

women's health *a u s t r a l i a*

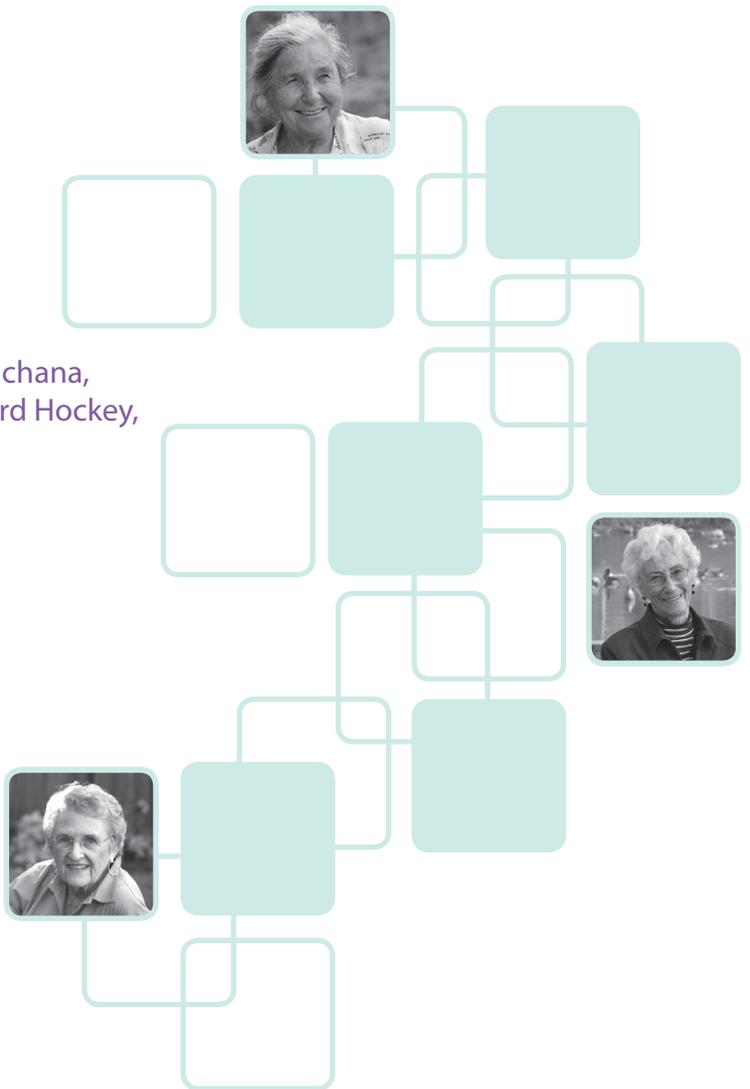


the australian longitudinal
study on women's health

Women, health and ageing: *Findings from the Australian Longitudinal Study on Women's Health*

Authors:

Julie Byles, Annette Dobson, Wendy Brown, Nancy Pachana,
Leigh Tooth, Deborah Loxton, Janneke Berecki, Richard Hockey,
Deirdre McLaughlin and Jenny Powers



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Women, Health and Ageing: Findings from the Australian Longitudinal Study on Women's Health

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1. Executive summary

This report focuses on the health of older women from the Australian Longitudinal Study on Women's Health (ALSWH). The report was developed on the basis of discussions between the ALSWH research team and the staff of the Australian Government Department of Health and Ageing and has the broad aim of examining the health of older Australian women.

The ALSWH is a very large longitudinal cohort study funded by the Department of Health and Ageing and conducted by a team of researchers and staff based at the Universities of Newcastle and Queensland. The ALSWH first collected data in 1996, from three cohorts of women then aged 18-23, 45-50 and 70-75. While some descriptive information concerning trends in health from all cohorts is included in the current report, the focus of analyses is on data collected from the oldest cohort, who were born 1921-26.

Women live longer than men and so as the population ages older women will comprise an increasingly larger proportion of the Australian population. Older women who are married may become carers of increasing frail or ill husbands and this may limit their capacity to look after their own health. When the women are widowed they suffer financial disadvantage and may face difficulty maintaining their homes and with transport. Nevertheless, provided they are in good health, they lead more active social lives than older men.

Due to their longer life expectancy, older women make up a majority of the people with dementia, sensory impairment, falls and fractured femurs. They are more likely to need aged care services. Caring for older women also impacts on the lives of middle-aged women, who often become their informal carers. Helping older women to remain healthy and live independently for as long as possible is a most important long term goal.

The life experiences and circumstances of women now in their 70s and 80s have been different from those of their daughters and grand-daughters. Extrapolation across generations is hazardous. Nevertheless, study of the health of older women, and its social and behavioural determinants, may shed light on likely health trajectories and prevention opportunities for younger women, especially the baby boomer generation.

The ALSWH participants were randomly selected from the Medicare database in 1996. They are a national sample of women from all walks of life chosen with intentional over-sampling of women living in rural and remote areas. The ALSWH collects data by mailed surveys at regular intervals. The 1921-26 cohort completed surveys in 1996, 1999, 2002, 2005 and 2008. Over 12,000 women completed Survey 1 of the 1921-26 cohort, and 5561 of these women completed Survey 5 in 2008. Details can be found on the ALSWH website (www.alswh.org.au).

Between 1996 and 2008, 28% of the 1921-26 cohort had died and a similar proportion withdrawn from the study due to frailty or other reasons or had been lost to follow-up. Of course, deaths in this age group are also common in the general population, but other forms of attrition (e.g., loss to follow-up) could mean that ALSWH participants have become increasingly different from the general population of women in their same age group. Therefore, we examined possible sources of bias and the extent to which they could impact on our findings. The results suggested that attrition is very unlikely to affect the generalisability of ALSWH findings to women living in Australia who were born in the years 1921-26.

Next we examined changes in physical health of women as they move from being in their 70s (70-75 years at Survey 1) to their 80s (82-87 years at Survey 5). Approximately half of the women maintained good physical health throughout this period. A clear finding is that women whose health declined or started low and continued low had lower socio-economic status. They were more likely to

be overweight or obese, undertake little physical activity and be current or ex-smokers. They suffered multiple chronic conditions and were heavy users of the health services.

There was a small group of women who reported clear improvements in health which appear to be related to restorative surgery (e.g. of hips or knees) or recovery from acute conditions or events.

