

These results revealed a consistent pattern of long periods of uninterrupted sitting. Despite their appreciation of the benefits of physical activity, all 14 of the responding HNs engaged in prolonged sitting for at least two hours or more a day. The largest period of sitting related to work and watching television. Eight HNs reported watching television for two to six hours a day, while another five reported spending three hours or more a day sitting at work, and two HN's reported sitting for up to seven and eight hours a day. One HN, Mrs L, reported watching television for five hours, reading for one hour, using the computer at home for three hours, and sitting at work for three hours, thus accumulating 12 hours of sitting time in a single day. This is a disturbing statistic for anyone, but even more concerning for someone with a heart condition.

Some HNs were, however, already planning or making changes to maximise their physical activity and minimise their prolonged sitting. The following section using the stages of change theory to understand and interpret the data in more detail.

SQ 3. HN's intentions regarding their levels of physical activity and sedentary behaviour

Although many HNs acknowledged the importance of physical activity in reducing their heart-related health risks, only 37 HN's responded to the survey question regarding their intentions to continue or maintain their current levels of activity, which could have been less than the recommended daily amount.

As discussed in Chapter 3, stages of change theory was used to analyse an individual's readiness to change, and whether or not HNs planned to increase their physical activity. Although some HNs were very keen to increase their level of activity, most HNs were either in the action or maintenance level; this is depicted in exemplary statements in Table 4-4 below which indicate their stage of change, ranging from pre-contemplation to maintenance. These results do not, however, indicate whether any individual HNs were achieving the recommended 30 minutes of physical activity per day or whether they were just maintaining their own level.

Table 4-4. Respondents' stages of change regarding physical activity

(n = 27)

Stages of Change	#Respondents	Indicators of stage
Pre-contemplation	4	I want to lose some weight Seems sensible
Contemplation	6	Intend to increase my level of activity As I recover, would like to be more active
Determination	3	I have a fitness plan to do some kind of exercise every day or so I intend to increase my level by including a hill climb at least twice a week as I would like to climb Mt Kilimanjaro Rearrange with husband times for him to look after our son
Action	12	Have now purchased a home gym Attempting to qualify for the Boston Marathon and ... the Kona Hawaiian Ironman Triathlon I try to increase my effort every single day I am slowly building up to longer training sessions
Relapse	1	I intend to increase it as I have been slack the past few months
Maintenance	1	continue to go to yoga classes continuing indefinitely Expect to keep this up This has become routine now

Some HNs were very motivated to maintain or increase their level of physical activity. One HN, Mr P noted that although his job as a house painter and maintenance man was physically demanding, working for more than 12 hours per day, he was nevertheless planning to integrate more exercise into his

leisure time by playing tennis a few times a week. His intention to increase his level of activity revealed a determination to remain committed. Similarly, Mr C was already very active, but still trying to find other opportunities to integrate exercise into his everyday life:

Mr C: Did 2 40km bike speed sessions over the weekend and feeling more and more like I have to find a way to chase my goal of training more each day and maybe even a job involved sports as well.

HNs reported a range of ways they intended to achieve this, including taking up training for a marathon, cycling, going to the gym and integrating more physical activity into leisure activities such as gardening. Some plans were vague, such as plans to do “more outdoor activities as summer arrives”, while others were highly detailed.

Those who made a quantifiable commitment to physical activity or who had already made it a part of their weekly routine, appeared to have a good chance of realising their goals. One HN “hoped to increase [physical activity] to 30 minutes 5 day per week”. Other HNs reported:

walking an hour a day is part of my daily schedule

...has become routine now, I incorporate extra walking in my day

have been working out for 6 years need to keep it up

The seasons and weather helped determine the types of activity some HNs engaged in or planned to engage in, as the following comments suggest:

I would like to increase by having lunch time walks as well not [when] the weather is better

more swimming when the weather is warmer

just for summer – by walking longer distances

Some HNs reported no barriers to their achieving at least 30 minutes of physical activity on most days, with one emphatically stating “no factors hold me back!” Others had a track record of meeting their targets regardless of weather

or daylight with one reporting “I always achieve 60 minutes or more even if it means walking late at night” and another stating “[I] always do at least 30 mins, rain, hail, or shine!”. Two exercise enthusiasts made and used contingency plans for training in case the weather was unfavourable for outdoor activities, as the following comments highlight:

Mr C: Today I did an indoor training session due to the rain... On other news I brought myself a rain jacket so I can ride to work in the wet weather and increase my training, yes I am slightly mad or maybe I have gone beyond that now haha.

Mr C: Pouring rain and having to go to meetings today for work meant I didn't ride to work. However when I got home I put the bike on the wind trainer and knocked out a much needed session.

Other HNs had flexible sets of activities they could mix, match and adjust to suit their self-monitored state of health, mood or environmental conditions, as suggested in the following survey response:

If my health allows I am active, I only take day off when my body is telling me I need rest

Comments by one HN suggested he had not succeeded in implementing his intention to change and had fallen back from the maintenance to the contemplation stage. A similar tone of resignation was reflected in another HN's comment: “I have tried many times to motivate myself but I just don't enjoy getting hot and puffed”. Another member commented that she couldn't increase her activity and was simply “lazy”.

SQ 4. Incentives, barriers and enablers to maximising physical activity and minimising sedentary behaviour

HNs reported a range of incentives, enablers and barriers to their plans and efforts to maximise physical activity or minimise sedentary behaviour. Many of these did not specifically relate to heart health. Some HNs engaged in physical activity because of their concerns about health conditions such as diabetes, while others were concerned to lose weight or remain reasonably fit. For a few, their

fitness routines had become somewhat of an obsession but for others, it was simply enjoyable because it made them feel good, improved their “overall wellbeing” or served to remind them they were *being* ‘healthy’. While it was unclear whether one of the HNs training for triathlons already had any prior competition experience, wanting to maintain his competitive standing within his triathlon age group gave him an incentive to stay physically active.

Everyday enablers and barriers to maximising physical activity and minimising sedentary behaviour

Of the 52 HNs who responded to the open-ended survey question asking them to identify factors which prevented them from achieving recommended levels of physical activity, the majority (n=42) cited barriers unrelated to their heart health issues. A small number of HNs (n=10) reported other health concerns (such as underactive thyroid, gout, sore muscles, sore knees, recent knee surgery, illness and fatigue, excessive, dizziness and nausea) as barriers which prevented them from undertaking physical activity. In addition to these health concerns, a range of internal and external factors acted as barriers. Internal factors included everyday barriers such as lethargy and laziness, while external factors included financial costs, work commitments, time restraints and bad weather. These barriers are likely to resonate with most people and are not specifically related to having a heart condition.

In addition, work, family commitments and the other demands of a busy life further reduced HN’s time and capacity for physical activity. Several HNs reported being too tired to undertake physical activity after work and another reported shifts work as a barrier to exercise. For one HN, work commitments constituted such a barrier that he would need to wait until retirement, when “I expect to be able to exercise with some regularity”. By contrast, another HN, who worked as a labourer was convinced his work provided enough physical activity. Another HN reported being “on my feet most-all day walking around, setting things out and cleaning things up”. Only two HNs reported screen time - whether “too much Facebook and TV” or just “too much time at the computer” - as a barrier to physical activity.

Transport, time and distance also posed barriers to physical activity for some HNs who were unable or unwilling to undertake physical activity in their home or work environments:

It takes too much time to get there, to the gym, etc

Not being able to get to the gym in time to do my program before it closes

Having to drive places (no public transport route)

As previously mentioned, weather was recognised both as an enabler and a barrier. For HNs not prepared to brave all the elements, hot days, rain and other bad weather tended to inhibit physical activity while good days encouraged it:

Mr C: Good news the rain stopped today (or at least so anyway) and when I woke this morning and saw this really big bright thing in the sky I decided it was a great day to do a ride.

Gloria: How's the weather over there today?? I do hope the rain has ceased... I must say you guys are very, very motivating- rain, hail, shine (or floods) you both pound out the miles!!

For one HN, the financial cost of accessing the gym (other than a cardiac gym at their treating hospital) was a factor:

Mrs R: I used to enjoy going to the gym, but I can't afford it at the moment. Perhaps I will join again in the New Year.

Financial barriers appeared less significant for the HNs who could purchase gymnasium equipment for their homes. Similarly, financial issues had not prevented Mr H equipping himself with "a NASA-inspired wafer thin carbon fibre [...] bike". Mr H was also looking to equip his "not as expensive" road-bike with a set of rollers to allow him to train indoors.

For Mr H, living in the tropical coastal environment of North Queensland facilitated physical activity:

Mr H: Then I transferred to Mackay, and living at the beach meant room for swimming. It was just a natural progression to buying a decent bike, having the beach virtually at my door, and already running every day that resulted in linking each of the disciplines and training for triathlon.

As mentioned previously, having pets helped to get some HNs moving, with Mrs M humorously reporting “the dogs make me walk”. Her comments also provided an opportunity for me to share my enjoyment of the garden and the opportunity it provides to take a break:

Gloria: I have lots of different fruit trees growing in the backyard. I often go for a walk in the garden. Any break is good.

Mrs R: I do have a lovely garden and I enjoy that. We have grapes growing and they will be ready to be picked soon

Heart health related barriers and enablers to maximising physical activity and minimising sedentary behaviour

Other barriers which related more specifically to having a heart condition were separated into a distinct code during the analysis. One survey respondent explained that congestive cardiac failure had affected her quality of life, as she experienced breathlessness and oedema, and was also concerned about suffering a secondary event. She therefore felt limited in her ability to be physically active. On good days, she was more capable and didn't notice her limitation but on other days, she felt the need to restrict her activity.

Mrs M: ...if I am not well, short of breath or fluid overload, then will wait till the next day or so.

Responding to a question I placed on the HN site regarding the impact of having had a heart event, Mr H replied:

Mr H: Gloria, our hypervigilance and hypersensitivity to our bodies (especially every little niggle and naggle twinge and twitch) is a direct consequence of our cardiac event. I know that I am able now, to stop what I am doing, concentrate for a moment, and then with a high level

of accuracy tell you what me BP and heart rate is. I know I will be accurate without any testing to within + or -

Another post by Mr H further emphasised his view on the need to balance hyper-vigilance and health-sustaining activities with occasional indulgence in less health-focused pleasures or vices:

Mr H: hypervigilance is the prime driving force behind the maintenance of a (relatively) healthy lifestyle. I highlight the word relatively, because I consider it vital that even we cardiac survivors have a few little VICES in life. We are human, we are not machines that can be overhauled, as emotional beings we need to do some of the things that we know we ought not do, but that make life a little interesting. And let's be honest here, a tim-tam [chocolate covered biscuit popular in Australia] here or there, a beer or two occasionally is not really going to do us too much harm (if any), provided we do not make a habit of those things, and for the remaining 95% of the time we religiously maintain our healthy lifestyles.

Heart health concerns clearly motivated some HNs to keep engaging in physical activity:

Mr S: Having unstable angina, I can't risk slacking off

Mrs B: I need to exercise as I have hereditary heart disease and I am trying to avoid open heart surgery – the thought of it scares me

While Mr H tended to make light of his health condition, he also acknowledged that his real motivation to look after his health emerged only after he had suffered a heart event.

Mr H: I guess in my situation the big thing that caused a reversal of attitude was that when I had my cardiac event, my life flashed before my eyes - it was a very short and boring story, so I figured that I had better turn things around if I wanted to live long enough to be every bodies problem.

'Beating the odds/blazing a trail' emerged as a key theme in explaining HNs readiness to change and/or maintain recommended physical activity levels. For example, Mr H's resolve to 'beat heart disease', together with an implicit recognition of the importance of staying both physically and emotionally healthy, and the confidence he had in his capacity to exercise, appeared to sustain his commitment to achieving the recommended levels of physical activity:

Mr H: I train almost every day (running, swimming and/or cycling). I eat (as best as I can) a low fat diet. I take (begrudgingly) all of my prescribed medications and I take supplements to support my heavy training loads. I try, with difficulty, to stay as relaxed and as calm as is possible. I refuse to let Heart Disease control me...

Two of the most physically active male HNs explained what motivated them to increase their physical activity:

Mr C: Gloria, I have always been into sports but slacked off in regards to the fitness side of things for a while and was starting to get back into it in a big way before the heart attack. I was doing rehab at the ticker club [his Heart Patients Rehabilitation group] and I was told and I quote "You can never do a competitive sport again, you can do one for fun and fitness" and right at the moment I said, 'watch me and choose [sic, chose] one of the most extreme sports I could 'Triathlons'.

Mr H: ...just tell me I can't... and I damn well WILL! [...] Now I think Mr C, Mr D and I have proven beyond any shadow of a doubt to the cardiology fraternity - it is possible to beat cardiac disease.

Mr H also often voiced his disdain at being diagnosed with a heart condition, usually by ending his post on the discussion board with his own personal 'motto' against the disease:

Mr H: Heart Disease... THE MONGREL THING AIN'T GUNNA BEAT ME!

Reducing the chance of his experiencing another heart event appeared to have motivated Mr H to modify his individual risk factors and adhere to healthy behaviours. While other posts by both Mr C and Mr H demonstrated a good understanding of the need for physical activity in their daily routine, it also appears that their efforts to increase their exercise regimes were, at least in part, externally motivated by their desire to prove the medical experts wrong.

Generic internal barriers relating to motivation, character or organising ability

The analysis of the discussion board posts revealed that some HNs who acknowledged the risks associated with prolonged inactivity lacked sufficient motivation to change their behaviour. Mrs R, for instance, stated that she was not participating in any exercise (i.e. she was non-compliant), and acknowledged she was sitting for extended periods of time:

Mrs R: Unfortunately I tend to sit more than 'get up and go' these days and I know it is not doing me any good but just can't motivate myself to do otherwise. I used to walk a lot but "burnt myself out" and now it doesn't interest me at all! so I am in a bad place at the moment.

Such a dynamic is also reflected in the following comments posted by a newer member of HN:

Mr M: I have good periods when I exercise religiously but recently I've dropped off, and of course I have gained weight... I used to go to rph [Royal Perth Hospital] cardiac gym but haven't been for around 8 weeks, just wanna sit around and read papers/books, stupid and dangerous considering my heart issues.

Barriers relating to self-confidence and self-efficacy

As Figure 4-9 below shows most surveyed HNs felt mostly or very confident to engage in physical activities.

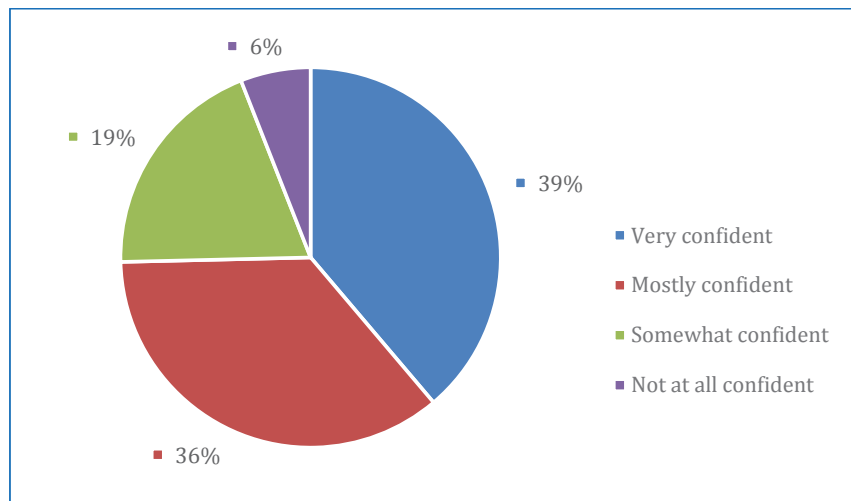


Figure 4-9. Respondents' reported 'confidence' (self-efficacy) regarding physical activity
(n=67)

As the following comments highlight, certain HNs exhibited high levels of self-efficacy in relation to physical activity. In most of the comments, there is recognition that their efforts are paying off or beneficial in some way. This is a concept related to self-efficacy, known as outcome efficacy (Bandura, 1997). For example, I am confident to exercise because I know it makes me feel strong.

My fitness level keeps improving as I progress with activities.

It keeps me fit and energetic, I sleep better and can work longer and more efficiently.

Having pushed my own boundaries, and succeeded, has empowered me to carry on when it gets tough.

I have lost 14kgs and this gives me the confidence to carry on.

I am confident because I have run a 3:30:00 marathon.

I feel comfortable and enjoy what I do

I have no aches and pains so feel confident in my walking exercise

Having 2 heart attack/heart failure will not beat me, mentally I am fine

I am physically strong and I'm able to walk and run. I am also very supple and can still train...

A smaller but still significant proportion of HNs (n=17) reported feeling either only somewhat confident or not at all confident about engaging in physical activity. One HN believed this occurred because "age is slowing me down". Mrs T's prior lack of success with activities such as walking on a treadmill or cycling made it hard for her to even imagine attempting some of the activities discussed on the Physical Activity forum.

Mrs T: I can't imagine me doing any of this... I can't even walk a treadmill without falling...it just doesn't compute with my brain or something...lol...and since I can't ride a bike (never learned as a kid) the idea/notion of trying to ride a bike on rollers also doesn't compute...maybe I could with trainer wheels...what do u think...Gloria stop laughing I'm serious here.

Support from social networking

HNs were in the fortunate position of being able to augment their own capacity for change by seeking advice and support from their fellow HNs. As Mr H's experience highlights, at least some HNs found the site by 'surfing' the Net:

Mr H: I found the site by 'surfing' the net - but I did this on the advice of staff at the cardiology ward where I had been admitted who suggested that the internet was as good a place as any to learn more about my [heart attack] condition.