Different conditions impacted in different ways on women's health related quality of life and their use of health services. For example, women with Alzheimer's disease needed more help with activities of daily living, had low scores on social functioning and general health, and were likely to die sooner. Women who had stroke or cancer were high users of services and had relatively low scores for all aspects of health related quality of life. In contrast, women who reported bronchitis/emphysema were not high users of health services, but they experienced some reduction in physical but not mental health scores.

Most of the older women in the study were living with at least one chronic condition, and many were living with multiple conditions that are associated with increased risk of physical health decline and other limitations on health-related quality of life. The more conditions a woman reported the higher the probability of poor health-related quality of life and decline in functional ability to perform activities of daily living.

To examine the effects of chronic conditions on the quality of life of older women, we considered four conditions in more detail: arthritis, diabetes, sleep problems and incontinence. These are common conditions which impact on different aspects of women's lives.

In 2005, 63% of ALSWH participants in the 1921-26 cohort reported diagnoses or symptoms of arthritis. Arthritis is associated with pain, physical limitations and greater costs of medications. There is some evidence that walking for leisure may reduce the risk of arthritis.

Data from the ALSWH show that medical management of diabetes fell well short of the guidelines. There is evidence that women who had good knowledge about diabetes management managed their condition better. Therefore greater health literacy and better understanding of their condition could improve the health of the growing population of older women with diabetes, particularly those with Type 2 diabetes.

Sleep problems commonly affect women as they become older. Women with sleeping difficulties reported a range of symptoms that interfere with sleep including pain, difficulty breathing, bad dreams, having to get up to use the bathroom, coughing/snoring, and being too cold or too hot. Use of sleeping medications did not appear to alleviate these problems for many women.

Incontinence is often described as a socially debilitating condition. In our data, incontinence was common and increased with age. The association between incontinence and social limitations, however, appeared to be more a consequence of underlying physical disability rather than the problem of incontinence.

A common risk factor for arthritis, diabetes and incontinence is higher body mass index (BMI). From a public health perspective prevention of overweight and obesity throughout adult life is a key national goal that could reduce disability in old age.

These findings have implications for primary care and the need for health professionals to work with older women patients to improve their understanding and management of common conditions. This includes helping women to improve their capability for self management and greater consideration of the effectiveness of medication, especially for women with multiple chronic conditions.

As women reach their 70s and 80s their health may become affected by risk factors and health behaviours accumulated over their lifetimes. Some of these factors act in conflicting ways. For example, osteoporosis, low BMI, being born in Europe and using medications for both sleep and anxiety were risk factors for height loss in older women. In turn, height loss was associated with

increased risk of heartburn/ indigestion and constipation, urinary incontinence and a decline in self-rated health.

Height loss can also affect BMI, as BMI increases as height reduces. Although a high BMI is associated with chronic conditions, a healthy BMI range for older women may be slightly higher than that recommended for younger adults. For example, risk of osteoporosis decreases with increasing BMI. Also, hospital admissions were lowest for women with BMI of 22 to 24 kg/m² (classified as healthy weight), and mortality rates were lowest for women with BMI 25 to 27 kg/m² (classified as overweight).

Falls are another risk affecting women at older ages, and are associated with common hazards around the home. These hazards include unsecured mats, shiny floors and poor bathroom design. Older women had an average around 9 to 10 potential falls hazards around their homes. Falls and fractures may be prevented through moderate to high levels of physical activity. However, few women in the 1921-26 cohort engaged in sufficient physical activity to prevent falls and fractures.

Smoking is a major risk factor at all ages. The impact of smoking on women in the ALSWH was seen in the earlier mortality for smokers compared with non-smokers in the study. Mortality rates decreased after quitting smoking, however even women who quit smoking more than 20 years ago had an increased mortality rate compared with women who never smoked.

Moderate alcohol intake in keeping with current guidelines may carry some health benefits for older women in terms of survival and quality of life. Around one third of women in the 1921-26 cohort reported regularly drinking alcohol, and most of these women drank 1 or 2 drinks per day on some or most days of the week. Survival rates and health-related quality of life were lowest among women who did not drink and women who rarely drank alcohol. There were no significant differences in outcomes for women in other categories of alcohol consumption providing evidence supporting the current alcohol consumption recommendations.

The preventive implications of these findings for older women are broadly in line with those for all other sectors of the population: for optimal health avoid being overweight or obese, do not smoke, use alcohol in moderation, undertake regular physical activity, and avoid household hazards. The difference for older women is that the opportunities for change may be reduced. For example, arthritis, osteoporosis and other chronic conditions may limit their ability to exercise. Additionally, while some changes may produce short term health benefits (e.g., quitting smoking) for many risk factors, evidence about time lags between behaviour change and risk reductions is weak. From a long-term policy perspective life-time maintenance of low risk is the best prospect for reducing the impact in old age of chronic conditions and their consequences on health care costs and services.

While much of this report is focussed on the physical health of older women we also examined social inclusion, social support, social participation and networks. Evidence for association between older women's health and social factors is weak and inconsistent. By using longitudinal data we showed that poorer health lead to social isolation (e.g., through loss of mobility, having to stop driving, or sensory loss). In contrast, our analyses have not, at this stage, shown that low levels of social connectedness and support lead to ill health. The implication of these findings is that policies or services aimed at increasing older women's social inclusion as a strategy to improve health are not supported by evidence.

Extrapolation from the health of older women to the likely future health of younger women is often inappropriate because social conditions, health-related behaviour and health services differ substantially between generations. However, through careful analysis of major health risk factors across age groups and over time some predictions are possible.

Cigarette smoking was uncommon among women born in 1921-26 yet it has shortened the life expectancy of smokers as well as increasing their risk of respiratory and other chronic conditions. Smoking at some time in their lives has been more common among the middle-aged and younger women and the adverse effects are likely to impact on their health for the rest of their lives. There is

good evidence that quitting smoking reduces risk of some conditions (e.g., cardiovascular conditions) quite quickly, but other risks (e.g., lung cancer) more slowly. For adult women who smoke, medical and behavioural help to stop smoking would increase their chances of making this change and reducing the subsequent health risks and costs. For children and young adults the emphasis should be on never smoking.

Among ALSWH participants (and the wider community) younger women (those born in 1973-78) are gaining weight on average faster than mid-aged women (born in 1946-51) who are gaining weight and have higher prevalence of overweight and obesity than older women (born in 1921-26). Based on current understanding of the metabolic effects of excess weight, it is very likely that hypertension, diabetes and cardiovascular disease will increase as consequences of this population-wide weight gain. This will substantially increase health care costs. Evidence for effective methods to avoid weight gain, to increase weight loss and about the time lags between weight change and risk change is weak (in part due to changes in modern diet and levels of energy expenditure). The implications are that weight-related health problems will increase for decades and that while prevention of overweight and obesity among children is important, there is an urgent need for better understanding of how to manage the burden of disease and costs due to excess weight in adults.

Current preventive activities in Australia to reduce overweight and obesity, reduce the prevalence of tobacco smoking, and increase levels of physical activity are all strongly supported by the data presented in this report.

Our data also identify growing needs for the primary care sector to help older women with chronic conditions. This will require improving the understanding of health care providers of older women's circumstances, multiple symptoms and diagnoses. Greater expertise in managing the health of older women and better access to services could improve their quality of life and reduce the costs incurred to the health system.

2. Health of older women in Australia

2.1. Key findings

- As the population ages older women will comprise an increasingly larger proportion of the total Australian population.
- Ischaemic heart disease is the leading cause of death and disability for women aged 65 and older. Among women aged 65-74, type 2 diabetes and breast cancer are the next two highest causes, while dementia and stroke are the next two highest causes among women over age 75.
- Many conditions such as dementia, sensory impairments and falls, do not have a greater age-specific incidence among women, but because women live longer they tend to account for the greatest proportion of people with these conditions, particularly at advanced ages.
- Biological differences between the sexes mean that women suffer from different conditions than men (most obviously breast cancer vs. prostate cancer). The epidemiology of common conditions also differs (e.g., the prevalence of osteoporosis and later manifestation of cardiovascular conditions in women) and women respond differently to some treatments than men.
- Social differences between the genders also affect health, e.g., differences in tobacco use results in higher death rates of lung cancer in older men than older women.
- A consequence of women living longer than men is that more older women than older men are widowed, and married women are often carers for frail or ill husbands.
- Women's roles as carers impact on their own health and use of health services.
- Older women often suffer financial disadvantage, face difficulty in maintaining their homes and with transport. Yet they lead more active social lives than older men.
- While the health of older women now may be indicative of the health of future generations as they reach old age, the patterns are unlikely to be the same due to differences in life experiences, health risk exposures and advances in health care.

2.2. Introduction

This section of the report provides a general introduction to the health of older women within the context of an ageing Australian population. Gender is an important factor in shaping people's experiences of ageing and in determining the impact of an ageing population. It is important to recognise "older people" not just as heads to be counted, but to acknowledge their individual characteristics, including gender, that help to shape their experiences and needs as they age. At present, 55 out of every 100 people aged 65 years and over are women, and the predominance of women increases with each successive age group. For example, in 2006, women accounted for 51% of people aged 65-74 years, 56% of people aged 75-84 years, and 67% of those aged 85 or over (ABS, 2007a). Moreover, as the population ages older women will comprise an increasingly larger proportion of the total Australian population. The future population of older women will comprise the current younger and mid-age women whose health related behaviours are included in this report.

2.3. Women's life expectancy

Women tend to outlive men, and this trend is accentuated at more advanced ages. Currently in Australia, the life expectancy for a girl born sometime during 2003–2005 is 83.3 years, whereas a boy born during the same period can expect to live 78.5 years (AIHW, 2005). A woman who has already survived to age 65 can expect to live another 21.1 years (to 86 years), whereas a man is likely to live another 17.5 years (AIHW, 2006; see Topic 16: Life expectancy, health status and causes of death). The number of older Australians aged 85 years and over has doubled over the past 20 years and is projected to increase more rapidly than other age groups: from 333,000 in 2006 to 1.1 million in 2036 (from 1.6% to 4.2% of the total population) (Older Australia at a Glance (OAAG), 2007). The proportion of people aged 85 years and over is also projected to increase, from 12% in 2006 to 18% in 2036. Over this period, the number of centenarians is projected to increase from fewer than 5,000 to more than 25,000 (ABS, 2006a). On 30 June 2006, there were 1981 females in Australia aged 100 and over (ABS, 2007b). Thus many women who are aged 80 years today can expect to live to over 100 years.

The experiences of women in the last century has been one of profound changes in roles within the family and society, and expanded opportunities with respect to education and participation in the workforce. These changes and increased longevity have resulted in a population of older women with a wide range of life experiences. In the following sections we summarise their health and well-being data across broad age bands.

2.4. Disease and disability among older women

A measure called disability-adjusted life years (DALYs), is used to summarise the burden of disease by combining data on years of life lost due to premature death (YLL) in the population and the years lost due to disability (YLD) for new cases of the health condition (Begg et al., 2007). Older adults experience a disproportionate amount of the DALY burden. In Australia in 2003, adults aged 65–74 years made up 7% of the total population and experienced 16% of the total burden of disease, while those aged 75 years and over accounted for 25% of the total disease burden even though they represented only 6% of the total population (Begg et al., 2007). Women aged 65–74 experienced a greater share of the burden than males aged 65–74 with respect to musculoskeletal conditions but not other conditions, but women over age 75 experienced a greater share of the burden than males overall and for all broad cause groups except chronic respiratory diseases and cancer. Ischaemic heart disease is the leading cause of DALYs for women aged 65 and older. Among women aged 65–74, type 2 diabetes and breast cancer are the next two highest causes of DALYs, while dementia and stroke are the next two highest causes of DALYs among women over age 75.

Despite their higher disease burden, older women are more likely than older men to rate their health as excellent or very good, and the majority (69%) of women aged 65 years or over consider themselves to be in good, very good or excellent health (ABS, 2006b). However, in 2003, over half of all people aged 65 years or over (56% or 1.4 million) had at least one form of disability lasting (or expected to last) at least 6 months and which restricted everyday activities, and there was little difference in disability rates for males and females. Differences in disability between males and females are mainly in terms of the severity of disability, rather than the prevalence, with females being more likely to report severe or profound disability at all ages.