After using HN for some time, Mr H was convinced of its benefits:

Mr H: ... this forum is vital to the recovery, health and wellbeing of heart patients and their families, friends, and carers etc. I don't believe that this is a nice little luxury - this forum is ESSENTIAL to the ongoing medical management of our conditions.

A post by Mrs K suggested that the personal connections and shared experiences she found on the HN site were instrumental in facilitating her positive behaviour change and the unique value of peer support:

Mrs K: The real value I found in this site (HeartNET) was that it involves people who have a personal connection to heart disease. The HeartNETers also demonstrate how it is possible to lead a valuable and physically active life after a heart attack. No amount of factual, informative information (or fancy web site graphics) can make up for the hope and perspective gained from member's personal stories and experiences.

A post by Mr H likewise highlighted how participation on HN served to inspire and motivate him to be more physically activity:

Mr H: The participation in this social site brings with it the benefits of being motivated by others. From that motivation hopefully the impetus to become more physically involved in a healthy lifestyle is spawned.

I found the HN posts about physical activity achievements so inspirational, that I made the following post:

Gloria: I really enjoy reading the posts here from you fitness gurus!! I myself have been motivated again since joining HeartNET and reading just how much exercise that you both do. This has made me take a good look at my daily routine and ensure that I don't spend most of it on the computer studying! Keep up the good work guys.

As noted previously, the Physical Activity forum was the most popular on the site. For HNs 'fitness enthusiasts' such as Mr C, Mr H and Mr D, the HN site functioned as a journal or diary, a place to record their physical achievements for reference by themselves or other HNs. Posting about their achievements appeared to foster a sense of empowerment (i.e. an ability to control the things that impact on one's health) while setting a good example for other less active HNs.

Mr C: I managed to push through and do 5km at a pace that was only 1min/km slower than my normal pace, which I was very happy about. Remember if you are out walking or running no matter how fast, you are lapping those that are sitting on the couch. Also my new saying for 2013 is "Train like your life depends on it"

Mr D: Just clicked over 2000km of running for this year! That is something I am really pleased about as it is all about consistency and doing something again and again despite the weather and tiredness and a zillion other excuses. And that's what people have to do to look after their hearts - whether it's a walking group, or swimming or whatever.

The Physical Activity forum also provided a platform for healthy rivalry that seemed to play an important role in supporting and facilitating behaviour change; this dynamic, friendly competition was most evident for men. The following excerpts illustrate a healthy male rivalry:

Mr C: There's nothing like smashing out a hard training session before work. I completed a 40km bike session in a new PB (personal best) time. I managed to do the distance in 1 hour 1.45 minutes at an average of 38.93km/hr with a max speed of 62.40km/hr.

Mr H: I have been out knocking out the Ks lately on the bike. Did a 100k'er [100 km ride] this week (the past 3 weeks I have been doing well over 200km's per week on the bike)". Have also been knocking out the km's in the pool with 3 sessions a week of over 2km per session.

Mr H: Constantly knocking over 4km runs in around 18mins [on my hilly course – it rises 25m at its highest point] and easily achieving averages of 30km/h on the cycle legs over 30 - 50km distances. 30 days until the race - so here's hoping that my training keeps moving forward.

Mr C: Double session day today consisting of endurance and strength. Endurance is a long run and strength is a weights session. As I write this I am recovering from the endurance session. I did a 1 hour long run and managed to record my best distance for quite some time. I managed to do 8.2km at an average cadence of 84rpm and lap pace of 7:17 mins/km. Now resting and going to do a weights

session this afternoon. Nothing like being totally addicted to training and obsessed about your goals I say.

Although it was common for the male HNs to post about their physical activity feats, female HNs were more likely to post about their lack of achievement regarding various forms of physical activity than their successes.

Mrs T: My daughters at different times had treadmills and try as I might I just couldn't walk them. Was so embarrassing at first and like u, they laughed and laughed, in the end so did I!

A female HN's post about the pleasures of water walking prompted this encouraging and self-critical post from Mrs T:

Mrs T:it is good to hear that you still enjoy doing walking laps of the pool, I think that's what I might end up doing to. I will have to see how I go with the water aerobics because like you I have trouble balancing and doing arms/legs at the same time!! My hubby tried to teach me to float, but I kept sinking. Not sure what I was doing wrong maybe Mr H or Mr C have some suggestions?? I blamed it on my heavy bones Ha.

Female HNs often posted messages of support, encouragement and gratitude in response to achievements reported by their male and female counterparts.

Mrs T: Mr C, Mr D, Mr H and Gloria...I will cheer u on and support ur efforts from the sidelines cos frankly U are inspiring if someone like me, with my history (with treadmills, bikes etc) even fleetingly thinks about trying it all again, then ur sharing is an invaluable contribution here on HeartNET.

Mrs B: Glad to see you are still as active as ever Mr H. It exhausts me just reading about your adventures! Think I will stick to Pilates and walking!!!

Moreover, whereas some of the male HN's posts emphasised achievement through competitive success and meeting goals, female HN's tended to emphasise enjoyment and fun, rather than competition and quantified achievements:

Mrs D: Mrs B, the walking sounds good to me! Gloria water aerobics sounds like fun....hope you enjoy it because it's so much easier doing things when you are enjoying yourself. Will be waiting to hear your report.

Mr C: Mrs D I agree you have to enjoy what you are doing, that is why I do what I do... Gloria I am sure you will love it and hey just remember for every lap you do, you are lapping someone sitting on the couch :)

Mr H: saw competitive success as a motivator telling Mr C:

Mr H: Your run times are very impressive and if you keep improving and running as fast as you are we could see you in the Olympics.

Mr H's own post about competing to win a silver medal and quantified achievements attracted a number of responses from female HN's:

Mr H: WELL, I am back home. I came home with a SILVER in the duathlon for the men's 40-44yr division, and a top ten overall placing. 2.5km run, 16km cycle, 2.5km run in under 46mins.

Mrs D: sounds good Mr C. Keep positive you are doing great.

Mrs R: Go Mr H!! You are the superhero of HeartNET. Congratulations!!

Moderator: Way to go Mr H - all that hard work paid off - WELL DONE.

Despite these achievements, Mr H noted in a self-lamenting post:

Mr H: I have been heavily training for triathlon now since my heart attack over 6 years ago, and I still do not have washboard abs (getting closer - but not there yet).

Shared mantras

HNs believed in using affirmations and mantras as motivation tools and happily shared these with their peers.

Mr H: Mr C, I must say 'Making the limited become unlimited by the power of the mind' is an affirmation that I love. I think I will have to print that out and prominently display it as a motivator.

Mr C: Mr H that affirmation is one I have worked on since my heart attack. I have been telling myself and my clients 'Put your mind there and your body will follow' and have changed it recently to that, however feel free to use it and I hope it serves you as well as it seems to be for me at the moment.

On another occasion Mr C posted:

Mr C: A little motivation to leave you with. It does not matter what you do as long as you do something every day and before you know it that little something may just add up to one big something. Oh and hey for every step you take you are passing someone sitting on a couch.

Commenting on my aquatic workouts, Mr C also reminded me to "just remember for every lap you do, you are lapping someone sitting on the couch".

What's interesting in these mantras is that physical activity is presented as the positive alternative to sitting on the couch. While this demonstrates knowledge that couch sitting can be detrimental to health, it does not necessarily mean that HNs such as Mr C viewed prolonged sitting as an independent health risk, even after strenuous workouts had been achieved.

Another of Mr H's mantras highlighted the importance of a positive attitude and the need to fight self-doubt:

Mr H: Hear, Hear, Mr C. With a mindset like that... nothing can beat you. Not even your biggest nemesis --- YOURSELF!

Negative impacts of HN, online support and the internet

The paradoxical idea that participation on HN or other social networking sites may be contributing to prolonged sitting time, and the associated health risks, does not seem to have been entertained by the surveyed HNs. Some positive messages on HN did, however, inadvertently create negative effects for some HNs who were lacking the motivation or self-confidence to be able to achieve or aspire to similar levels of physical activity. Mr S was moved to post:

Mr S: It is well and good for others to say we need to do more, however, I for one do not have the confidence that my body will not breakdown again if I put it under extra pressure.

De-identified: This site [HN] is great for those who have had the cure, who can bounce back and run marathon, but some of us can't. There are other heart diseases out there other than heart attacks and this site does not cater to them all. We are obviously in the too hard basket.

SQ 5. Does participation in HeartNET and other social networking sites contribute significantly to sedentary behaviour?

Information about how much time HNs spent on an individual social networking sites in any one sitting needs to be considered alongside how many times a day they returned to these sites and the time spent on other sedentary activities during their day.

Time spent on HN

Despite efforts to limit the survey to active users of HN, a number of respondents reported they were: “no longer using HN at all”, “don’t use this site”, “hadn’t been on the site in two years”, had only “used the site once for information in two years”, “rarely, if ever accessed it” or “had not used HN for a long time”. One respondent who had found HN informative and “helpful in understanding others who had undergone similar surgery”, no longer required this support.

Reported dissatisfactions leading people to desert HN or decrease their use of HN included:

In the early days following my bypass surgery I was looking for support and advice. There did not seem to be and still is no support, of the kind I'm looking for [another site] works so much better than sites like HeartNET, as there is no influence from people 'who have not walked the walk' and therefore it is more real. Real issues and concerns are expressed and the help and support is given by people who have been there

Bullying by some members towards others turned me off. It was supposed to be a stress relief not add to worries.

As mentioned previously, many HNs appeared to have become inactive, infrequent visitors to the site. While this is a unique situation, reminiscent of a site in decline, quite possibly for a range of management and sustainability issues which have been reported by the original research team (Costello, Dare, Green, & Bradshaw, 2013), it may also indicate negative effects. For example, two of the earlier papers published by the HN team document the fall out which occurred when a dispute broke out on the site (Bonniface & Green, 2007b; Green & Costello, 2009). This may be what one of the respondents meant by 'bullying' in the statement above. However, for communities that continue to grow and foster high traffic and good relations, time spent online may be much more significant.

As figure 4-10 shows, most HNs (n=60 of 66) said they spent only 15 minutes or less on HN in any one sitting and this brief time spent on the site is consistent with the decline in interactivity observed.

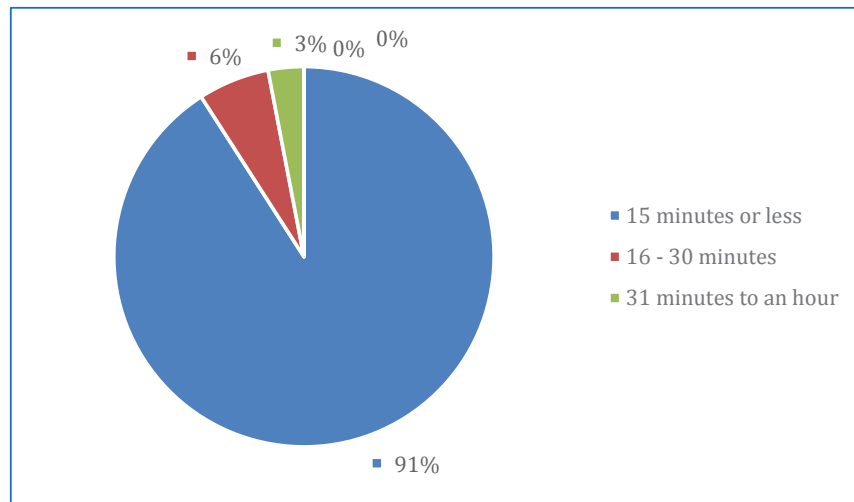


Figure 4-10. Reported duration of respondents' HeartNET sessions (HN)
(n=66)

When asked to provide feedback through the discussion board about these findings, HNs confirmed they spent a limited amount of time on the site:

Mr H: I think the 15mins a day might be relatively accurate as I know from personal experience, that I log in, quickly check around the site for recent posts, add a post as appropriate and then log off.

Mr C: I agree with Mr H, I think the 15 minutes would be fairly accurate and I also log in to have a quick look around be inspired by others and post my own reports and then log out.

What survey respondents liked about HN was accessing it “for ideas and support”, having “a nice chat with similar people”, “sharing with other heart sufferers”, “sharing as a mentor”, “motivating others to start physical activity following their cardiac events”, “to try and be there for others as ppl [people] had been there for me”. These reasons were sufficient motivation to engage HN’s core active members.

As the charts below shows, gender has implications for people's reasons for visiting HN. Seeking information was the main reason for both males (46%) and females (35%). A higher proportion of females sought support and advice (43%) compared to males (33%). Friendship was a lesser consideration (only 10%) for either males or females.

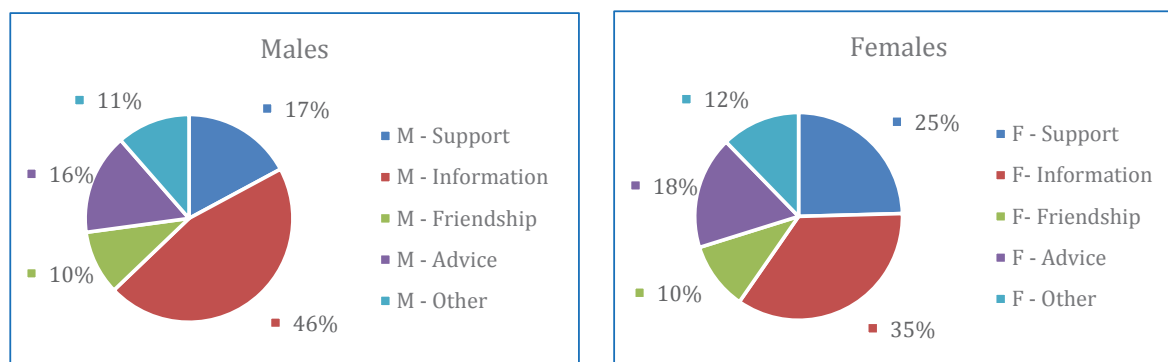


Figure 4-11. Gender and reasons for visiting HN

Time on other social networking sites

For some HNs, the site did not address all of their health, social or other interests. Health interests led some survey respondents to visit other online sites. One "visited a Swedish online group specifically concerning the AF [Atrial Fibrillation] patients... because it is more specific". Another often used "eMedicine or Heart Centre Online". Another spent time with an Australian online shopping site and an English parenting site. Other HNs blogged or read blogs about people's experiences of other medical conditions, while some spent their time online doing searches relating to medical conditions.

As Figure 4-12 shows, 42% of respondents reported they did not access other social networking sites apart from HN, while 51% of HNs reported being regular users of other social networking sites. Apart from HN, the most popular social networking site used on a daily basis by respondents was Facebook 51%. One survey respondent reported limiting Facebook time "for security reasons".

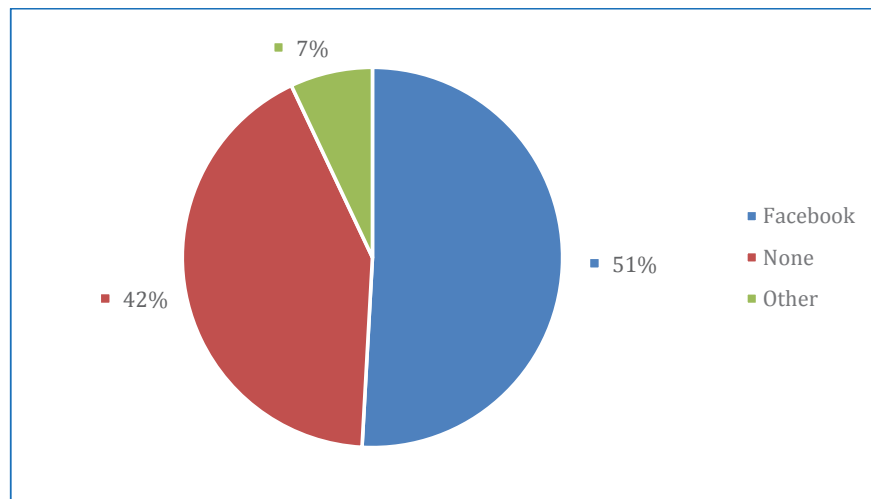


Figure 4-12. Social networking sites other than HN accessed by respondents
(n=57)

Survey comments and posts affirmed that most HNs used Facebook primarily for social purposes, whether to “connect with a few close school friends” or “stay in contact with friends or family overseas” or just to “check to see if I have a message”. Professional interests underpinned some involvement with Facebook for “learning new training techniques from other PTs [Personal Trainers]” or “finding new products”. One daily Facebook user was “very active in working with people who want to recover their health through a raw vegetarian diet”.

A post by Mrs D suggested she and some other HNs may have been attracted to Facebook and other sites by the availability of online games:

Mrs T: That’s why the games become attractive there I suppose, cos then you are at least interacting on a superficial level based on a need to get what you need to keep the games going! In the beginning I was addicted and I had many HeartNETers like yourself (Mrs D) as my neighbours.

As shown in Figure 4-13, 56% of HN survey respondents reported accessing social networking sites at least one or more times a day and 35% of HNs who used these other sites on a regular basis revisited them two to three

times a day 9%. For example, Mrs B stated she regarded Facebook simply as part of “modern life” and she would “log on two or three times a day.”