2.5. The importance of sex and gender

The male-female differences in life expectancy and disability arise not only from variations in male and female biology, but also from a complex interplay of social and lifestyle factors. Biology does of course play a big role. As Wizeman and Pardue (2001) note, “every cell has a sex” and gender differences have been identified for a whole variety of physiological and biochemical functions. Biologically, females tend to have an advantage over males. Statistically more boys are born but more girl infants survive. Oestrogen plays a protective role for women with respect to conditions such as cardiovascular disease, although the sudden decline in oestrogen following menopause contributes to the higher rate of bone loss in women and greater risk of osteoporosis (different exposure to physical activity and weight bearing exercise across the lifecourse may also play a part). Osteoarthritis is also more common among women than among men, although the biological mechanisms for this effect are not known.

Men and women are also likely to have different biological responses to toxins and to medications. Women tend to absorb, metabolise and excrete drugs more slowly than men, and they have a smaller volume of distribution for medications (having lower lean body mass). Consequently women have a higher risk of adverse effects from medication use. Mostly, though, and despite the obvious differences, we have a very limited understanding of the biological differences between the sexes and how these should affect how we treat disease (Wizeman & Pardue, 2001).

Some obvious epidemiological manifestations of biological differences between men and women include cancers that are more likely to affect women (such as breast cancer) and those that can only affect men (such as prostate cancer). For the most part, however, the types of conditions which commonly affect people at older ages are similar among men and women. The differences are predominantly in terms of the incidence of these conditions and the peak age of onset, but diseases also sometimes have different manifestations and require different treatments according to gender. For instance, men experience peak incidence of coronary artery disease earlier than women, and there is a tendency to think of cardiovascular disease as a problem that is specific to men. In reality, however, cardiovascular disease is the main cause of death for both sexes (AIHW, 2008).

While biology plays a role, many of the differences in ageing are strongly linked to the social differences between men and women and the influence of “gender” across their lives. These less obvious differences include risks we are exposed to throughout our lives and how these affect our health at older ages, the ways in which we approach health care, and the ways in which we adapt to changes in our selves and in the world around us. For instance, lung cancer is more common among men who have had higher rates of smoking than women, although rates of lung cancer in women increased after women took up smoking in greater numbers. Women have higher prevalence of incontinence than men do, mostly due to the effects of childbirth, although these problems are also important for men particularly those who have had prostate surgery.

Men and women’s reactions to conditions are also different. While women are more likely to develop melanoma, for instance, men are more likely to die from this condition. At least part of the explanation for this effect is that women are more likely to seek help, and are also likely to be the instigator of help for their husbands. Men and women also have different responses to mental health issues. Compared to men, women are more likely to be diagnosed with mental health problems such as depression (partly due to gender-bias in diagnosis), but men are more likely to commit suicide.

Other gender differences in terms of life course, social roles, and access to financial and social resources will also have significant effects on men and women’s health and wellbeing in older age. However, these contextual factors and the differences between men and women are not fixed as women gain increasing levels of education, workforce participation and financial independence. A question of importance for an ageing population in a changing society is whether the differences between women’s and men’s risk factors and disease profile become less significant over time.

2.6. Ageing as women's business

Because of women's greater longevity, many of the major issues of ageing are seen as "women's business". Many conditions such as dementia, sensory impairments and falls, do not have a greater age-specific incidence among women, but because women live longer they tend to account for the greatest proportion of people with these condition, particularly at advanced ages. For example, of the 181,000 people with dementia in Australia in 2006, 65% were women (AIHW, 2007a).

While women will increasingly need care as they age, in general women are more likely to care for others than to receive care themselves. Among primary carers - those providing the most ongoing informal assistance with personal care, mobility or communication – women predominate except at the oldest age ranges (age 85+). (AIHW, 2005). Data from the ALSWH illustrate this phenomenon: prevalence of caring changes with age, with the percentage of women caring rising from 8% in women in their early 20s to 32% for women in their 50s and declining to around 20% when women are aged in their 70s and 80s. Many women care for more than one disabled older person across their lifetime, having cared for parents, older siblings, and friends as well as their husbands. Around 54% of all carers are women, and women predominate among primary carers with over two-thirds (71%) of all primary carers being women (AIHW, 2005). Women take on the caring role at a younger age than men and are more likely to provide care for people other than their own partners (ABS, 2005: Table 19). However, at older ages these sex differences in caring become less apparent.

Most older carers are caring for a spouse or partner (83%), and this carer group is the least likely of all primary carers to seek help (Hales, 2007). Thus they may be at risk of not receiving support when it is needed, with negative consequences to their health and well-being.

Data from the ALSWH show the impact that caring can have on women, an important modifier being where the women live relative to the care recipient. For women aged in their 70s and 80s, those who never provided care typically had better health-related quality of life compared to carers who lived with their care recipients but worse outcomes compared to carers who lived elsewhere. Generally, women who were either starting or stopping providing care for a care recipient who lived with them had higher use of health services and had poorer mental and physical health outcomes. Better mental health was shown in women who were starting or stopping providing care for a care recipient who lived elsewhere (McKenzie et al., 2009). ALSWH data also show that for women aged in their 50s those who care, particularly if they live with the care recipient, have less involvement in the workforce, more involvement with caring for children, less social support, and more negative outcomes in terms of mental health, optimism, stress, sleep problems and physical symptoms. These live-in carers are consequently heavy users of health services (Lucke et al., 2006).

Additionally, when they do need care, many older women will already be widowed and living alone. While widowhood is decreasing with successive age cohorts (for both sexes), in 2006 almost 80% of women and 37% of men aged 85 years and over were widowed, and 42% of women and 12% of men aged 65 years and over were widowed (AIHW, 2007b). As well as the grief and adjustment associated with the loss of their spouse, many of these newly single older women struggle with maintaining their homes and gardens, transport, and managing financially on a single pension or annuity (Byles and Feldman 1999; Feldman et al., 2000; Feldman et al., 2002). For instance, women have greater difficulties getting to places they need to, with 25% of women 65 years and over reporting such difficulty compared with 15% of men (Table 5.1; ABS, 2007c).

Women are also more likely to require aged care than men. In 2006, 284 of every 1000 women aged 85 years and over were in residential care, compared with 153/1000 men. Women residents also tend to have longer length of stay in residential care, with the average length of stay for women being 167 weeks, compared with 109 weeks for men (AIHW, 2007b).

Under current arrangements older women are particularly financially disadvantaged during retirement and older age. Women's patterns of work-force participation have traditionally not followed the occupational career path of men. Most women have worked at some time in their lives, but

participation tends to be intermittent. A consequence of women's patchy and late workforce participation is that they have limited access to superannuation funds (Kelly, 2006). In 2000, an estimated 78% of males and 71% of females in the pre-retired population had some level of superannuation coverage; however, among retired people aged 45 years and over, only 55% (of both sexes) had contributed to a superannuation scheme at some stage (ABS, 2006c). However, even for women who do have superannuation funds, their equity may be minimal and an estimated 50% of females born between 1946 and 1961 have superannuation accounts of \$8000 or less (Kelly, 2006). Women are consequently heavily reliant on government pensions as their main source of income in older age. In June 2006 women made up 58% of all age pensioners and relatively more women than men were on a single rate of payment as opposed to a partnered rate (56% of female pensioners compared with 30% of male pensioners; see Table A13.1). At ages 85 years and over, 74% of aged pensioners were women, consistent with women's greater longevity (FaCSIA unpublished data – OAAG, 2007).

In terms of social contact and participation, women enjoy some advantages. According to the 2006 ABS General Social Survey (GSS), a larger proportion of older women were in face-to-face contact in the previous week with family and friends than men (82% compared with 69%), and this was true for all but the oldest age group (OAAG, 2007). Similar proportions of older men and women reported participating in informal social activities until aged 85 years and over, when men's participation rates declined. However, participation in more formal social or support groups for both genders declines precipitously at these advanced ages; of those over age 85, 61% of women (compared with 50% of men) reported no active involvement in social groups.

2.7. Future generations of older women

Since the experiences of ageing are shaped by circumstances, behaviours and risk factors that are evident at much younger ages, future generations of older women may not experience the same prevalence or incidence of conditions and disability. Changing approaches to illness prevention and management will also alter disease incidence and outcomes for future generations of older women. It is none-the-less worth viewing the current health state of women at younger ages in relation to the patterns of conditions and risk factors exhibited by women in the 1921-26 cohort. Examining the characteristics and activities of the women aged in the 1946-51 cohort as they move from their late 40's, through their 50's and into their 60's may provide insight into the health needs of the next generations of older women, and particularly those on the advancing edge of the post-war baby boom.

2.8. Summary

Women live longer than men and so as the population ages older women will comprise an increasingly larger proportion of the Australian population. Older women who are married may become carers of increasing frail or ill husbands and this may limit their capacity to look after their own health. When the women are widowed they suffer financial disadvantage and may face difficulty maintaining their homes and with transport. Nevertheless, provided they are in good health, they lead more active social lives than older men.

Due to their longer life expectancy, older women make up a majority of the people with dementia, sensory impairment, falls and fractured femurs. They are more likely to need aged care services. Also caring for older women impacts on the lives of middle-aged women, who often become their informal carers, Helping older women to remain healthy and live independently for as long as possible would appear to be the most important long term goal.

The life experiences and circumstances of women now in their 70s and 80s have been different from those of their daughters and grand-daughters. Extrapolation across generations is hazardous.

Nevertheless, study of the health of older women, and its social and behavioural determinants, may shed light on likely health trajectories and prevention opportunities for younger women, especially the baby boomer generation.

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3. Introduction to older women in the Australian Longitudinal Study on Women's Health

3.1. Key Findings

- Between Survey 1 and Survey 5, 28% of ALSWH participants in the 1921-26 cohort had died, 16.5% had withdrawn from the study due to frailty or other reasons, 10.4% had been lost to follow-up so only 44.7% remained in the study.
- Compared to women of the same age in the general population, ALSWH participants in the 1921-26 cohort were more likely to be married and to have a tertiary education, and less likely to be widowed. They were also less likely to be current smokers.
- Compared to those still alive at Survey 5, participants who died had reported lower self-rated health at Survey 1.
- While ALSWH participants had a slightly better survival rate than other women the same age, the cohort remains very similar to the general population.
- Cohort attrition is very unlikely to affect the generalisability of ALSWH findings to women living in Australia who were born in the years 1921-26.

3.2. Introduction

The purpose of this section is to describe the current cohort of older women in ALSWH, but particularly to consider the effect of attrition over the study period on how representative older women in ALSWH are of all women of the same age in the Australian population. This representativeness is important because it affects the generalisability of Study findings to the general population.

First we start by looking at how representative the ALSWH participants were at the beginning of the Study in 1996. Next we look at the extent of attrition since 1996. We then consider factors associated with various forms of attrition and how these may have affected representativeness over the Study period. Finally we consider the likely effect of attrition on our ability to extrapolate from the ALSWH participants and their present health needs to those for all women in this age group in Australia.

3.3. How similar were the older women who participated in the first ALSWH survey to women of the same age in the general population?

When the Study began in 1996 we were able to compare ALSWH participants using data from the Australian Census conducted in the same year. We also compared ALSWH data with information about women of the same age who participated in the National Health Survey conducted by the Australian Bureau of Statistics at the same time. Table 3-1 and Table 3-2 show these comparisons.

Table 3-1 Comparison of selected demographic characteristics in 1995/6 between the ALSWH participants born in 1921-26, women of the same age who participated in the 1995 national health survey, and women of the same age in the 1996 Australian census

Item	ALSWH N=12,423 %	NHS N=894 %	Australian Census
State or Territory of Residence			
New South Wales	34.9	35.8	
Australian Capital Territory	1.1	0.8	
Queensland	16.3	16.6	
South Australia	10.2	10.0	
Tasmania	2.8	2.5	
Victoria	26.0	25.9	
Western Australia	8.5	8.5	
Marital Status			
Partnered	55.6	49.6	48.9
Separated/ Divorced	6.3	5.6	6.8
Widowed	34.8	42.4	39.9
Never married	3.2	2.4	4.4
Country of Birth			
Australian born	73.5	74.2	66.4
Other English Speaking	13.6	10.9	11.0
Europe	10.1	12.0	12.7
Asia	1.8	1.4	3.3
Other	1.0	1.6	6.5
Highest Educational Qualification			
No Higher Qualification	84.0	79.3	70.4
Trade/Apprentice Certificate/Diploma	11.7	16.7	6.0
University	4.2	2.7	2.4
Inadequately described		1.2	21.2

The ALSWH participants were more likely to be married and less likely to be widowed than women of the same age in the general population. They were also more likely to have a tertiary education. There were more women born in 'Other English speaking background (ESB)' countries in the ALSWH cohort and fewer born in Europe.