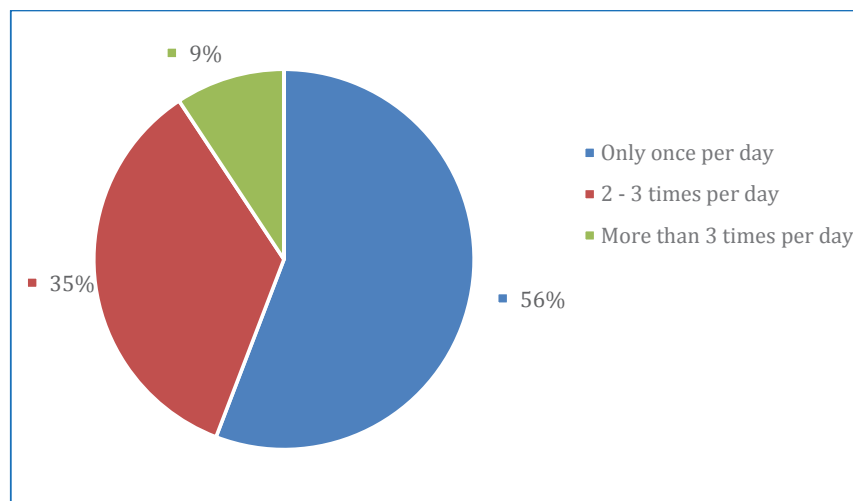


Figure 4-13. Reported return visits to social networking sites other than HN
(n=62)

As shown in Figure 4-14, 58% of HNs reported spending between 15 minutes to an hour on other sites. Alarming, 3% of HNs reported spending between two to five hours online in any one sitting. Only two HNs explicitly nominated social networking (including participation on HN) or online activity as contributing to their sedentary time.

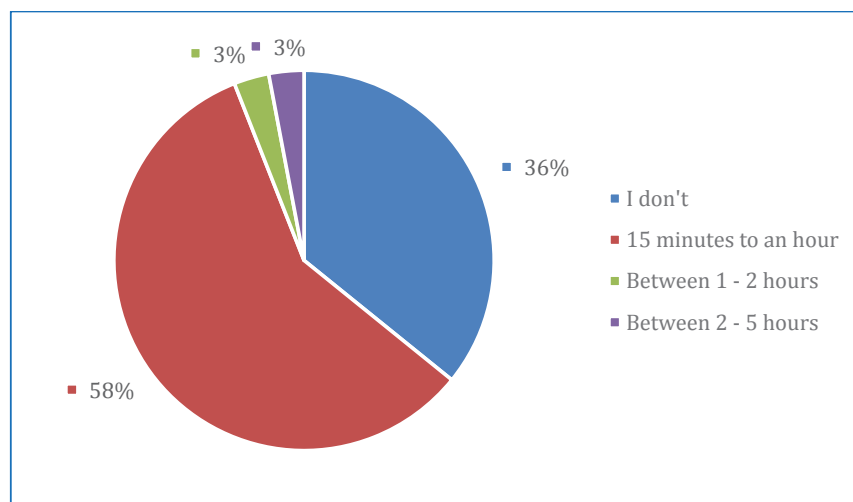


Figure 4-14. Reported time respondents spent on other social networking sites

(n=67)

As shown below, gender seemed to influence the use of social networking sites. Female HNs spent more time on these other sites than their male counterparts and a higher proportion of females (56%) than males (41%) reported using them every day. Only 7% of females rarely used such sites compared to 31% of males.

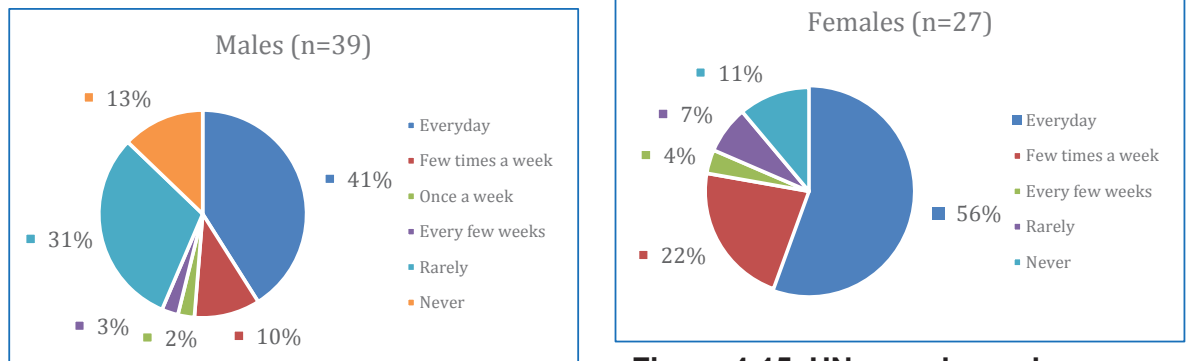


Figure 4-15. HNs gender and social networking use

SQ 6. Do HNs try to break up their online or offline sedentary behaviour?

Given that avoiding prolonged sitting by taking regular activity breaks minimises the associated risks of sedentary behaviour, the survey asked HNs whether they usually took a break if they had been online for more than an hour, and if so, what they usually did in that break period. Of the 67 HNs who responded to the question the majority (72%) indicated they did take a break, but there was still a significant proportion (27%) who didn't.

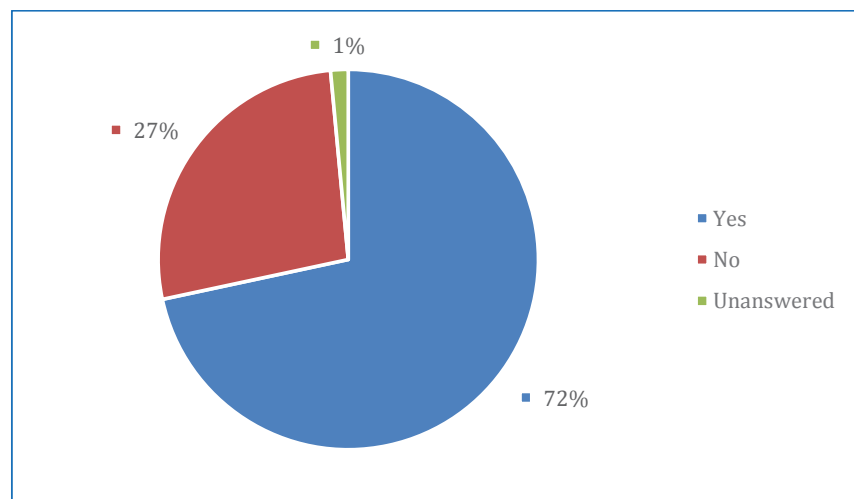


Figure 4-16. Taking breaks after more than an hour online
(n=67)

Gender may have influenced the likelihood of taking a break after an hour of online activity. Males constituted 77% of the sample reporting taking a break, while females constituted only 67%. As the charts below show, although there were more male survey respondents than females, males contributed to the 20% of the population not taking breaks compared to their female counterparts who accounted for 33% not taking a break after an hour online.

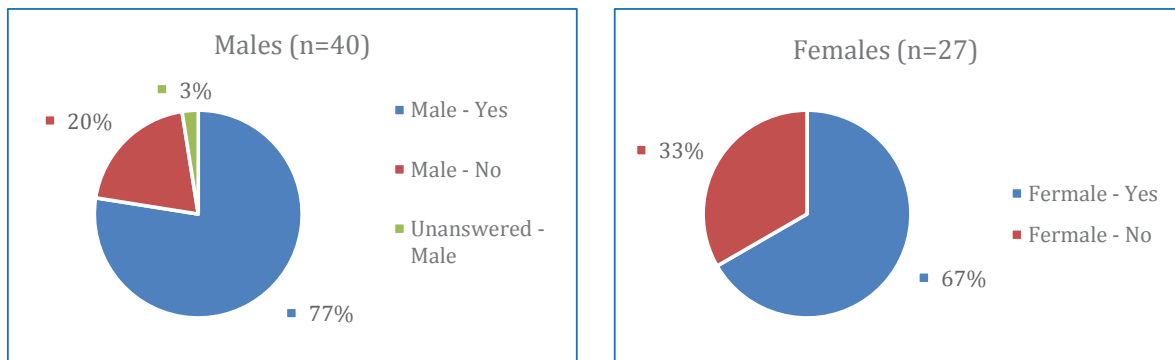


Figure 4-17. Gender and respondents likelihood of taking breaks after more than an hour online

Another 32 HNs reported using a diverse range of strategies to break up time spent on the computer, including going for a walk, playing with the dog and doing stretching exercises (see Table 4-5 below). While no HNs reported setting a timer or other device to monitor their sitting time while online or at the computer, one HN indicated he had some means of limiting computer use to sessions of no more than 45minutes.

Table 4-5. What type of activities are used to break up online/computer time

What type of things do respondents do to take a break? (N=47)	
Responses	Number of Respondents
Not online for that long/rarely online over an hour	13
Go for a walk	13
Make a tea or coffee/get a drink	7
Do household checks/chores/gardening	6
Visit the toilet/bathroom	1
Go outside (for fresh air, play with dog, visit the garden)	2

Breathing exercises/stretching/relaxing	3
Do not take a break	2
Total	47

While one survey respondent reported that at work “I am generally chained to my desk for 4-5 hours or longer”, another reported not taking a break after an hour online because of the tendency to “get wrapped up in what I am doing”. Another HN who tried to restrict time on the computer “because it is so easy to spend hours on it” consciously tried to “do 20 minutes of inactivity and then go and do something for 30 mins - walking, gardening etc”. The strategy of taking regular breaks from sitting also appeared engrained for Mr H:

Mr H: I doubt that I would go much longer than around 30mins without getting out of the car or up from the desk.

Other HNs, whose work required them to sit for prolonged periods, posted about consciously adopting strategies to break up their sitting time. In response to the time they spent sitting, they said:

Mr C: I am lucky I drink a lot of water as that helps me to get up move (even if it is only to the toilet) regularly.

Mr D: At work I have to find reasons to get up and move around often.

Gloria: I try to remind myself to walk around after I have been online for an hour (or get a drink or take a toilet break) just standing up will have a benefit.

While my focus was on breaking up sedentary behaviour, the motivation for both Mr C and Mr D to “get up and move” appeared to relate more to their interest in seeking the health benefits of physical activity than to minimising the harms of prolonged sitting. Concerns about uninterrupted sitting seemed to be much less ‘front of mind’ than the physical activity which some HNs used to measure their own fitness, health and sense of self.

The Big Picture - Overarching Research Question and Themes

Returning to the overarching research question, the coding process described in Chapter 3 identified 11 recurring themes. As shown in the table

below, some of these themes were particularly relevant to specific research sub questions. In this Chapter, I describe each of these themes in turn, to highlight their relevance to the research sub questions. While the themes are presented from 1-9 in the table below, they are not necessarily discussed in this order in Chapter 5 so that their interconnectedness and complexities can be illuminated.

Table 4-6. Recurring themes and their relevance to specific research sub questions

Themes	Relevant research sub questions					
	SQ1	SQ2	SQ3	SQ4	SQ5	SQ6
T1. healthy paradox	✓				✓	✓
T2. tacit knowledge	✓					✓
T3. guestimating time		✓				
T4. fear and uncertainly			✓			
T5. beating the odds/blazing a trail			✓			
T6. support from social networking			✓		✓	
T7. compounding factors		✓	✓			
T8. dissonance and do-ability		✓	✓	✓		✓
T9. fun and laughter				✓		
T10. quick affirmations						✓
T11. healthy Rivalry				✓		✓

T1. healthy paradox

Though HNs were aware of the health hazards facing couch potatoes, they found the notion of an ‘active couch potato’ both novel and paradoxical. Many HNs comments suggested they had less appreciation of the risks associated with prolonged sitting at home or in the workplace than of the risks associated with not meeting recommended levels of physical activity.

T2. tacit knowledge

HNs behaviour revealed some tacit, unarticulated knowledge regarding physical behavior and sedentary behaviour and ways of breaking up sedentary behaviour. Some HNs acknowledged that too much sitting time was unhealthy and needed to be reduced, while others felt a need to move after sitting for extended periods.

T3. guestimating duration of physical activity and sedentary behaviour

As noted earlier for SQ2, some HNs keenly measured their physical activity and celebrated their achievements competing against others or against the clock. Male HNs with a competitive streak were the most prone to precise statements about time spent running, cycling, swimming, training for triathlons or working out at a gym. Their reports of distances and times associated with their physical activity were often so precise as to imply measurements with watches, GPS, bike computers or careful estimates made with reference to maps. Reports of non-sports based activities, such as gardening, housework and walking, were less precise.

Unlike physical activity, the extent of sedentary behaviour and online time was not regarded as something that needed monitoring. Apart from one respondent who limited computer use to sessions of 45 minutes or less, HNs were not in the habit of reporting precisely on either their sedentary behaviour or their online time. As no HNs reported setting a timer or their watch to monitor their sitting time while online or engaging in leisure pastimes, it is likely that HNs not only under-estimated the time they spent sitting per day, but also the time they sat before taking a break.

T4. fear and uncertainties

As discussed earlier in relation to SQ3, fear and uncertainty about engaging in physical activity was linked not just to heart health concerns, but also to everyday issues related to external and internal factors. For Some HNs, lack of confidence in their body's ability to perform particular exercises or activities fed on fear that physical activities could trigger another heart event. For example, a lower sense of self efficacy, manifested through fear and uncertainty, was holding

Mrs R back from engaging in the intensity, frequency and type of activity that she considered health promoting:

Mrs R: I am confident because I know my level of determination but I am always a little hesitant, particularly with activities I am not familiar with, because of my heart health.

T5. beating the odds

Fears of being identified or defined primarily as a 'heart patient' or 'invalid' for the rest of their lives led some HNs to greatly increase the extent and intensity of their physical activity. A determination to 'beat the odds' and achieve levels of physical activity well beyond those recommended, predicted, or expected by their health professionals led Mr H and some other male respondents to markedly increase their physical activity and reduce their leisure-time sedentary behaviour.

T6. support from social networking

As discussed earlier in relation to SQ3 and SQ5, support from the HN site was one of the enablers for increasing physical activity and reducing sedentary behaviour. While social network support was not confined to HN, HNs found the personal connections and shared experiences related to the HN site facilitated positive behaviour change. Gender influenced whether HNs received or gave support, and the nature of this support.

T7. compounding factors

As discussed in the sub question on barriers and enablers, sedentary activities embedded in everyday life compounded the health impact of sitting time while online. These sedentary activities include seated time associated with online activities, computer use, television viewing, desk-bound work and lengthy periods of commuting. Several of the working HNs mentioned the sedentary nature of their work. Some found the 12-hour work shifts reduced their time and capacity for exercise and for participation in team sports or social exercise.

T8. dissonance and doability

As discussed earlier in regards to SQ2, 3, 4 and 6, HNs differed in their knowledge of the health hazards of physical activity and sedentary behaviour, the activities they considered doable and the activities they actually performed. The inconsistency between knowledge and the 'doable' or 'done' activities was sometimes so great as to increase an individual's risk of experiencing another heart event. Thus, despite acknowledging that she was sitting more and that it was not doing her any good, Mrs R had not acted to reduce those risks.

HNs often appeared unaware of dissonance between what they saw as insurmountable barriers to the 'doability' of increasing physical activity or reducing sedentary behaviour, and their evident capacity to make changes that would shrink those barriers to a surmountable size.

T9. fun and laughter

From the time of my *entrée* onwards, it was evident to me that a sense of fun and laughter added significantly to the appeal of the peer support available on HN. As mentioned in SQ4, Mrs T and other female HNs seemed more willing to laugh at themselves than were their male counterparts.

Mrs T: ... laughter does help, especially if u can laugh at yourself. Laughter keeps things in the right perspective and not take yourself or the negatives to [too] seriously! (I just need to be reminded of my words when next I am feeling down. Many friends here had reintroduced laughter to my life which is one of the reasons I keep coming back to HN even though it has been so very quiet here for some time!!)

T10. quick affirmations

The use of affirmations and mantras was discussed in SQ6 as one of the enablers for increasing physical activity and reducing sedentary behaviour. Even brief visits to HN provided sufficient time to allow HNs to use their Physical Activity forum to share mantras, and affirm shared commitments to physical activity and

improved health. Mr H, for example, usually ended his post on the discussion board with his own personal 'motto' or mantra.

T11. healthy rivalry

The use of the Physical Activity forum by the male fitness enthusiasts' on HN provided them with a platform for journalising their physical activity feats in friendly competition with each other. As discussed in SQ4 this was one of the incentives/enablers that appeared to empower the male HNs to continue with their extreme fitness regimes.

Conclusion

As the reduced level of interactivity on the HN site was less than ideal, and not anticipated at the commencement of the study, the survey data generated more data for the analysis than the netnographic data. Coupling the survey data with the scaled-down netnographic analysis still produced insights relating to each of the research questions in this thesis. Developing theories remained beyond the scope of this exploratory study with its limited netnographic data.

The next chapter provides a commentary on the significance of my findings within the broader context of health promotion and health management activities.

Chapter 5. Discussion of findings

Introduction

As the physiological and bio-medical responses to sedentary behaviour act independently of the benefits achieved through physical activity, efforts to promote health must both encourage exercise or physical activities *and* discourage prolonged periods of sitting. My research was designed to identify HNs understandings of physical activity and sedentary behaviour and their health impacts, barriers and facilitators to achieving recommended levels of exercise, and explore links between participation in social networking sites or communities such as HN, and prolonged sitting.

This chapter will contextualise my research findings by highlighting valuable contributions and providing some further interrogation of specific topics. I first reflect on the significance of my experience of netnography. I then address each research sub question and finally, I discuss the overarching research question and implications of my research for members and managers of online health-promoting communities and other social networking sites.