Table 3-2 Comparison of selected health characteristics in 1995/6 between the ALSWH participants born in 1921-26, women of the same age who participated in the 1995 national health survey, and women of the same age in the 1996 Australian census

Item	ALSWH N=12,423 %	NHS N=894 %
BMI Group		
Underweight, BMI < 18.5	3.2	4.2
Healthy weight, 18.5 ≤ BMI < 25	50.4	52.1
Overweight, 25 ≤ BMI < 30	33.1	29.1
Obese, 30 ≤ BMI	13.2	14.5
Does Your Health Limit You in Walking 100m		
Limited a lot	7.1	11.3
Limited a little	15.4	19.7
Not limited	77.4	68.9
Smoking Status		
Never-smoker	62.1	64.6
Ex-smoker	30.4	24.3
Current smoker	7.6	11.0
Self Rated Health		
Excellent	6.4	7.6
Very good	26.2	23.2
Good	39.4	34.4
Fair	23.6	24.3
Poor	4.3	10.5

For health related behaviours the ALSWH participants were less likely to be current smokers, less likely to report fair or poor self rated health, and not to report that their health limits their ability to exercise (walk 100 metres). Although the differences represent a 'healthy volunteer' bias they are not very large and were unlikely to limit the generalisability of ALSWH results.

3.4. Who remains in the Study?

When the ALSWH began the women born in 1921-26 were aged 70-75 so it is not surprising that as the ALSWH continues, more and more of these older women die or become too frail to continue to participate. Each year, ALSWH participant information is linked to the National Death Index by the Australian Institute of Health and Welfare so that we are able to ascertain all deaths (family members and other informants also provide advice of participants' deaths). Participants, their family members or carers also inform the ALSWH team about withdrawals from the study (including reasons for withdrawal) and extensive efforts are made to trace women with whom we lose contact. Table 3-3 summarises the situation up to Survey 5 which was conducted in 2008.

Table 3-3 Attrition across surveys 1 to 5 in the ALSWH for women born in 1921-26.

Survey	Respondent	Dead	Frail	Withdrawn	Lost to Follow Up
1	100.0%	-	-	-	-
2	83.9%	4.5%	0.8%	4.7%	6.1%
3	69.6%	9.9%	2.6%	9.0%	9.0%
4	57.6%	18.4%	4.4%	10.9%	8.7%
5	44.7%	28.4%	5.1%	11.4%	10.4%

Note: Total number of women at each survey is 12,432.

By Survey 5 fewer than half of the original group continued to participate, more than one in four had died, while one in twenty had withdrawn due to fragility and about double that number had withdrawn due to other or unknown reasons. Contact had only been lost with about one in ten of the women. Table 3.3 shows that the main reason for participant loss was death. Of course deaths also occur in the general population of women of this age group.

3.5. Who died?

When ALSWH participants who died were compared to those who were still alive, we found that at Survey 1 they had reported lower self-rated health than survivors (Ford et al., 2007). For this reason we examined death rates (estimated as hazard ratios) for the whole cohort and separately for those who reported 'good', 'very good' or 'excellent' health (the 'healthy' group) at Survey 1. The results are shown in Table 3-4. Women who reported poorer health, those who were older and women who reported lower levels of physical activity, and being current smokers or ex-smokers were at greater risk of dying.

Table 3-4 Predictors of death among older women in the whole cohort and in the ‘healthy’ cohort: results from a stepwise proportional hazards survival analysis – hazard ratios (HR) and 95% confidence intervals (CI) for all factors that had p-values <0.1 in the univariate analyses.

	Whole cohort		‘Healthy’ cohort	
	HR ^b	95%CI ^b	HR ^b	95%CI ^b
Self-rated health				
Excellent ^a	1.00		1.00	
Very good	1.04	0.75-1.44	1.09	0.77-1.52
Good	1.18	0.85-1.63	1.43	1.03-1.98
Fair	1.65	1.16-2.34	-	-
Poor	2.48	1.63-3.77	-	-
Smoking Status				
Non-smoker ^a	1.00		1.00	
Ex-smoker Quit 20+ yrs	1.07	0.89-1.29	0.95	0.71-1.28
Ex-smoker Quit 11-20 yrs	1.17	0.95-1.43	0.84	0.60-1.18
Ex-smoker Quit 6-10 yrs	1.41	1.10-1.81	1.18	0.76-1.83
Ex-smoker Quit <5yrs	1.58	1.25-1.99	1.08	0.69-1.69
Current smoker	1.95	1.62-2.34	2.00	1.52-2.63
Exercise				
High	0.93	0.74-1.17	0.92	0.68-1.25
Moderate ^a	1.00		1.00	
Low	1.12	0.96-1.32	1.30	1.05-1.62
None	1.73	1.49-2.01	1.52	1.20-1.92
BMI				
Underweight	1.91	1.50-2.43		
Acceptable weight ^a	1.00			
Overweight	0.81	0.71-0.92		
Obese	0.82	0.69-0.97		
Co-morbidity Score	1.13	1.10-1.16		
Age	1.06	1.02-1.10	1.12	1.06-1.19
Physical health component score	0.986	0.98-0.99		

^a Denotes reference category

^b Bold indicates that the 95% confidence interval does not include unity

We also compared death rates among the ALSWH participants with death rates of women in the same age group in the general population using Australian life tables.

Table 3-5 shows relative survival of the ALSWH cohort compared to the general population of women of the same ages. Relative survival estimates greater than 1.0 indicate better survival of ALSWH participants. Where the confidence limits do not include 1.00 the difference is statistically significant.

Table 3-5 Relative cumulative survival over the period 1996-2008 of participants in the Australian Longitudinal Study on Women's Health 1921-26 cohort by state or territory of residence, accessibility/remoteness index (ARIA) and age at Survey 1.