My experience as a HeartNETer and netnographer

As described in chapter 4, my *entrée* phase ended with my becoming an accepted member of the HN community, at least by the few who were still active and engaged at the time. At that time, the combination of the lack of further research funding, competing demands on Lynsey's time, and declining use of the site had lead the ECU-ARC team to contemplate winding up and disbanding the HN site. I was concerned that HN was in such a state of decline that it might not yield sufficient material for a meaningful netnography. I would not have imagined then that HN would still be operating (albeit with limited traffic) in September 2014.

Having completed my research, I have come to admire the commitment to HN demonstrated by some of its active members. That they have not *all* deserted HN in favour of alternative online support communities testifies to either this online community's ability to satisfactorily address some key member needs, or

to their reluctance to seek alternative communities of support, or to some combination of these factors.

As my prime purpose in joining HN has been satisfied by the research presented in this thesis, I have been inactive on HN for some time. However, curiosity about how other HNs are faring still leads me to occasionally login to the site. In effect, I have become a lurker and this has given me a better appreciation of the benefit that lurking can offer. What is surprising to me is that I still retain such a strong sense that I am member of this resilient community that appears to be fighting for life in the absence of any further funding, and with nobody left to manage or host its functions.

I am pleased I chose to apply a netnographic approach to the study of HN, as it forced me to openly discuss my research motives, methods and findings, and acquire the habit of checking my findings with other HNs. I saw the strength of netnography in the relatively prompt and helpful replies to my postings. Because I was posting and waiting for replies, I gained an appreciation of the nature of 'elapsed time' that goes hand-in-hand with an online community reliant on asynchronous communication. I do not believe that I would have developed this understanding had I simply read through postings to forums in which I was not an active participant.

As an accepted member of the HN community, I felt free to comment and joke with other HNs. As a researcher, I wanted to participate in and observe the community, but not to steer it. I wanted to identify themes emerging from the community, but not to force themes on it. I was functioning as 'Gloria, the member' rather than as 'Gloria, the health promoter'. As such, where I offered comments, I tried to do so as a friendly peer, rather than as a researcher. The pattern of my own postings reveals repeated efforts to open up discussion around the research and other matters relating to physical activity and sedentary behaviour, but few efforts to challenge perceived barriers to increasing or reducing them, respectively. However, there were considerable limitations to the netnography, given I was unable to elicit further comments from HNs in regards to their posts at certain times.

It seems that online health-promoting communities and other sites would benefit from management guidelines that address the scope for using netnographic interventions to promote health or at least minimise the risk of harm. Like the need to reduce the harms of online bullying, the need to reduce the harms associated with too little physical activity and too much prolonged sitting surely merits consideration by the members and managers of these communities and networking sites. Hence, netnographic intervention could become a powerful tool for online health promotion and harm minimisation.

The HN population

The demographic data on respondents' gender, age and employment status presented in Chapter 4, suggested male respondents may have been healthier than their female counterparts. More males reported they were still in employment or retired while more females characterised themselves as being unable to work. This may in part account for the differences in their levels of physical activity and sedentary behaviour and the differing roles members played on HN.

SQ 1. Understandings of physical activity, sedentary behaviour and their health impacts

While the majority of HNs appeared to recognise the health hazards associated with insufficient physical activity, their knowledge of the health risks posed by prolonged uninterrupted sitting appeared much less well-developed. As most HNs are heart patients who had already experienced some sort of heart event or ailment, and perhaps as a result appeared to have a heightened awareness of healthy behaviours, it was concerning that they did not appear to be more aware of the health hazards of prolonged sitting. It is of course possible, though unlikely, that HNs did have a good understanding of the effects of prolonged sitting, but simply felt no need to elaborate on this.

To some extent, the limited understandings of the risks to their health in regards to sedentary behaviour is to be expected, since physical activity has been given much more exposure as 'a good' health behaviour, while the harms associated with prolonged sitting and sedentary behaviours had received far less

publicity during the period I was collecting data. This suggests that public health campaigns that simply promote 30 minutes or more of daily exercise or activity can unfortunately serve to obscure risks linked to periods of prolonged sitting. Hence, sedentary behavior is now positioned as a 'new' public health issue (D. Dunstan et al., 2012) and one which will only gain traction if it is viewed independently of physical activity pursuits.

As the recommended levels of physical activity had become a benchmark by which many HNs assessed their health, some HNs understandably had trouble reconciling the fact that even individuals exceeding minimum levels of physical activity could incur significant health risks as a result of prolonged sitting. Mr H, who felt that he was healthy because he ran "40 kms each week", did not appear to recognise the other risk factors he incurred as a result of sedentary behaviour. It is therefore quite likely that the health of even the more physically active HNs was still being compromised by prolonged bouts of sitting despite their intentions to lead healthier lives and the very real benefits they derived from engaging in physical activity.

Once the health risks of prolonged sitting are acknowledged and accepted, they can be significantly and systematically reduced by strategies such as setting timers to trigger a brief intervention such as standing up, stretching or engaging in some form of physical activity.

SQ 2. Types of physical activity and sedentary behaviour

HNs preferred forms of physical activity match those of other Australians (Beactive, 2010- 2013) and highlight the ecological and cultural logics underpinning HNs choice of activity. HNs outdoor activities are those relevant to warm or temperate Australian climates. As with other Australians, gender, age, work commitments, socioeconomic status and their state of health influence the type of physical activity (Australian Bureau of Statistics [ABS], 2012, 2013) they undertake and the time they devote to it. Many HNs' physical activity reflected a gradient from light through moderate to vigorous and even extreme physical activity, yoga and Tai Chi would normally be regarded as falling at the light end of the spectrum and endurance events, such as triathlon and marathons, at the extremely high level of physical activity. All of those activities now cater to a wide

range of age groups, but even yoga and Tai Chi can seem challenging to inactive or unfit individuals, people with low level of physical literacy, or people with chronic health conditions such as heart disease, as are many HNs.

Like many Australians, HNs have access to pools and gyms and other sporting and recreational facilities; however, HNs were more likely to pursue individual activities than engage in team sports. The team or social sports HNs reported pursuing were not associated with popular Australian sports such as cricket, football, netball or tennis. Although one HN reported playing hockey, other HNs preferred more sedate activities such as golf or indoor carpet bowls. Carpet bowls is a sociably inclusive, indoor game popular in clubs and retirement villages, because it requires little space and minimal equipment and can be played by able-bodied persons and by individuals with differing degrees and types of ability. HNs casual references to gym work, Tai Chi, yoga and Zumba show that these activities are not novelties, but accepted elements in the spectrum of physical activity within Australia (Lan et al., 2013; Penman, Cohen, Stevens, & Jackson, 2012). In particular, gym and fitness classes can offer social benefits as well as physical activity, which may be why these were well accepted amongst HNs.

While gym classes, club competition, or encounters with dog walking friends, imply some level of sociability, yoga and Tai Chi might be practiced solo or in a group setting. Though few HNs engaged in competitive sport, the Australian heart patients interviewed by Pryor, Page, Patsamanis, and Jolly (2014) drew support from fellow members of bowls clubs, golf clubs and motorcycle clubs, and ongoing friendships with heart patients they had met during their cardiac rehabilitation program. This is an interesting difference in view of Stone, Meisner, and Baker (2012), contention that participating in both group and individual physical activities may have important implications for maintaining older adults' mental health status.

According to Vallerand and Young (2014) while enjoyment, stress relief and social-affiliation motives predicted commitment of both sportspersons and exercisers, sportspersons placed more value on competition and social-affiliation motives. Health-related and stress relief motives buffered both sportspersons and

exercisers against the risk of lapsing from their preferred styles of physical activity. Exercise is also essentially an amateur activity, while spectators play a much less significant role in exercise than those participating in amateur or professional sport. However, while live or televised spectator sport does little to keep its spectators physically active, it can provide fans and followers with valued mental stimulation and a sense of belonging.

Preferences for walking, jogging, running and cycling

Given that walking is the form of exercise promoted by Australia's National Heart Foundation for all types of heart conditions to prevent secondary heart events and other chronic health conditions (Briffa et al., 2006), HNs preference for walking was not unexpected. Walking can be undertaken either solo, with other people, or with dogs, and need not involve the use of any specialised equipment (even shoes are optional though a good pair of walking shoes may be helpful). Walking can take place outdoors in streets or gardens, and in indoor environments such as shopping centres or on the even more controlled conditions of a treadmill. It is also convenient as there is no travelling time required, particularly if walking around the block or at the local park.

My own involvement in an Aboriginal health service's Heart Health group has highlighted that this group, like other adults perceive walking as an easy, familiar, inexpensive, and less intimidating form of exercise than cycling or gym activities, other than use of a treadmill. It is easy to adjust both the time and speed of a walk to suit an individual's fitness level. A heart patient recovering from surgery may only be able to walk for a few minutes at any one time, while others may have built up to sessions of 30 minutes or more.

Walking can be done in the individual's desired timeframe. Yet, while some HNs mentioned walking in their lunch hours, none mentioned walking to work or to the shops. It is possible that HNs lived, worked and played in places that discourage active modes of transport such as walking and cycling.

Walking did, however, appear to be viewed as an outdoor activity, rather than one conducted inside more controlled indoor environments such as shopping malls or galleries. HNs also appeared to have more interest in walking

dogs than in bushwalking, or competitive walking events staged to raise funds for charities. As none of the HNs mentioned step counts, it appears they were not making use of pedometers or fitness bands to monitor their activity levels.

While the benefits derived from walking are well documented, running remains a more glamorous activity than gentler to the body activities such as walking or jogging. In addition several HNs mentioned running in events such as marathons, half-marathons and triathlon events that have running as one of their components.

HNs discussed cycling as a form of exercise and training rather than as a pleasure or a social activity. They made no mention of membership in any cycling club, though such clubs are commonplace in Australian cities and towns. Several HNs mentioned triathlon events that have cycling, running and swimming as their components, suggesting a focus on competitive rather than social sport for these members.

Preferences for specific forms of physical activity

Physical literacy and personal history of sport and physical activity influence the types of activity individuals find doable and pleasurable. While learning to ride a bike is a skill many Australians master in childhood, this was evidently not the case for Mrs T. Her reported difficulty using equipment such as bikes and treadmills indicates that her level of physical literacy has remained low. For this to change she would need tailored and supportive formal or informal coaching that encouraged her to master basic physical skills and increase her ability to use common gym equipment and physical activity opportunities. The minimal equipment requirements of Tai Chi and yoga suggest these activities, which can be performed at home or in classes, could be more appealing and suitable for Mrs T and people like her than forms of physical activity involving more complex equipment.

The forms of physical activity that cannot be categorised as sport or exercise also merit attention. These now include housework and gardening but also newer activities such as exergaming. While none of the HNs made any mention of exergaming, this increasingly popular effort to integrate online activity

and exercise might be expected to have some appeal to members of an online health-promoting community. My HN research did, however, begin before recent Western Australian initiatives were introduced (exergamingaustralia.com/) to use exergaming to improve the health of older Australians. This may be worth exploring in further research with communities such as HN.

Work by Bentley et al. (2013) highlighted the importance of heart patients finding a form of physical activity that they enjoy. Community events such as the “Have a Go Days” staged here in Perth on November 2014 provide a cheap and safe way for people to experiment with activities not familiar to them, and these may now afford a number of health, pleasure and social benefits. There was, however, no mention of such days on the Physical Activity forum of HN, despite several threads relating to the appeal of various forms of physical activity. HN’s acknowledgement that exercise can be pleasurable, even fun, is discussed further under the themes relating to T2 tacit knowledge, T9 fun and laughter and T8 dissonance and doability.

SQ 3. Intentions regarding physical activity and sedentary behaviour

Some HN’s involved in this study were very keen to ‘take charge’ of their health, and were doing all they could in terms of physical activity to reduce their risks of a secondary heart event. However, as even Mr H, a self-confessed exercise enthusiast, reported difficulty in limiting sitting time, less motivated individuals are likely to experience even more difficulty.

The concept of readiness (ie stages of change – (see Harris et al., 2010), to change for heart patients requires that individuals move through a number of attitudinal and behavioural changes over a period of time in order to ensure the new behaviour is fully adopted and maintained. Posts on the HN Physical Activity forum suggested scope to leverage discussions on the site to assist HN’s move from the pre-contemplation stage through to the action stage. Without such assistance, individuals such as Mrs R could remain stuck in the pre-contemplation stage of change. Zimmerman, Olsen, and Bosworth (2000) noted that the family members of their ill patients could be taught to support their affected loved ones who become ‘stuck’ and help move them to the next stage of change. Hence, support tailored to individual circumstances and the relevant

incentives, barriers and enablers would appear to offer better chances of success than any 'one size fits all' approach. Similarly, strategies to assist participants to better manage structural barriers such as heavy work commitments or inflexible work schedules may enable them to increase their physical activity. A netnographic approach is potentially well suited to such a strategy but this requires a critical mass of users, much like the one that HN once boasted.

SQ 4. Incentives, barriers, enablers and support

This sub question investigated the factors that HNs perceive as motivating, enabling the achievement of recommended levels of physical activity, or preventing them from reaching the desired amount. Napolitano et al. (2011) contended that addressing individual barriers and emphasizing strategies for overcoming them, may be of utmost importance to prevent frustration, build self-efficacy and promote sustainable adoption of physical activity. This is addressed later in this chapter during the discussion of the T8 on dissonance and doability and T11 healthy rivalry. Other barriers and enablers may be understood in terms of the ecological model; the extent to which HNs differed in their recognition and acceptance of the ecological model for the coproduction of health is also discussed later in this chapter under the theme T7 compounding factors.

Difficulties in achieving physical activity recommendations and a tendency for prolonged periods of sedentary behaviours are certainly not unique to heart patients (Salmon, Owen, Crawford, Bauman, & Sallis, 2003) or HNs specifically; however, my research revealed that external and internal factors acted as incentives, barriers and supports.

Impact of external factors

From the demographic data in Chapter 4, it is clear that HNs are scattered across Australia and are likely to experience different types of work, living and recreational environments, even though most appear to be city dwellers. As noted in Chapter 2, Australia's major cities differ quite markedly in the provision of public transport, and support for active transport such as cycling and walking, and a range of structural barriers may impede even motivated individuals to increase their level of physical activity, or limit their sitting time.

The survey and netnographic data do, however, suggest that individuals involved in this research project did have adequate access to gyms, fitness centres, pools and sporting facilities. Transport issues generally posed a distinct but less formidable barrier to HNs than to members of my health service's walking group, whose participation is completely contingent on their having access to community transport to bring them into the Health Service and return them to their homes. Concerns about crime and threats to personal safety did not appear to constitute a barrier to physical activity for any of the HNs, and even HNs who did not engage in sport or exercise appeared to have some level of mobility. The HNs who engaged in walking and other forms of exercise also seemed less dependent on walking buddies or exercise buddies than are members of my health service's walking group. HNs made little mention of beaches, parks, walkable neighbourhoods or spending time in nature, and it is not clear where HNs walked their dogs. The gardens mentioned by HNs as enablers of physical activity appeared to be part of the home environment rather than community gardens, and their dwelling places were not seen by HNs as constituting barriers to physical activity in the same way that their workplaces did. It seems, however, that no HNs worked for organisations providing workplace-based programs to promote physical activity and reduce sedentary behaviours.

External barriers to physical activities identified by HNs meshed with those reported in the literature and discussed earlier in Chapter 2. Screen-based work and recreation, shiftwork, travel by car, heavily trafficked roads, and costs associated with gym memberships were acknowledged as barriers to physical activity. For some HNs, work posed a formidable barrier to physical activity; for one member any increase in physical activity would have to come after his retirement. In this context, future interventions which draw on a stages of change theoretical framework need to acknowledge, and address where possible, that structural factors including financial costs or work schedules can present significant barriers to individuals adopting healthy behaviours, even where they are motivated to enact change.

HNs mentioned their weight, state of health and personal experience of sport and physical activities as additional barriers, while online advice, pets and gardens were seen as enablers. While music was not mentioned as an enabler,

HNs attended fitness classes such as Zumba and Prime Movers which involve movement to music and most gym and fitness centres play music to exercise by.

It is therefore not surprising that HNs who were not achieving the recommended levels of physical activity attributed this to perceived external barriers not specific to heart health, such as sickness, work and family commitments, and time spent on other activities such as Facebook. For Mrs R, the cost of joining a gym was a main factor in preventing her from accessing it. This could be a deciding factor preventing other HNs from increasing their activity or reducing their sedentary time.

Impact of heart health concerns and other health concerns

A recently diagnosed heart patient who recognises the need to prioritise physical activity may be sufficiently motivated to achieve healthy lifestyle changes, but find it more difficult to come to terms with what it means for them to be a 'heart patient' (Green et al., 2007). The stigma of being pigeonholed as a 'heart patient' or 'invalid', and a desire to prove oneself or 'beat the odds' made some HNs ready and determined to increase their level of physical activity.

Mr H's posts emphasised that his refusal to let a heart condition control him had strengthened his resolve and motivation to beat the disease. Such comments echo previous research (Tannenbaum & Frank, 2011) which found that male patients who experience a life-threatening event often change their behaviours to ensure they make the most of their 'second chance' at a healthy life. Individuals do, however, often need more than a motivation seeded by external forces (such as beating the odds, a taunt or a stigma) to support and sustain health-promoting behavioural changes (Anderson, 2008) that reduce their risk of experiencing a secondary heart event.