	Relative Cumulative Survival	95% Confidence Limits	
		Lower	Upper
All women	1.095	1.083	1.107
State or Territory of Residence			
Australian Capital Territory	1.233	1.113	1.321
New South Wales	1.108	1.087	1.127
Northern Territory	1.249	0.791	1.541
Queensland	1.085	1.054	1.113
South Australia	1.063	1.024	1.099
Tasmania	1.106	1.024	1.179
Victoria	1.086	1.063	1.109
Western Australia	1.109	1.068	1.146
Accessibility/Remoteness Index (ARIA)			
Highly Accessible	1.104	1.091	1.116
Accessible	1.042	1.004	1.079
Moderately Accessible	1.064	0.997	1.124
Remote, Very Remote	1.068	0.939	1.173
Age at Survey 1			
70	1.064	1.039	1.087
71	1.060	1.036	1.083
72	1.094	1.068	1.119
73	1.109	1.079	1.138
74	1.129	1.095	1.161
75	1.215	1.145	1.280

Over the 12 year period 1996 to 2008 the ALSWH sample had a relative cumulative survival 9.5% (95% confidence interval, 8.3% - 10.7%) greater than their peers in the general Australian population matched for age and State or Territory of residence. The relative survival per year remained somewhat constant over the period indicating that the survival advantage of the cohort did not diminish over time (data not shown here).

ALSWH participants in all jurisdictions except the Northern Territory had significantly better survival than the general population with the relative cumulative survival advantage being between 6% for South Australia and 11% for Western Australia, but with a markedly higher survival advantage of 23% for the Australian Capital Territory. Across all ARIA groups relative cumulative survival was consistently higher than the general population although in the remote/ very remote areas the difference was not statistically significant. The relative survival advantage increased with initial age. Those women aged 70 in 1996 had only a 6% advantage which increased to 22% for women aged 75 in 1996.

We examined the extent to which this survival advantage compared to other Australian women might be attributable to the slightly more favourable profiles shown in Tables 3.1 and 3.2. The magnitude and direction of the effects suggested the demographic and health behaviour differences could explain the major portion of the survival advantage in the ALSWH cohort (results not shown here).

3.6. Who has been lost from the Study for reasons other than death?

While deaths occur in the general population as well as the Study, losses for other reasons only occur in the Study. Therefore the causes of attrition other than death are potentially a more important threat to the generalisability of the Study results now.

Table 3-6 shows the odds ratios for each of the forms of attrition, relative to respondents, in relation to demographic and health behaviour variables and self rated health at Survey 1. Those women most likely to have died by 2008 had no formal educational qualification, were underweight, did very little or no physical activity, did not drink alcohol, were current smokers, and reported having poor health at baseline. Women most likely to withdraw due to frailty reported having poor health at baseline, and drank alcohol rarely or not at all. Women most likely to withdraw due to reasons other than frailty were born in a non-English speaking country, had no formal educational qualification, and did very little or no physical activity. Women most likely to be lost to follow up were born in a non-English speaking country, did very little or no physical activity, were current smokers, and reported having poor health at baseline.

Table 3-6 Odds ratios from multinomial logistic model for different types of attrition, compared to response, at Survey 5 in 2008 in the ALSWH for women born in 1921-26. In total 8938 women were included in the model, of whom 4327 (48.4%) were respondents. Odds ratio estimates with a 95% confidence interval not including unity are shown in bold.

Risk Factor	N	%	Odds Ratio (95% Confidence Interval – bold indicates exclusion of 1)								
			Dead (N=2395) vs. Respondent		Frail (N=410) vs. Respondent		Withdrawn (N=942) vs. Respondent		Lost to Follow Up (N=864) vs. Respondent		
Country of Birth	Australia	6893	77.1	1.00	1.00	1.00	1.00	1.00	1.00		
	Other English speaking	1202	13.5	0.98	(0.84,1.15)	0.97	(0.70,1.33)	0.95	(0.76,1.19)	1.18	(0.95,1.47)
	Other	843	9.4	0.95	(0.78,1.16)	1.17	(0.83,1.67)	1.93	(1.55,2.42)	2.03	(1.62,2.54)
Highest Qualification	University	377	4.2	1.00		1.00		1.00		1.00	
	Certificate/Diploma	728	8.1	1.24	(0.89,1.72)	1.05	(0.55,2.00)	1.54	(0.89,2.68)	0.81	(0.52,1.27)
	Trade/Apprenticeship	327	3.7	1.12	(0.75,1.66)	1.49	(0.73,3.04)	2.27	(1.25,4.13)	1.10	(0.66,1.83)
	Any high school	4665	52.2	1.31	(0.99,1.74)	1.19	(0.69,2.05)	2.28	(1.41,3.70)	1.17	(0.81,1.68)
	No formal qualification	2841	31.8	1.51	(1.13,2.01)	1.41	(0.81,2.47)	3.54	(2.18,5.76)	1.20	(0.83,1.75)
BMI Classification	Acceptable	4487	50.2	1.00		1.00		1.00		1.00	
	Overweight	2959	33.1	0.86	(0.76,0.97)	0.91	(0.72,1.14)	1.07	(0.92,1.25)	1.11	(0.94,1.31)
	Obese	1203	13.5	0.91	(0.77,1.07)	0.79	(0.57,1.10)	0.62	(0.48,0.79)	1.09	(0.87,1.37)
	Underweight	289	3.2	2.17	(1.62,2.92)	1.72	(1.00,2.97)	1.04	(0.64,1.70)	0.77	(0.43,1.36)
Physical Activity	Low to very high	6474	72.4	1.00		1.00		1.00		1.00	
	None or very low	2464	27.6	1.75	(1.55,1.97)	1.08	(0.85,1.38)	1.34	(1.14,1.59)	1.19	(1.00,1.42)
Alcohol Consumption	Low-risk drinker	3055	34.2	1.00		1.00		1.00		1.00	
	Non-drinker	3007	33.6	1.38	(1.20,1.58)	1.34	(1.02,1.75)	1.15	(0.96,1.38)	1.13	(0.93,1.37)
	Rarely drinks	2576	28.8	1.21	(1.06,1.39)	1.43	(1.09,1.86)	0.92	(0.76,1.10)	1.13	(0.94,1.37)
	Risky or high-risk drinker	300	3.4	1.02	(0.76,1.37)	1.31	(0.74,2.32)	0.84	(0.54,1.31)	0.74	(0.46,1.18)
Smoking Status	Never smoker	5624	62.9	1.00		1.00		1.00		1.00	
	Ex-smoker	2673	29.9	1.45	(1.29,1.64)	1.10	(0.87,1.39)	1.00	(0.85,1.19)	1.25	(1.06,1.48)
	Smoker	641	7.2	2.73	(2.22,3.36)	1.26	(0.80,1.97)	1.26	(0.92,1.72)	1.82	(1.35,2.45)
Self-Reported Health	Excellent	578	6.5	1.00		1.00		1.00		1.00	
	Very good	2489	27.9	1.11	(0.86,1.42)	0.93	(0.56,1.55)	0.98	(0.73,1.33)	1.10	(0.79,1.53)
	Good	3516	39.3	1.57	(1.23,2.01)	1.58	(0.97,2.55)	1.11	(0.83,1.49)	1.29	(0.93,1.78)
	Fair	2014	22.5	3.25	(2.52,4.19)	2.88	(1.75,4.74)	1.41	(1.03,1.93)	1.94	(1.37,2.73)
	Poor	341	3.8	11.87	(7.92,17.79)	7.14	(3.54,14.41)	1.73	(0.95,3.17)	4.14	(2.38,7.20)