For other individuals who have experienced a heart attack or event, any unpleasant, unwelcome or unexpected physiological responses to physical exertion can elicit sufficient fear of a secondary heart attack to inhibit them from engaging in any forms and levels of exercise that they perceive as unsafe (Costello, 2009). Several HNs in my study reported that health concerns and the

fear of triggering another heart event or inducing negative symptoms, posed significant barriers to their achieving recommended levels of physical activity.

For Mrs M, it was not a lack of motivation that held her back from engaging in physical activity, but the challenges she faced in being a heart patient. For others, poor cardiac health inhibited them from being more physically active and thus, seemed to reduce their self-efficacy and capacity to achieve the recommended levels of activity. Such a response has been highlighted in previous research, which found that when an individual is confronted with a health threat, “they have a choice of denying the threat, modifying risk factors and health behaviours in an attempt to alleviate the threat, or seeking professional help” (Tannenbaum & Frank, 2011, p. 244).

In addition to their heart health issues, several HNs had other health conditions that influenced their willingness and capacity to engage in physical activity. Efforts to enhance this, and reduce sedentary behaviour, do therefore need to cater for people with multiple morbidities. Health-promoting behavioural changes that reduce HNs risk of experiencing a secondary heart event could be expected to benefit their general health and chronic conditions such as diabetes, obesity and arthritis. Those HNs delaying effort to increase their physical activity until after surgery or recovery from injury could be encouraged to focus on reducing prolonged sitting prior to surgery, and to look at both increasing physical activity and reducing sedentary behaviour after their operations.

Self-perception and self-efficacy issues

As indicated above, several HNs appear to have remained physically, psychologically and emotionally vulnerable due to heart conditions and concerns that have reduced their sense of self efficacy. Other key internal factors inhibiting HNs from achieving sufficient levels of physical activity included fear and anxiety, and a lack of motivation, or perceived character flaws they appeared to regard as fixed and immutable. Several HNs cited lack of motivation or laziness as a justification for not engaging physical activity, as if laziness and motivation were factors over which they could exert no control. Although no HNs explicitly mentioned depression as a barrier, it may have been a factor contributing to a

lack of motivation, 'being in a bad space' or a reluctance to change their levels of physical activity and sedentary time.

Even individuals with the appropriate knowledge and skill level required to undertake a desired behaviour may still fail to embark on the required behaviour change, simply because they lack the confidence to do so (Harris et al., 2010). A lowered sense of self efficacy for new types of physical activity appeared to be holding Mrs M back from engaging in the intensity and frequency of activity, which she desired in order to promote good health. The physical activity relapse reported by one of HNs newer members, Mr M, may have reflected both his difficulties in adjusting to life as a heart patient and a persistent low level of self-efficacy in relation to exercise despite, or possibly even because of, his experience using a cardiac gym, usually only accessed by patients recently released from hospital.

Assisting progress through the stages of change

Supporting and motivating individuals such as Mrs R and Mr M to progress through the stages of change could require action to address a set of barriers, ranging from limited understanding of the health hazards of prolonged sitting, a belief that increasing physical activity and minimising sedentary behaviour necessarily involves strenuous activity or access to a gym, and a belief that the cost of attending a gym constitutes a significant barrier.

Previous research has identified the health benefits derived from peer support and how confirmation from others can strengthen an individual's self-efficacy (Aliabad et al., 2014). Costello's research has previously established that support exchanged through HN was critical to building self-efficacy, and motivating many of the members to become more physically active despite the challenges posed by an existing heart condition.

Similar dynamics were evident in my research, with some HNs noting how they were motivated by other HNs achievements. The themes of 'beating the odds/blazing a trail' and 'support from social networking' and healthy rivalry discussed in the previous chapter were evident in posts by several male HNs with high levels of physical activity. By affirming male HNs sense of masculinity and

assisting their active rejection of identification as a 'heart patient', these overt demonstrations of 'healthy' masculinity seemed to help sustain positive behaviour including regular physical activity. Competitive male HNs benefited from the platform HN provided for 'performance' of normative masculine identity through descriptions of sporting and physical prowess (Tannenbaum & Frank, 2011). Such posts and the online responses they elicited may have served to increase these HNs own sense of efficacy and to motivate them to push themselves harder.

Messages highlighting HNs physical achievements were also acknowledged as instrumental in encouraging and motivating others on the forum to Increase physical activity. A post by Mr D exhorting others to overcome barriers such as tiredness, bad weather and health fears thus had the potential to inspire other HNs to overcome their own barriers to increasing physical activity. It certainly offered a handy reminder to avoid making excuses for failing to increase physical activity or sustain the recommended level of exercise.

Overt displays of physical achievement and masculinity did however, occasionally have unintended negative consequences for HNs struggling with aspects of their heart health, and feeling unable or fearful about engaging in physical activity. For example, proclamations of sporting prowess had the potential to reduce others' sense of self efficacy by inadvertently contributing to feelings of inadequacy or disempowerment. Disempowered individuals who felt less confident and/or willing to maintain or increase their level of physical activity are likely to face greater risk of experiencing further heart events.

In general, however, participation in the HN community was linked to an increase in self-efficacy, which in turn facilitated the maintenance or increase in physical activity for some HNs. The online HN community clearly played an important role in supporting HNs efforts and commitments.

As this discussion suggests, the gendered online and offline experiences of people with heart conditions need to be acknowledged. Gender and activity levels appeared to determine who posted about their physical activity achievements and who acted as a cheer squad for those reporting high levels.

During the time I participated on HN, I appeared to be the only female HN posting about her physical activity achievements.

SQ 5. Does participation in HN and other social networking sites contribute significantly to HNs sedentary behaviour?

Male and female HNs differed in their use of the site. Seeking information was a stronger motivation for men, perhaps because it is easier for men to seek/ask questions using an online pseudonym than face to face with a GP or specialist. This is consistent with a notion of masculinity which regards seeking health information as a sign of weakness (J. Smith, Braunack-Mayer, & Wittert, 2006).

The men's health network (<http://www.menshealthnetwork.org/>) and many other programs focused on men's health have sought to overcome male reluctance to visit doctors and other medical professionals including counsellors (Vogel, Wester, & Larson, 2007). Tannenbaum and Frank (2011) identified that men do not visit a doctor as frequently as women.

Any activity characterised by prolonged sitting, such as social networking use, is potentially detrimental to heart health and general wellbeing. As noted in Chapter 4, even some of the more physically active HNs were spending considerable periods of time sitting during the day but failed to appreciate the risks they are incurring through prolonged sedentary behaviours. They also appeared unaware that their participation on HN or other networking sites could further contribute to prolonged sitting time.

It appears that while the current pattern of quick visits to HN does not encourage prolonged sitting, HNs use of other sites may be accompanied by more prolonged bouts of sitting. It is not clear whether HNs take breaks between their use of HN and their visits to these other sites or their other computer-based or seated activities.

Given that social networking has become the most popular activity for computer users around the world (e.g. Pew Global Attitudes Project [PEW], 2010) the reported popularity of Facebook and the increasing number of new users in the last few years (Facebook, 2010; Spraggins, 2009), it was not surprising to

find most HNs reported accessing social networking sites once or more a day, with accessed Facebook most often.

While more than 1 billion people played online social games worldwide – representing an 8% increase in 2012 (Kuss, 2013) – the Facebook game ‘Farmville’ attracted an unreasonably high number of HNs. The high entertainment value of these online games may lead to people spending more time online and more of their time sitting.

Although the survey data seemed to indicate that most HNs did not engage in more than one hour of prolonged sitting in relation to online activity, two HNs seemed to be engaging in extended sitting time relating to their use of online communities or other networking sites – in excess of the supposedly ‘safe’ 2 hour limit proposed by Owen and colleagues (Owen et al., 2010). As in the Baker IDI Institute Heart & Diabetes study, it is highly likely that many HNs underestimated how much sitting time they actually engaged in; thus, any form of incidental activity or just simply standing up can have health benefits.

SQ6. How often do members take regular breaks while participating in their community or any other social networking site and what type of activities do they engage in when taking a break?

Given there is no way to know how accurately HNs monitored the time they spent sitting before they attempted to take a break, objective measurements (see Healy et al., 2008) of their total sedentary time would assist development of appropriate strategies to reduce their likelihood of prolonged sitting.

While most HNs reported taking a break when they have been online for over an hour or more, efforts to devise useful and appropriate strategies to limit the duration of sitting, and which serve as a reminder of the duration of their sitting time, can build on the strategies HNs reported already using.

Few HNs appeared aware of the importance of breaking up their sitting time, perhaps because physical activity achievements mask the need for this. Yet even HNs (such as Mrs R) whose existing heart conditions leave them reluctant or fearful of engaging in more strenuous physical activity, *can* act to minimise the health hazards of prolonged sitting.

Overarching Themes

Some of the recurring themes reported in the last chapter have clear relations with the literature reviewed in Chapter 2. I therefore review each of these themes in turn in a sequence highlighting where they reinforce and conflict with each other and the reviewed literature. I deal in turn with T4 fear and uncertainty, T5 beating the odds/blazing a trail, T6 support from social networking, T7 compounding factors, T9 fun and laughter, T10 quick affirmations, before focusing more specifically on sedentary behaviour matters in T1 healthy paradox, T2 tacit knowledge, T3 guestimating time, T11 healthy rivalry, T8 dissonance and doability. While these themes appear to be out of sequence, they have been presented in a way that demonstrates their fit with the questions that were either related to physical activity or sedentary behavior. Hence, they are often inter-related and multi-dimensional especially in terms of the literature which has been cited to add value to the discussion.

T4 fear and uncertainly

Even though HN is a heterogenous ‘community of circumstance’ (Chadwick, 2011), a mix of men and women united by issues relating to heart health but differing in age, location, occupation, leisure activities and levels of health, physical activity, sedentary behaviour and socio-economic status – they all share in knowing and living the fear surrounding a heart event. For HNs and other heart patients and their carers, a heart event is wakeup call, a warning that ongoing heart health and the ability to continue normal, familiar or desirable lifestyles cannot be take for granted. As noted in Chapter 4, concerns with heart health led some HNs to become hyper-vigilant about their health. However, having a heart condition or the burden of caring for a heart patient can reduce the capacity to engage in health promoting activities such as physical activity (Mochari-Greenberger et al., 2010). Some heart patients and their carers may also be managing additional comorbidities (such as arthritis, diabetes, digestive or respiratory disorders), as they attempt to navigate their way to a heart healthy life. While these matters are discussed further under theme T7 compounding factors, they add to the stressful circumstances surrounding heart patient recovery.

As Bandura (1997) points out, the self-efficacy needed to initiate and sustain new behaviours after a heart event is likely to be diminished at least temporarily by the heart event itself. Heart patients interviewed by Pryor et al (2014) spoke of the shocking tiredness and overwhelming emotions that dogged them for weeks after their heart event, and their needs for immediate practical and emotional support from friends and family and their sense of having lost control over their lives and bodies, all of which create some form of fear or distress for HNs in some form or another.

Seto et al's. (2011, p. 377) study of outpatients attending a multidisciplinary heart function clinic found barriers to "self-care included lack of self-care education, financial constraints, lack of perceived benefit, and low self-efficacy". Many heart patients are not referred to, or do not attend, the cardiac rehabilitation (CR) programs with physical activity as a core element developed in the late 20th century (Bentley et al., 2013; Clark et al., 2012; Sunamura et al., 2013). While participation in such a program has well-documented health benefits at least in the short term, the weeks of waiting to enter such a program can be stressful for anxious heart patients in need of support (Pryor et al (2014). The Australian heart patients interviewed by Pryor et al (2014) had however made significant adjustment to their lifestyles by the time they completed their weeks or months of cardiac rehabilitation.

Elliott, Bentley, and Aromataris (2013, p. 14) note that the barriers to participation in cardiac rehab "commonly include patients' lack of knowledge of services, patient identity, perceptions of heart disease, and financial or occupational constraints". As Bentley et al. (2013) highlighted, women tend to be under-represented in rehab programs, while Clark et al. (2012) also suggested heart patients who were older, poorer, or living in remote communities were less likely to participate in rehabilitation programs. They also noted that dropout rates tend to be higher for females, unmarried persons, older persons, people with lower fitness capacity and people with a higher number of comorbidities, or those who have a fear of falling.

As Sunamura et al. (2013, Para, 2) pointed out, "only little is known about the effects of CR programs on the level of daily physical activity after CR" has

concluded. However, Bentley et al. (2013) found that Canadian heart patients reported meeting or exceeding recommended levels of physical activity three years after completing rehabilitation. Less information is available on the impact of rehabilitation in terms of sedentary behaviour, which has not been a traditional area of focus for these programs and remains neglected even in the mHealth (mobile health) rehabilitation program proposed by Dale et al. (2014) earlier. Weinstein and Sesso (2006), and Goodwin, Forman, Herbert, Butryn, and Ledley (2012) contended that 'cardiac lifestyle interventions' have tended to be minimally successful in long-term modification of behaviour considered risky for heart health, and that cardiac lifestyle interventions are ill-suited for people with multiple morbidities and less successful for heart patients with low SES and low levels of education. Indeed, while this may not be directly related to fear and uncertainty, it is likely that some of the reasons why cardiac rehabilitation programs have minimal success is related to issues surrounding fear or stress.

Thus, even with access to cardiac rehabilitation programs, or other initial assistance with lifestyle changes, heart patients can still find it difficult to sustain health-promoting changes to their lifestyles (Artinian & Franklin, 2010; Pryor et al., 2014) especially if fear and uncertainty persist.

While some HNs acknowledged positive aspects of rehabilitation programs, referring to them as 'ticker clubs', they were constructed as an initial step (almost a cursory one) that was far removed from the kind of self-care they required and their own capacity to provide it. Hence, HNs role, and the role of online communities generally, in supporting their self-care is perhaps under reported or under regarded in the mainstream media and in the literature.

In Australia and most other developed countries, the self-transformational learning about the ongoing self-care HNs and other heart patients need to improve and sustain heart health (Coady, 2013) now takes place in a world where physical activity tends to decline with age (Jefferis et al., 2014) and where workplaces, homes, and transport systems have been designed to minimise physical activity. Achieving the recommended levels of physical activity and decreasing sedentary behaviour may therefore require changes to the habits of

a lifetime, experimenting with unfamiliar and initially unappealing behaviours and breaking with expectations of family, friends and cultural groups.

It is thus not surprising that Goodwin et al. (2012) identified ‘distress tolerance’ and psychological acceptance of their new health condition as a factor that may assist heart patients to adopt a sustainable heart-healthy way of life. Newer Acceptance-Based health behavior interventions have assisted people to quit tobacco or adopt healthy diets and may prove as relevant and successful for the adoption of sustainable heart healthy ways of life (Goodwin et al., 2012). Such interventions assist ‘mindful’ acceptance of a new health condition and highlight the importance of clarifying personal values (Spatola et al., 2014) and keeping lifestyle choices aligned with those chosen values (Goodwin et al., 2012).

As Artinian et al. (2010, p. 424) pointed out, heart patients, who are realistic about their own capabilities and set specific and “appropriately ambitious” behavioural goals for themselves, are most likely to achieve those goals and perhaps less likely to be plagued by fear and uncertainty. In the context of my research, HNs differed in the extent to which they had chosen to accept or challenge (perhaps in the face of fear) their identity as a heart patient or a heart patient carer.

T5 beating the odds/blazing a trail

A small but influential group of male HNs active on the Physical Activity forum have chosen to focus on demonstrating that they have ‘beaten the odds’ by successfully engaging in types and levels of physical activity beyond those they or their health professionals associate with heart patients. This group’s notions of ‘appropriately ambitious’ goals appear to transcend rather than accommodate the risk of a further heart event. They have forged leisure careers in amateur sport, whether in masters swimming or the endurance event known as triathlon.

Some sports enthusiasts (Stebbins, 1997, 2007) – masters swimmers, veteran hockey players and competitive triathletes – are pursuing ‘serious’ leisure rather than the more popular ‘casual’ leisure based on “relatively short-lived pleasurable activity requiring little or no special training to enjoy it” (Stebbins,

1997, p. 18). Serious leisure affords unwaged leisure careers that require perseverance, significant personal effort linked to special knowledge, training, or skill, and contribute significantly to an individual's well-being and identity (Stebbins, 2007). Serious leisure thus includes amateurism, hobbyist pursuits and career volunteerism and offers benefits ranging from fun to self-actualisation, self-enrichment, recreation or renewal of the self, a sense of accomplishment, self-expression, an enhanced self-image, social interaction, and sense of belonging to a distinctive subculture (Stebbins, 2007).

Masters sports afford older persons the opportunity to compete against others of their age group by mastering new sporting skills or by continuing to compete in a sport they have long pursued. According to Young and Medic (2011), Masters sport participants are usually motivated individuals who maintain high levels of physical activity and are regarded as role models for healthy ageing. Likewise, these authors note that Masters swimmers who devoted more time, effort, or energy into their sport reported greater resolve to continue sport participation and that enjoyment and satisfaction are the strongest predictors for ongoing participation, especially where the competition provides opportunities to travel, win medals and make friends (2011, p. 169).

As Phoenix and Smith (2011, p. 628) stated, involvement in masters sport—and/ or a physically active lifestyle in older age— can create possibilities for people to age positively and reconstruct what aging “normally” means. Dionigi, Baker, and Horton (2011) considered that the sense of empowerment older people experienced through their participation in sport was predominantly driven by a fear of its opposites—a loss of power, loss of ability, loss of health, and loss of self-hood. In their view, older people participating in Masters sport were attempting to fight, avoid, or delay losing their physical ability, health, independence, and sense of self. As with those studied by Dionigi, Horton, et al. (2011), very active HNs perceived their high levels of physical activity as empowering them and assisting them to resist and manage their aging process and health issues.

The HNs who engaged in Masters sport and in endurance activities such as triathlon did appear to see themselves as trail blazers for other heart patients

and as role models and mentors for less active HNs. Both their sporting and trail blazer identities are far removed from that of an inactive older person or a passive heart patient dutifully following the advice of health professionals. Not only are they 'beating heart disease', but also forestalling many unappealing aspects of ageing. These highly active HNs have, like the older bodybuilders studied by Phoenix and Smith (2011), fashioned self-narratives based on a sporting identity that enables them to resist the narrative of decline that dominates the Western world's understanding of the ageing process. They have demonstrated their self-efficacy by engaging in demanding training regimes and have benchmarked their achievements against those of others within and outside their age groups.

Their new identities as proud members of a distinctive subculture focused on physical activity and endurance, make them role models for fellow HNs, for others their age and for younger persons, much like those who were interested in sport and physical activity in Phoenix and Smith (2011). They have been willing to endure the inconvenience, discomforts and pain of training and competition in order to forge these new identities. In Vogler's (1992) terms, they have accepted the call to adventure and embarked on the 'Hero's Journey,' of having successfully pursued their quests despite encountering a range of obstacles, and they return able to impart new wisdom to those who had ignored, resisted or not received the call to adventure.

T6 support from online health promoting communities & social networking sites

The extent to which online health promoting communities and other social networking sites complement and substitute for real life buddies and support will vary for individuals. While most of the heart patients studied by Pryor et al. (2014) had friends, family or general practitioners (GP) who provided all the support they required, one heart patient had asked for a GP referral to a heart patient support group, and a further four said they would like to be linked to a peer support group. By contrast, some of the HNs had health professionals recommend that they investigate support available from HN. Others had only encountered HN after investigating other sources of online or face-to-face support, and most clearly

saw value in HN, even though it had become a less vibrant community than in its earlier years.

HNs comments affirmed that peer support via HN reduced their sense of isolation and afforded them a sense of belonging. While membership of HN implied some acceptance of a heart patient identity, as discussed in the previous themes, some HNs did not see this as their most important identity. They may well have used other identities and personas in other online communities and in real life.

As should be clear from the account of my *entrée*, HN was a welcoming community. One method used to promote friendliness was HNs provision of automated notices regarding birthdays of HNs. Though most HNs were male, it was the female HNs who most often took advantage of this facility to send timely 'happy birthday' messages.

As a moderated community, HN offered some protection from the risk of online bullying and bad behaviour that can be encountered in un-moderated environments, and from the provision of inappropriate or health-hazardous support and advice. During my study, relations in the Physical Activity forum on HN appeared cordial and often light-hearted, though one survey participant highlighted the long-lasting impact of earlier community crises on HN.

HN was also a place that assisted people to experiment with and reinvent their personas. The use of self-chosen screen names allowed HNs to preserve a degree of privacy or to forge a persona that may differ markedly from their offline persona. The avatars chosen by HNs gave some idea of their preferred HN persona as did the style and content of their postings. During my study, the avatars of posters to the Physical Activity forum ranged from cartoon characters to a personal photo of them competing in an event such as in a marathon. While analyzing identity and avatars has been previously undertaken by Costello (2009), it was beyond the scope of this thesis and is noted here only to provide the reader with a visual depiction of the HN community and its members.

While logging into HN could provide reassurance that valued online buddies were alive and well, posting to a forum affirmed that you were still

interested in the discussion and well enough to take part in it. When any formerly active HNs stopped posting, it could indicate dissatisfaction, a loss of interest, a change in priorities, engagement with travel or other activities that restricted internet access, or the passing of a member. For these reasons, it was not surprising that HNs often enthusiastically welcomed a post by a HN absent from the forum for some time. It also caused me to reflect on one notable deficiency in the netnographic method, namely its failure to give as much care to planning the researchers exit from an online community as their *entrée* to it. While my own exit strategy is still in development, it will include informing HNs that I have completed my thesis, how they can access it, and what I will be doing next.

Becoming a member of HN demonstrated some interest in learning more about health and self-care from people like themselves rather than from health professionals offering generalised and potentially disinterested advice. Arslanian-Engoren et al. (2014) suggested that peer-support is particularly important for female heart patients, yet online support also has characteristics that make it attractive to men, a segment of the population often reluctant to consult health professionals (Malcher, 2009). Online community support does not require face-to-face contact with health professionals, is generally available 24/7 when and where the user requires it without any of the discomforts endured in a doctor's waiting room. Online peer support can provide the free, detailed, direct communication with trusted others that many Australian men would prefer their GPs to adopt (Malcher, 2009).

In many ways, HN offered a sense of comfort, inclusion and a range of learning and mentoring opportunities comparable with the supportive environment of the community-based men's sheds, now recognised as a successful Australian intervention that assists men to learn how to lead fit and healthy lives (Cordier & Wilson, 2013; Malcher, 2009). Like the men's sheds, HN offers learning, belonging and mentoring. As in the men's shed described by Shann (2012), HNs social aspects also foster regular participation and ongoing engagement. This leads to development of positive relationships and a sense of belonging to something that is worthwhile and positive. It provides participants with a place in which they feel they can be useful, share common activities and socialise with other men.

Both HN and men's sheds provide what Shann (2012, p. 3) categorises as a "mediating structure between the 'everyday world of men' and the health care system", while also having capacity to offer team activity and outreach to men disinclined to seek face-to-face assistance from health professionals. As Malcher (2009, p. 92) stated, "many indigenous men still see the health delivery system as part of a powerful, authoritarian and threatening complex that cannot be trusted."

My experience with HN has also led me to think more deeply about the role of posters, responders and lurkers. As Phoenix and Smith (2011, p. 2) state "narration is a social activity involving other participants who may provide storied responses to a story heard." A good audience can elicit, assist and support the telling of a good story. HNs seeking to serve as role models and mentors need to make contact with other HNs searching for those services or in a position to benefit from them. Just as in face-to-face communication, HNs willing to share their experiences and offer advice and information need reassurance that others are listening. Similarly, HNs who are seeking advice need contact from other HNs to reassure them that someone is listening to them and may be able to help, perhaps by sharing mantras (discussed further in T10) or adding a little fun and laughter (discussed further in T9). Lurkers are part of the audience for posters and even if they chose not to post responses, they may still be influenced by texts and images (or these days, even the audio and video material) they encounter in their online community. Any HNs can operate at various times as posters, responders or lurkers, but if all 900 registered HNs become inactive or silent for long enough, then HN will cease to exist as an online community.

People who do post responses to postings by others could in Giulianotti's (2002) terms be categorised as supporters, fans, followers, or flâneurs. In those terms, a lurker is perhaps an audience member who does not let others see or hear them laugh, applaud, groan or complain, functioning not so much as a participant at a live performance but rather as a television viewer not in a position to vote for the performer of their choice. In contrast, HNs such as Mrs H and Mrs T fit into the fan category by revering those HNs who are regarded as stars. Posting accounts of their physical activity achievements on HN enabled certain individuals to achieve a star status that they could never have attained by

privately journaling their physical activity achievements. While the nominated stars did appear to enjoy the attention from their fans, postings by Mrs H and Mrs T suggest they also benefited from engaging with them as fans. At first glance, gender seemed to determine which HNs were most likely to become stars and which HNs would become fans, but health status probably also played a part in this. The demographic data discussed in Chapter 4 suggests that female HNs were likely to be in poorer states of health than the male HNs.

Like the programs discussed by Coady (2013) and the other cardiac rehab programs mentioned in theme T4, fear and uncertainty, HN affords transformational experiential learning. Unlike those time-limited programs, HN allows people to engage with it, learn, change and seek support over an unbounded timeframe. Empathic support and feedback from fellow HNs can strengthen a member's sense of self efficacy, affirm their goals, applaud their efforts, and offer strategic advice. A HN who suddenly finds physical activity has ceased to be enjoyable can, for instance seek advice and options from fellow HNs and perhaps go better prepared to seek and understand advice from health or fitness professionals.

While HN in its present form still appeared to offer value to its member, there is considerable scope to develop and expand HN in ways that could allow it to offer further value. Adding the ability to post and access audio or video messages is one option, facilitating pair buddies as in the Go Red Heart Match (discussed in Chapter 2) is another. Tighter integration with other forms of computer-mediated communication could enable HN to automatically generate periodic text messages, emails, Facebook messages or voice messages, to alert members to new features or resources on HN or remind site members to check in at the HN website.

I have addressed the potential for gamification of HN later under theme T9, fun and laughter. I also discuss the potential for enhancing the journaling and self-monitoring capacity of HN under theme T3 guesstimating time.

T7 compounding factors

One of the services HNs performed for each other was to acknowledge the many matters that compounded the problems they experienced in trying to live heart healthy lives. Barriers to effective self-care of their heart health came in many forms, linked to lack of knowledge, financial concerns, work commitments and inflexible work schedules, perceived character defects, the online and real world environment within which they lived, worked and played, and comorbidities including mood issues and mental health conditions. HNs differed in the extent to which they favoured notions of individual responsibility for health over a more ecological model for the coproduction of health and the sense of what was doable for themselves. I address this matter further in T10 affirmations and quick visits.

T9 fun and laughter

The grim reality of having a heart condition and dealing with the many factors that compound the difficulties of self-care and achieving the recommended levels of physical activity can understandably prompt some HNs to look for the lighter side of life. Sharing jokes and humorous stories also helps build a sense of community.

Gamification is one option to provide fun and laughter in this regard. Members of a heart health group at my own health service can choose to exercise on stationary bikes and treadmills and record the distance they cover. Using felt pens and a wall map of Australia, they then represent these distances as part of a virtual journey around Australia's coast for everyone to see. Having set out from Perth at the beginning of 2014, their virtual journey has now taken them to the NSW coast. This recording method has encouraged people to focus on adding their own distances to the group's virtual journey. The journeyers have started to set themselves goals to reach certain places within a specified timeframe. The health service's exercise physiologist, cardiac nurse specialist and any group members incapable of using this gym equipment, encourage the others to keep pedaling and walking.

Fun and laughter can and should be part of programs to promote increased physical activity and reduced sedentary behaviour among members of online and offline communities. I discuss this topic further under theme T2 tacit knowledge.

T10 quick affirmations and visits

The HNs who logged in to post or read affirmations or swap mantras appear to gain some therapeutic and behavioural benefits while avoiding the harms associated with prolonged sitting. This current pattern of ‘quick visits’ to the HN site was not, however, apparent back when HN was at its busiest (Costello, 2009). The newer pattern, where few HNs log in more than once a day and rarely engage with HN for over an hour at a time will, however, only deliver the benefit of avoiding extended periods of sitting time if time spent on HN is not preceded or followed immediately by further online or other activities performed while seated.

The acceptance of Twitter as a social networking site and of the existence of Twitter communities focused on particular topics demonstrates that even messages as brief as 149 characters can foster a sense of community. The practices of quick visits and quick affirmations in HN can therefore perhaps be viewed as a new stage of evolution and not necessarily as evidence of a community in decline.

As the table below shows, some of the mantras and affirmations posted on HN are relevant to both physical activity and sedentary behaviour, and while all of the examples below emphasise individual responsibility for health, it is highly likely that ecological barriers and enablers – such as access to safe walking paths etc - influence whether or not these mantras are ultimately acted upon. Even if they are not, or if other environmental factors impede progress, personal mantras are still likely to be valued by those who aspire to using them as motivational tools.

Table 5.1. Mantras and affirmations

Mantras	Increase/ sustain physical activity	Minimise sedentary behaviour	Compatible with individual responsibility
Use it or lose	Yes	Yes	Yes
If you're not on the couch your lapping someone who is	Yes	Yes	Yes
This mongrel thing (heart disease) ain't going to beat me	Yes		Yes
Making the limited become unlimited by the power of the mind	Yes		Yes

As even brief, light physical activity such as standing up can serve to interrupt sedentary behaviour, these mantras could be used to assist people to minimise their sitting time and maximise their physical activity. Recasting the use of mantras in this way would help to avoid provoking feelings of guilt and shame among HNs, who in Dionigi, Horton, et al.'s (2011) terms are "unable to access physical activity or leisure or overcome medical conditions due to various societal and individual reasons" (p. 416).

T1 healthy paradoxes regarding physical activity and sedentary behaviour

While HNs are likely to have a keener interest in maintaining and improving their health than the general population, even they find it paradoxical that it is possible to meet or exceed recommended levels of physical activity without mitigating health risks relating to sitting time or other forms of sedentary behaviour. The messages emphasising the health benefits of physical activity have been so strong and so consistent for so many decades, that engaging in

exercise has almost created a guarantee or a recipe for good health and successful ageing. There was indeed little need or incentive to look beyond physical activity, until sufficient research demonstrated that sedentary behaviour has influences which are independent of physical activity. While some health professionals and researchers still dispute the sufficiency of that evidence (Ekelund, 2012), international bodies, national governments and bodies such as Australia's National Heart Foundation are now, as discussed in Chapter 2, issuing guidelines relating to physical activity and sedentary behaviour. Furthermore, as men are likely to have higher levels of moderate to vigorous physical activity and higher total sedentary time than women (Jefferis et al., 2014), this healthy paradox is of even more significance for men than for women.

Even HNs, who appeared very motivated when it came to meeting or exceeding recommended levels of physical activity, appeared unaware and/or unconvinced by emerging evidence that the health hazards of prolonged sedentary behaviour apply even to individuals who meet or exceed the daily recommended levels of physical activity. HN's recognition and appreciation of the health benefits of engaging in physical activity or engaging with the HN site, likewise made it difficult for them to accept that prolonged sitting while online could be detrimental to their health.

Management of HN has been complicit in helping to sustain this paradox. As a health promoting site, it could be considered to have an ethical responsibility to keep its members up to date with new evidence-based health information. This could have taken the form of a reference to relevant postings in a forum devoted to new research. Since the health significance of physical activity and sedentary behaviour are so intertwined, HN could perhaps have a forum dedicated to sedentary behaviour rather than one focused solely on physical activity. That forum, or a research-specific forum, would be appropriate places to discuss the active sitting techniques and devices mentioned in Chapter 2 that have to date not been discussed on the Physical Activity Forum. In a paper published in 2014, for which I was co-author, a number of strategies are suggested to support the idea of active sitting; one being to "problematise conventional passive sitting" and "foster discussion of what to do in activity breaks" (Costello et al., 2014, p. 66).

T2 tacit knowledge

Without needing advice from health professionals or information based on recent research or national guidelines, HNs have tacit knowledge about physical activity and sedentary behaviour derived from their personal experience, self-monitoring and folk knowledge. HNs know the value of pleasurable physical activity and many have an idea that too much sitting is not good for them, even if they are not sure why this would be so. Perhaps reflecting on the level of control they can exert over their sitting time, most are more concerned about the sitting they do at work or on their way to and from work, rather than the sitting they do at home or elsewhere.

While their tacit knowledge appears to underestimate the extent of the health risks linked to prolonged sitting time and other forms of prolonged sedentary behaviour, HNs identified and used a variety of strategies to interrupt their sitting time. It is impossible to tell whether the older British men studied by Jefferis et al. (2014) also used some of the same strategies to keep so many of their daily bouts of sedentary behaviour to less than 30 minutes.

While more could have been done on HN to highlight the usefulness of such knowledge and some of the methods used to break up bouts of sedentary behaviour in workplaces, such discussion might have seemed inappropriate for a forum on physical activity. Discussion of methods for breaking up sitting time, would, however, be entirely appropriate for a HN forum focused on physical activity and sedentary behaviour.

T3 guestimating time/blazing a trail

Artinian and Franklin (2010) emphasised that heart patients who monitored their progress towards the goal they have set themselves have a good chance of identifying and addressing relevant barriers and achieving those goals. At the time of my study, HN did not offer any facilities other than the Physical Activity forum for recording achievements, and there were no charting facilities to visually display this data or referrals to sites and apps or software tools with such facilities.

While some HNs reporting on their bike ride and runs appeared to fit the profile of the 'Quantified Selfers' described by Choe (2014), it was clear that many HNs monitor their physical activity by the state of their own breathing rather than measuring devices such as heart rate monitors, pedometers or step counting apps. My study did not gather data on whether HNs carried mobile phones or other monitoring devices with them while engaging in exercise, even though, in hindsight such data would have assisted my analysis.

The definite start and endpoints associated with sessions of more vigorous physical activity may make the duration of these sessions easier to recall and report than the durations of less vigorous physical activity, such as pottering around the house or garden. Even the HNs keenest on physical activity and quantification showed little interest in measuring sedentary time or celebrating any reductions in prolonged sitting behaviour.

Part of the difficulty here is that sedentary time is not in itself perceived as constituting an event. While individuals consciously choose to go for a swim, run, walk or bike ride, their sitting time tends to be an incidental aspect of other chosen or mandated activities such as eating, reading, playing cards or board games, driving, working at a desk or table, or engaging in screen-based activities. It is thus all too easy for incidental time to lapse into longer (unnoticed) periods of time even for HNs aware of the importance of breaking up their sitting time. Nor does breaking up sedentary time represent an achievement of endurance or strength, as does competing in a triathlon. As such, it is likely to appeal less to the more competitive male HNs.

During my study, neither the Physical Activity forum, nor any other aspect of HN, encouraged more precise measurement of sedentary behaviour as a necessary first step to implementing strategies to reduce and better manage sedentary behaviour. Like the popular Candy Crush game, which locks its player out (unless they pay to re-enter), online communities could lock users out for health related benefits after they have been online for more than an hour. While the loss of immediate gratification is something that would need to be carefully thought through if lock-out strategies were implemented, it might be more appropriate for an online health promoting community to consider other 'softer'

approaches to harm minimisation. As discussed in T9 fun and laughter, there are ways to use innovative and engaging data and graphics to encourage HNs to measure, upload and monitor themselves as well as deal with triggered lock outs.

T11 healthy rivalry

HNs with a tendency to quantify their physical activity undeniably produced sufficient data to enable comparisons and fuel a friendly informal rivalry. This rivalry did not, however, extend to the formation of competing teams as is common in many mobile apps or initiatives to promote workplace physical activity.

This rivalry based on time and distances and specific types of activity reported in postings to the Physical Activity forum was, however, as close as HN came to engaging with the notions of gamification and exergaming as discussed in Chapter 2. The rivalry afforded by this method is clearly important to HNs physical activity stars and their fans and followers, and it would be a shame to disrupt this. There is, however, scope to offer additional HN features operating in parallel with a physical activity and sedentary behaviour forum to encourage friendly rivalry and self-monitoring of both while encouraging teamwork between male and female HNs, as well as between the more and less physically active HNs.

Building on the ideas discussed earlier under theme T9 fun and laughter and T3 guestimating time, HNs could use a map of Australia or the world to record and compare the distances covered in their physical activities and record as step count equivalents that could be mapped and portrayed as road travel. Another option would be to segregate and compare recording for specific types of distance-covering activity, so that cycling could be compared with cycling, running with running, walking with walking and triathlon with triathlon achievements. Aquatic achievements or use of indoor rowing machines could be portrayed as ocean or river voyages.

If energy use measurements were used as the basis for comparison, then special graphics could aid comparisons. A point system, based on step counts or energy expenditure that links to a coded display such as the ones mentioned in

Chapter 2, could add a touch of whimsy to the self-monitoring of physical activity and sedentary behaviour. HNs could also have the option of customising their display format.

The uploading of data relating to physical activity and sedentary behaviour could perhaps take place via apps or text messages. Automated text messages could also be used to prompt competitors to upload the details of their physical activity and sitting times as well as congratulate winners.

Alternatively, HN could be invited to compete for best effort in maximising activity and reducing sedentary time. Competitors could be individuals or teams of two or more, and points could be awarded for the duration and intensity of activity and for minimising total sedentary time. This would encourage HNs good at maximising physical activity to team up with HNs who were good at reducing sedentary behaviour. These team members would be well placed to learn from each other and to serve as role models for their fans and followers. As in tennis, singles competition could be segregated by gender, while there could be doubles competition restricted by gender as well as a mixed doubles competition. Another option would be to offer competition within age groups as in Seniors/Masters competition or by class of disability as in the Paralympics. Innovative, light-hearted and user-friendly infographics could aid easy comparison of the performances of solo competitors and teams.

T10 dissonance and doability

The prime example of dissonance was observed in HNs who believed that they need to exercise to improve and maintain their heart health, but whose fear of another heart attack inhibited them from exercising. This in turn raises the issues of what type of activity can and should be regarded as doable.

While not disputing the strength or sincerity of HN's views on what physical activity or reduction of sedentary behaviour was doable for them, I do see a dissonance between those views and what my experience and study has shown to be possible. I therefore see benefits in gently and respectfully challenging self-limiting beliefs about doability as set out in the table below.

Table 5-2. Challenges for beliefs about doability

Self-limiting beliefs	Challenges
Physical activity has to be strenuous to be worth doing	Physical activity does not need to be strenuous to deliver health benefits. Adequate activity to avoid prolonged sitting would deliver health benefits
Discomfort is more important than health	Could seek a more comfortable form of exercise – sweating is not a problem for swimmers
Can't exercise at home or work or do physical activity unless the weather is good	<p>Exercise need not be strenuous or lengthy- just take breaks or move [e.g. Stand in TV breaks or when dealing with phone calls at work- see standup Australia]</p> <p>Consider engaging in indoor sports and indoor activity when weather is bad or acquire wet weather gear. Consider reframing walking in the rain as an exhilarating activity, rather than as an experience of discomfort (admittedly easier to do if walking by choice while suitably dressed and not tired or carrying anything likely to be damaged by rain)</p>
Exercise can't happen now – perhaps not until retirement	Increased physical activity and reduced sedentary behaviour increase the odds of retiring in sufficiently good health to enjoy the retirement years
Costs are stopping me from engaging in physical activity	A wide variety of low cost lifetime activities are readily accessible
I am lazy, therefore cannot be expected to change and am unable to change	Laziness is a choice - why not give the alternative choice a try? It might be fun!
I can't make a plan - I don't have the time or the skills	Most people have enough time and skills to make a basic plan that can be refined or adjusted later if required

It is after all difficult and perhaps unethical not to challenge beliefs that a person can take no steps to improve physical activity or reduce sedentary behaviour, or that becoming healthier is a process best limited to summer or delayed until retirement. However, it is equally unethical to cause unnecessary and avoidable damage to a person's sense of self efficacy or make HN into a space where the voicing of self-limiting beliefs triggers a flood of negative feedback.

Barriers to minimising sedentary behaviour would appear to be far fewer and lower than for physical activity, with Jefferis et al. (2014) finding that even inactive older men managed to take up to seven breaks from sedentary behaviour in an hour. Support to interrogate perceived barriers and encourage movement through the stages of change could also involve gentle and appropriate netnographic interventions to challenge assumptions. This could take the form of comments based on personal experience or recent reading (e.g. "I have found ..." or "In my experience, ..." or "Have you heard about the new research on exercise and arthritis ... " or "Have you heard about some new ways to make sitting more active ..". In terms of the stages of change, such interventions could assist HNs to move from pre-contemplation to contemplation and perhaps from contemplation to action.

As Artinian and Franklin (2010) noted, persuading less active individuals that they could take small but significant steps to increase physical activity and reduce sedentary behaviour could strengthen their sense of self-efficacy, as could testimony from those who have already benefited from taking such small health-promoting steps. Napolitano et al. (2011) held that programs to promote activity among previously inactive groups such as obese women should emphasise easily achievable, low-to-moderate intensity activity, to help bolster self-efficacy by preventing embarrassment and unwittingly discouraging activity. Programs to promote increased physical activity and reduced sedentary behaviour would therefore introduce a set of more easily achieved goals, such as perhaps standing up or moving during TV commercials. Individuals who have managed to reduce the duration of their bouts of sedentary behaviour should find it less daunting to contemplate increasing their light physical activity. Reaching

that level of activity could then put them in a better position to contemplate undertaking moderate to vigorous physical activity.

That being said, older adults and less mobile individuals seem more primed to increase light-intensity activity as a way to reduce sedentary behaviours (Ekblom-Bak, Ekblom, Vikström, de Faire, & Hellénus, 2014). This might be more helpful and fitting than trying to encourage moderate to vigorous movement for this age group. More broadly, Coady (2013) suggested strategies to improve physical activity of under-represented groups by:

soliciting input from members in designing interventions; linking the intervention to group values; addressing problems of language and literacy; using specific media and media personalities; suggesting socially and culturally acceptable forms of PA [physical activity]; and addressing cultural beliefs, norms, and values that may act as barriers to increased physical activity (p. 399).

Providing strategic support to remove or lower barriers to physical activity includes finding creative ways to address any perceived lack of recreational and rehabilitation facilities catering for the needs of individuals with co-morbid conditions. Fortunately as Timmermans et al. (2011, p. 25) noted, such individuals often “found alternate ways to remain active, such as creating a raised garden to limit bending, and using indoor malls for walking in the winter.” Other individuals may choose to address the lack of available and affordable fitness facilities by buying exercise equipment and installing it in their homes.

To assist people to move beyond their current comfort zones, Goodwin et al. (2012) incorporated training in mindfulness and distress tolerance into their heart healthy lifestyle program: “Participants were taught that increasing their willingness to experience distressing internal states increases their ability to engage in difficult behavior change such as “adopting heart-healthy behaviors” (p. 205). That heart healthy lifestyle program (Goodwin et al., 2012) also encouraged “cultural customization of lifestyle behaviors” (p. 205). Lacking any information on the cultural background of HNs and given the evident computer literacy and fluent written English of their postings, it is not clear what further cultural customisation might more effectively address the needs of the current

HNs. I can however see that further customisation would be required to make HN an appealing support service for many of the Indigenous people served by my health service, who for the most part have little access to computers, but access many services, and increasingly the internet via their phones.

Adapting HN for group rather than individual use would however make it more accessible and appealing to the majority of elderly heart health clients who attend our weekly heart health program. This program has three facilitators, a cardiac nurse practitioner and two staff from the WA branch of the Heart Foundation. The program already operates from an internet connected conference room with an overhead projector and a large screen. Logging into the HN website as a group would enable these heart patients to make postings about their achievements in that day's session. Extending HN to allow for posting audio or video messages would reduce the barriers to using HN for people with limited computer skills or who lack fluent written English. Current HNs might also appreciate and benefit from being able to upload audio and video. It would also allow our program's health-related presentations by the various guest speakers to be shared with other HNs in live or recorded form, perhaps as podcast or webinars.

This would overcome the lack of internet access and computer literacy that currently prevent these clients obtaining regular online support. The support available within the conference room from health professionals and peers would encourage these heart patients to explore HN and experience the benefits it can deliver. If HN catered for virtual competitions in physical activity and sedentary behaviour, our clients could enter as a team. The same logic could apply to groups meeting at men's sheds, health services, retirement villages and other community groups. There is also potential for virtual team competition within and beyond Australia by such groups, which could enhance self-efficacy, computer literacy and health literacy.

Conclusion

Looking at the themes that emerged in my netnography, I realise the vast scope for careful, coordinated, and consistent use of netnographic interventions to gently and respectfully challenge some of the self-limiting beliefs that

unnecessarily restrict physical activity and promote sedentary behaviour. Identifying, implementing and evaluating such an intervention was beyond the scope of my research. I did, however, address this matter in more detail in my discussion of the barriers and enablers for physical activity and sedentary behaviour.

From a traditional public health perspective, those who achieve recommended levels of physical activity are perceived as compliant, with no further intervention required, except perhaps programs to encourage maintenance of these healthy behaviours. By failing to consider the concurrent health risks associated with prolonged sitting, this perspective breaches the duty to 'do no harm'.

My research provides significant insights into how a diagnosis of heart disease can impact on an individual's level of self-efficacy and their motivation to increase physical activity and decrease sedentary behaviour. It also highlighted that despite participation in sites which are designed to help sustain motivation for physical activity, use of them may inadvertently result in prolonged periods of sitting.

The issues raised in this Chapter suggest the ethical imperative to 'do no harm' requires the managers and funders of online health-promoting communities and other health professionals to encourage their members/clients to engage in healthy behaviours. Recognition that members of an online community are active in a range of sites and social networks further emphasises the need for dedicated health-promoting communities such as HN to draw their members' attention to the health risks associated with prolonged sitting.

Chapter 6. Conclusions and recommendations

Introduction

Prolonged sitting is associated with a range of activities, such as watching television, reading, driving, deskbound work, computer use in the workplace and also recreational computer use including the use of online communities and social networks. This thesis aimed to use an online survey in combination with a netnography of Australia's HeartNET (HN) community to investigate the significance of physical activity and sedentary behaviour for members of online health-promoting communities and other similar sites. This research provides exploratory insights for health promotion strategies and interventions, which might be designed to minimise the risks associated with prolonged sitting in particular for researchers and practitioners alike.

When I commenced this research in 2010, an understanding of the health hazards from sedentary behaviour and prolonged sitting specifically was beginning to gain traction. Many workplaces within and beyond Australia are now acting to discourage prolonged sitting by their employees. This may involve using scheduled lockouts on the computer screen to permit only a certain period of uninterrupted computer time, setting personal timers to monitor computer usage and encouraging the use of stand-up desks or sit/stand workstations, or 'walk and talk' rather than seated meetings.

The increasing use of tablets and smartphones for internet access has increased mobility of the device, but may also have increased sedentary behaviour. As well as sitting at their desks while using desktop computers and laptops, individuals may now also engage in sitting time while using tablets and smartphones to access the internet. Tablets and smartphones along with wearable devices such as smart watches and fitness trackers do, however, now offer convenient, affordable monitoring and reporting on an individual's physical activity and sedentary behaviour, and could be used to encourage individuals to break up their sitting time.

While Chapter 5 provides a detailed discussion of the findings for the research undertaken, Chapter 6 is more general in nature and provides a

conclusion and reflection of the approach take in this research. First the methodology is discussed in terms of the types of questions that would have provided more depth in the analysis; especially in terms of demographic data, knowledge about sedentary behavior, and the extent of physical and sedentary behaviors. Then, further research is suggested in terms of the changing ICT context and the emergence of new devices and equipment. The potential for objective measurement is also discussed before broad implications for health promotion and online health promoting communities are provided.

Methodology

My study relied entirely on data collected from online surveys and a netnography that needed to be conducted on a smaller scale than was originally planned. My experience convinced me that netnographic research is important for studying online communities and networks due to its exploratory nature and its free-ness to provide insights of real online experiences. Any researcher seeking to use netnography as their prime source of data collection should, however, take care to select vibrant and viable online environments to work within.

Despite the response rate to the initial online survey, there was a poor response rate to the single supplementary question seeking to clarify HNs overall daily sedentary pursuits. With the benefit of hindsight, a more rigorous (piloted) single survey could have posed a greater range of questions specifically on sedentary behaviour. However, in this research the limited information retrieved through the supplementary question meant that it was difficult to accurately estimate participants' overall sedentary time. Future research could consider including the following questions in order to gain a better understanding of participants' personal context, and how their social networking behaviours fitted with their other sedentary behaviours:

Demographic data

The survey didn't ask about HNs living arrangements and these are some of the questions subsequent research could consider:

- Do you live on your own, or with family or in an aged care or health care community or other managed residential community?
- Do you have a live-in carer?
- Did you play a lot of sport before the age of 18?
- Have you always lived in Australia?

Knowledge about health impact of physical activity and sedentary behaviour

These are the extra questions in regards to the health impacts of physical activity and sedentary behaviour that should be included in future survey-based research:

- What do you see as the main health risks of prolonged sitting time?
- Have you had discussions with any health professionals about the health risks of prolonged sitting? If so, please indicate whether these professionals were cardiologists or other specialist, a GP (general practitioner), nurses, physiotherapist, podiatrists, dietician, diabetic educator or other health promotion staff, pharmacists or other allied health roles?

The extent of physical activity and sedentary behaviour

Likewise, there were many other questions in regards to the extent of HNs' physical activity history and sedentary pastimes that other researchers should consider in future studies:

- How much do you sit in your work or non-leisure time?
- How much do you sit in your leisure time?
- Do you sit when doing online searches?
- Do you sit when posting to online communities and social networking sites?

- How much time do you spend sitting down to watch television each day?
- How much time do you spend sitting down to use a computer or access the internet by other devices each day?
- How much time do you spend sitting down to eat and drink each day?
- How much time do you spend sitting down to read, write or work at a desk or table each day?
- How much time do you spend sitting while commuting (e.g. in a car, train, or bus)?
- What other daily activities do you usually do while sitting down (e.g. do you sit down to listen to music or the radio or make phone calls or play cards or board games)?
- Are you more or less physically active than when you joined HeartNET?
- Are you more or less physically active than you were five years ago?

Since commencing this study, phone apps, fitness bands and other forms of digital technology have been developed. The survey did not ask about these types of equipment and nor were they discussed on HN.

Further research could frame the following questions as:

Devices and equipment

- What device(s) do you use to access the internet and online communities? For example, desktop computer, laptop or notebook computer, tablet, smartphone?
- Can you access the Internet from your mobile phone?

- Do you carry a mobile phone when you are engaging in physical activity?
- Do you listen to music or other recordings while you engage in exercise or physical activity?
- Do you use a fitness band, pedometer, heart rate monitor, fitness apps or other form of wearable technology to monitor your physical activity or sedentary behaviour?

Travel

- Do you own or use a bicycle?
- Do you own or use a car or other motor vehicle?
- Do you often travel by public transport?
- Do you have a mobile phone?

Barriers

- What are some of the barriers related to decreasing your sedentary behaviour?

Interventions

- Does your workplace have strategies to reduce prolonged sitting time? For example, standup desks, lock out interventions, chill out rooms?
- How would you rate the likely effectiveness of the following online interventions to break up sitting time [provide list and rating scale].
- Can you suggest any other simple ways to minimise health risks associated with desk-bound work without reducing workplace productivity?

Potential for use of objective measurements

Evidence suggests that HNs' self-reports in regards to physical activity are usually over-estimated, compared to the results of objective measurements using

pedometers, accelerometers, activity trackers or even use of a time diary. Similarly, sedentary behaviour is probably underestimated by HNs.

The changing mix of technology means it is no longer valid to assume that participation on health-promoting sites such as HN almost inevitably occurs while sitting. Had I had access to affordable monitoring devices such as fitness bands, I could have explored the accuracy of self-reports or encouraged participants to upload their objective data to a suitable forum on HN, which might have helped re-invigorate HN and would have made for a more rigorous netnographic study.

I now see great scope for further studies that not only combine netnography and quantitative methods, but also trial a range of online interventions for breaking up sedentary behaviour and encouraging physical activity in combination with peer-support.

Implications for health promotion

The limited awareness and/or understanding of the potential health risks associated with sedentary behaviour and prolonged sitting found amongst many HNs may well apply to members of other online health-promoting communities. Furthermore, given HNs are probably more sensitive than most about the need to engage in healthy behaviours, it is likely the general population has even less awareness of the health hazards of sedentary behaviour, being independent of any physical activity achieved.

Until very recently, mainstream public health campaigns have framed physical activity as the key strategy to reduce the risks of chronic disease and other health ailments and have predominately focused on encouraging people to be more physically active. Unless prolonged sitting time is promoted as a legitimate risk factor, even people concerned to undertake more physical activity every day in the interest of good health, may forget to monitor their periods of prolonged sitting.

Additional health promotion strategies or programs are therefore needed to raise awareness amongst the broader online and offline populations in relation to:

- the significant health risks posed by sedentary behaviour, regardless of whether an individual is physically active, and
- the benefits of breaking up their sedentary behaviour with strategies as simple as standing up for a few moments after sitting for an hour or more.

Whether online or offline, future health promotion interventions using the stage of change theory to increase physical activity or minimise sedentary behaviour need to acknowledge both the psychological and the physical health challenges associated with being diagnosed with a heart disease or other health condition. In particular, interventions aiming to move individuals from pre-contemplation through to the action stage need to take into account the socio-ecological determinants of health, such as degree to which contemporary office work goes ‘hand in hand’ with being desk-bound (Yates et al., 2011). Similarly, strategies encouraging individuals to reduce their sedentary time and become more physically active need to also consider other barriers such as limited time and lack of access to appropriate infrastructure (e.g. accessible parks, dedicated bicycle/pedestrian paths). Such an approach recognises that health is influenced by a range of determinants including individual behaviours and self-efficacy, as well as structural factors including neighbourhood environment and income (Giles-Corti & Donovan, 2003). These sociological determinants constrain people’s ability to make the ‘healthy choice’. If this is done successfully, the stages of change model could be extended to future studies and interventions designed to break up sitting time specifically. This will also provide other online sites with information to develop specific communication strategies which advocate for responsible sitting times.

Implications for online health-promoting communities

Managers of online health-promoting communities have an ethical responsibility to ensure that the health of their users/members is not compromised through prolonged sitting time while using the site. HN and other online communities could play a vital role in encouraging positive health behaviours, while minimising the risk of the potential harms incurred as a result of participation.

Online health promotion strategies may be particularly useful for relaying the message about the desired behaviour (such as standing up), which can be linked in a time specific way to risky behaviours. However, such communities may need to adopt a pragmatic approach and recognise that individuals, (particularly those with life-threatening health conditions) are likely to be at different stages of readiness to change, and are also influenced by structural determinants which may constrain their capacity to change, and therefore need tailored support, affirmation and encouragement to support their move to the next stage of change. In developing interventions which remind people to simply '*stand up*' it will also be important to ensure the enjoyment and enrichment that comes from online participation is retained.

Both guidelines and exemplars are required to leverage the benefits of health-promoting communities and other social networking sites while minimising the health hazards such as prolonged sitting. Advocacy for change and intervention in the broader social networking industry, could involve implementing best practice regarding sedentary behaviours in their sites first (eg: standing up after 30 minutes of logged in time) and then evaluating the results and making these available to other networks.

The close links between social networking and sedentary behaviours mean that online health communities such as HN provide an ideal 'setting' through which to promote healthy behaviours. Research suggests that utilising online communities to deliver health promotion messages and provide a platform for the exchange of social support is even more important for people with underlying health conditions. People facing the impacts of life-limiting conditions receive a range of benefits from online communities and social networks (Greene, Choudhry, Kilabuk, & Shrank, 2011; Love et al., 2012), particularly when recipients live in rural and remote areas or have a disability, constraining their engagement with face-to-face services. Such evidence highlights the need to embed health promotion strategies in such sites, and enhance their availability to other vulnerable groups as a way to promote affordable and accessible primary health care initiatives. In this context, my research suggests scope for further

studies regarding these communities in relation to prolonged sitting time by accessing a larger population to investigate. Facebook, for example, may be an ideal environment in which to undertake netnographic investigations around online participation.

In 2014, at the conclusion of my research, one research paper was published by me and my team of supervisors in order to pique the interest of the research community around this topic and the need for greater action. Specifically we called for online health promoting communities to:

- “preserve the site’s [or any site’s] health promoting aspects
- enact the ‘do no harm’ premise of public health
- foster awareness amongst users of the need to take regular breaks when participating in any social networking sites, or indeed any other prolonged sitting or sedentary behaviour, and
- stimulate further research on the health hazards of sedentary behaviour and the ways to address them using the opportunities afforded by online communities and the mobile internet” (Costello et al., 2014, p. 66).

Limitations

Although my study sought to provide insights about sedentary behaviour as a strategy to encourage safer practices in relation to online community use, collecting data only via the HN site means that my findings can’t readily be generalised. Concerns with heart health may have sensitised HNs to become hyper-vigilant about their health and their efforts to increase physical activity. The fact that most HNs were in the 44 to 69 years age group could also limit the study’s findings, particularly for online communities and other networking sites which target an older or young demographic.

In addition, methodological limitations relating to the assessment of participants’ sedentary time means it is difficult to accurately determine how participation on HN fits with other common sedentary behaviours such as reading, driving or watching TV, or to accurately estimate the overall time

participants spend sitting. However, as television viewing has been found to provide a sound indicator of overall sedentary patterns (D. Dunstan et al., 2010; Sugiyama et al., 2008), it may be possible to use other methods besides direct observation, self-reports or technologies such as fitbands to assess combined sitting time.

As the decline in interactions, posts and online chats over the last few years also limited the netnographic data available to me, extending the study to include other social networking sites would have generated more in-depth data for this study. Still, this study has provided useful a-priori information which could be expanded and tested in larger studies.

Conclusion

By investigating one online health promoting community, this study has generated initial findings, conclusions and recommendations valuable to the public health domain and to members and managers of broader online communities and networks. The overall physical activity pursuits and sedentary behaviours of HNs may need more in-depth investigation in further studies making use of both objective measurements and self-reports. Such studies could also consider the intensity of the physical activity in which HNs engage. Follow-up studies are needed to determine the sustainability and applicability of the conclusions and recommendations in emerging online environments where smartphones are the primary means of internet access, and where wristbands can conveniently and unobtrusively monitor physical activity and sedentary behaviour.

Appendices

Appendix A. Initial email to HeartNETers to introduce researcher



Dear HeartNETer,

My name is Gloria Askander and I am currently completing my Masters by Research at Edith Cowan University, in Perth, Western Australia. The aim of my research is to explore health behaviours online and HeartNET provides a great context for my achievement of this.

The research will involve questions in relation to physical activity, sedentary behaviour and social networking sites. Given your involvement with HeartNET, it is highly likely that you will have important information and experience to share. In fact, your ideas may help identify ways to improve health services like HeartNET.

For this reason, I would very much appreciate your participation in my study and ask you to complete the online questionnaire. The questionnaire should take no longer than 15 minutes to complete. Your identity is completely confidential and it will not be revealed should this study be published in any reports. Your participation in the research is entirely voluntary and I appreciate that you may have been asked to participate in other studies previously. Indeed it is only through your kind participation that we are able to understand more about health promotion online. It is not anticipated that the questions will cause any distress, however, if this does occur please stop answering the questions and contact me if you would like to discuss the matter. Contact details for an independent representative have also been provided at the bottom of this email.

If you agree to take part in this research, you will need to read and accept the online consent form which will be included as the first section of the questionnaire. Once the consent form and the questionnaire are completed, you will have the opportunity to discuss related topics on the HeartNet website and we may invite some willing participants to attend an interview with me. I will also be able to provide some of the results via the HeartNET site for your interest and comment. Please feel free to contact me or my Supervisor (details below) if you require any further information about the research.

Gloria Askander (Researcher). Email contact: gaskande@our.ecu.edu.au

Dr Leesa Costello (Supervisor). Email contact: l.costello@ecu.edu.au

This project has been approved by the Edith Cowan University Human Research Ethics Committee. If you have any concerns or complaints about the research project and wish to talk to an independent person you may contact:

Research Ethics Officer
Edith Cowan University
100 Joondalup Drive
Joondalup WA 6027
Telephone: (08) 6304 2170 / Email: research.ethics@ecu.edu.au

Thank you for taking the time to consider assisting with this research.

Gloria Askander
Masters by Research Student (Edith Cowan University)

Appendix B. Consent form

I have read the information letter sent to me via email or via the HeartNET website and I understand the purpose of the research.

I have asked any questions or queries that I had about any part of the research, and I consider that these have been answered adequately.

I understand that all information disclosed will be confidential, and any identifying information will not be revealed without my written permission. I am voluntarily participating in this research.

I accept that this report may be published under the provision that I am not identifiable. Where my comments are used in such a publication, my name will not be revealed and a code name will be assigned instead.

I understand that I have the right to refuse to answer any questions asked by the researcher in the online questionnaire.

I understand that I can, at any time, withdraw my participation and any information disclosed will be removed from the research.

I also understand that there will be no penalty in withdrawing.

I understand that I can obtain a copy of this consent form on request.

Thank you for agreeing to participate in this research. Please press Agree and you will be transferred to the online questionnaire.

Please press yes and you will be transferred to the online questionnaire

Appendix C. On-line survey

Please answer all the questions below. Use the 'next page' button to move through the survey at the bottom right hand corner. If you need to go to a previous page, use the 'previous page' arrow - DO NOT click the usual 'back' button in your browser.

1. On a typical day, how much physical activity/exercise do you engage in?
 - None
 - 1 - 10 minutes
 - 11 - 20 minutes
 - 21 - 30 minutes
 - 31 - 60 minutes
 - More than 60 minutes

2. What type of physical activities do you enjoy participating in and how often do you do these? Please describe this in the box below:

3. How many days per week do you usually achieve 30 minutes of physical activity/exercise?
 - Never
 - 1 - 2 days per week
 - 3 - 4 days per week
 - 5 days per week
 - Everyday

4. Do you intend to continue with your current level of physical activity?
 - Yes - Please explain more about this in the box below:
 - No - Please add any additional comments in the box below:

5. What factors (if any) hold you back from achieving at least 30 minutes of physical activity on most days? Please describe this in the box below:

6. Are you intending to increase your current level of physical activity/exercise?
 - Yes - Please explain more about your plans to achieve this:
 - No - Please add any additional comments in the box below:

7. How confident do you feel about doing physical activity/exercise?
 - Very confident
 - Mostly confident
 - Somewhat confident
 - Not at all confident

8. Please tell us more about your answer to Question 7 in the box below. For example, we'd like to know what makes you confident or why you feel your confidence is lacking.

9. How long would you normally spend on HeartNET in any one sitting?

- 15 minutes or less
- 16 - 30 minutes
- 31 minutes to an hour
- Between 1 - 2 hours
- Between 2 - 5 hours
- Over 5 hours

10. What is your main reason for accessing the HeartNET Site? You can tick multiple boxes below and/or select 'other' and type in your own responses:

- Information
- Advice
- Friendship
- Support
- Other - please describe this in the box below:

11. Besides HeartNET, can you identify any other social networking sites (like Facebook or MySpace), or online community sites (like HeartNET) that you use? Please list or describe these in the box below:

12. On a typical day, how long would you say you spend on these other social networking sites in any one sitting?

- I don't
- 15 minutes or less
- 16 - 30 minutes
- 31 minutes to an hour
- Between 1 - 2 hours
- Between 2 - 5 hours
- Over 5 hours

13. On a typical day, how many times do you return to these sites?

- I don't
- Only once per day
- 2 - 3 times per day
- More than 3 times per day
- Most of the day

14. In total, how often do you think you spend participating or visiting social networking sites generally?

- Everyday

- A few times a week
- Once a week
- Every few weeks
- Rarely
- Never

15. If you have been online for more than one hour, do you usually stop and take a break?

- Yes - Please describe what you normally do to take a break:
- No- Please add any additional comments in the box below:

16. What do you understand about the dangers of sedentary lifestyles? Please explain this in the box below:

Please take the time to answer the Questions below which will help me to understand your responses:

17. What is your age?

- 18 to 30 years
- 31 to 43 years
- 44 to 56 years
- 57 to 69 years
- 70 to 82 years
- 83 years and over

18. What is your gender?

- Male
- Female

19. Please indicate if you are:

- Employed
- Student
- Between Jobs
- Unable to Work
- Retired

20. What is your association with HeartNET?

- Heart patient
- Family/Friend
- Carer
- Professional

21. What is your Post Code?

22. Would you be willing to attend a confidential interview with me? This will enable you to share your 'real life' experiences and it will help me to understand more about these issues.

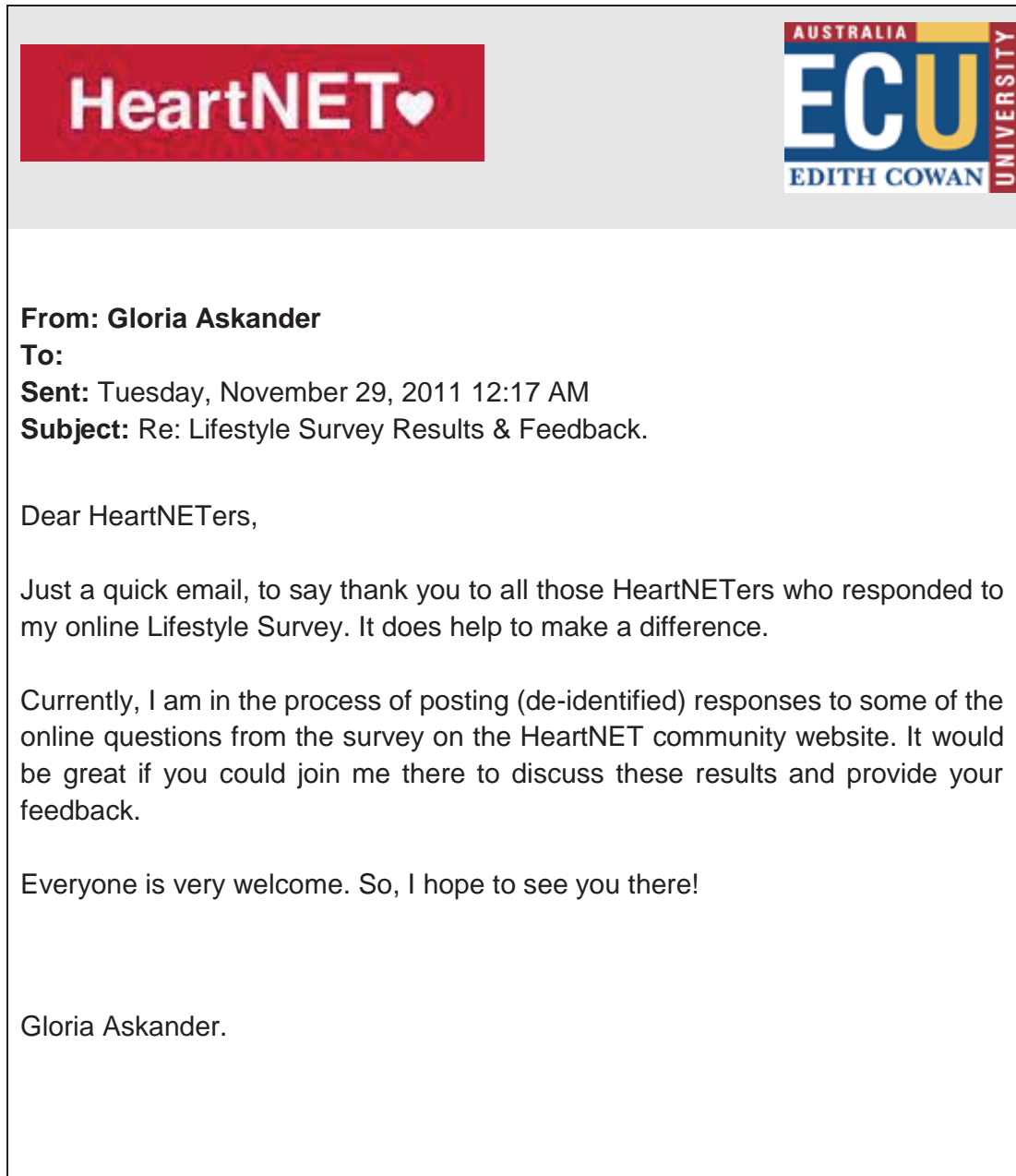
- Yes - Please provide your email or phone contact in the box below. (This information will be kept strictly confidential):
- No

Thank you for your time participating in the Survey.

Please press the 'Next Page' button below to submit

I would also be grateful if you could share your thoughts with me on the HeartNET website. Please Log on to HeartNET and visit Gloria's Forum. I look forward to seeing you there!!

Appendix D. Email to HeartNETers re: lifestyle survey results and feedback



Appendix E. The supplementary question

The supplementary question posted online - and emailed to all HNs

Gloria's Forum

Gloria: Hi everyone, I am in the process of writing up the findings from the online Questionnaire data and was hoping you would answer 1 more question for me? Q) At any one time, how long do you spend sitting (in hours) for each of the following past-times on a daily basis? 1) Watching TV 2) Reading 3) Using the computer at home 4) Travelling in the car 5) Sitting at work. Please feel free to clarify any of your answers here: Thank you in anticipation. Gloria :)

Q) At any one time, how long do you spend sitting (in hours) for each of the following past-times on a daily basis?

Pastime	Hours						
	1-2h	2-3	3-4	4-5	5-6	6-7	7-8
Watching Television							
Reading							
Using the Computer							
Travelling in the car							
Sitting at Work							
Other							

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