3.7. How does participant loss limit the value of the Study's findings now?

While the survivors who continue to participate in ALSWH were different from the women who died, they may still be reasonably representative of women of their age group in the general population. From the health services perspective this is the most important issue.

We can assess the effects of deaths and other forms of attrition on the representativeness of the survivors by comparisons with data from Australian Censuses and National Health Surveys conducted during the ALSWH study period. Illustrative examples are shown in the following set of figures.

Being born in a non-English speaking country is an example of a risk factor associated with non-death attrition but not the risk of death (i.e., similar to the situation depicted in Figure 3-1 below).

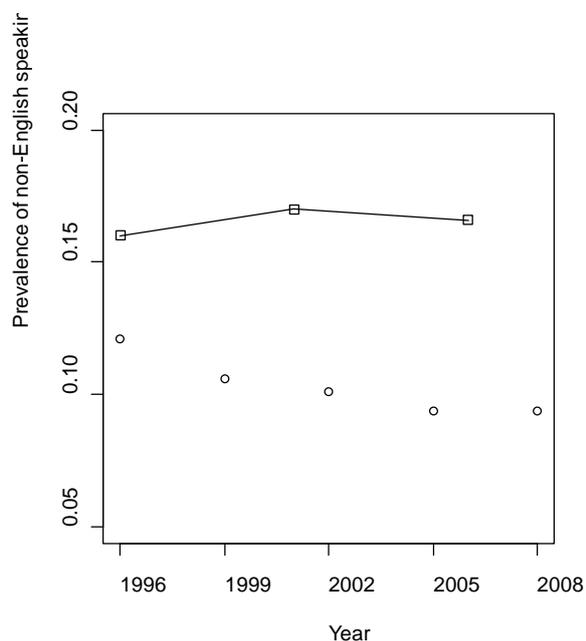


Figure 3-1 Prevalence of a non-English speaking country of birth in the Australian Census and the ALSWH cohort (left panel), and prevalence of current and ex-smokers in the Australian National Health Survey and the ALSWH cohort (right panel).

The left panel of Figure 3-1 shows the change in prevalence of a non-English speaking country of birth in the Australian population of women in this age group and the ALSWH cohort, over approximately the same ten years. This is a variable associated with lower risk of death but higher risk of attrition due to other causes in Table 3-7. Prevalence of a non-English speaking country of birth was lower in the ALSWH cohort at 1996 (0.12 vs. 0.16), 2001/2 (0.10 vs. 0.17) and 2005/6 (0.09 vs. 0.17). This corresponds to a bias of 0.04 in 1996, increasing to 0.07 in 2001/2, and 0.072 in 2005/6.

Smoking is an example of a risk factor associated with both the risk of death and non-death attrition (Table 3.6). The right panel of Figure 3-1 shows the change in prevalence of current or ex-smokers in the target population and the ALSWH cohort. Prevalence of current or ex-smokers was higher in the ALSWH cohort at both 1995/6 (0.38 vs. 0.35) and 2005 (0.35 vs. 0.30). This corresponds to a bias of 0.03 in 1995/6, increasing to 0.06 in 2005.

The extent of differences in other major factors between the surviving ALSWH cohort and the general population of the same age is shown in Table 3-7. Prevalence of no post-high school qualification is almost the same in the ALSWH cohort and the Australian population at 1995/6 (0.797 for the ALSWH vs. 0.793) and 2005 (0.784 for the ALSWH vs. 0.798), and so bias did not change much. In contrast, bias increased in the prevalence of both the underweight BMI classification and poor self reported health. However the biases are remarkably small.

Table 3-7 Prevalence of risk factors in the ALSWH and the target population at 1995/6 and 2005/6, and changes in bias over this time.

Risk Factor : Level	1995/6			2005/6		
	ALSWH	Target Population	Bias	ALSWH	Target Population	Bias
Country of Birth: Non-English speaking background	0.121	0.160	0.039	0.094	0.166	0.072
Smoking Status: Current or ex-smoker	0.379	0.353	-0.026	0.354	0.296	-0.058
Highest Qualification: No post-high school qualification	0.797	0.794	-0.003	0.784	0.798	0.014
BMI Classification: Underweight	0.029	0.042	0.013	0.021	0.059	0.038
Self Reported Health: Poor	0.043	0.105	0.062	0.043	0.132	0.089

3.8. Summary

The Australian Longitudinal Study on Women's Health (ALSWH) is a large nationally representative survey that has been collecting data since 1996. This report on the health of women born in 1921-26 is uniquely able to characterise the health and well-being of older women in Australia at the beginning of the 21st Century.

The study participants were randomly selected from the Medicare database in 1996. They are a national sample of women in all walks of life chosen with intentional over-sampling of women living in rural and remote areas. Between 1996 and 2008, 28% of the 1921-26 cohort had died and similar proportion withdrawn from the study due to frailty or other reasons or had been lost to follow-up. Of course, deaths in this age group are also common in the general population, but other forms of attrition (e.g., loss to follow-up) could mean that ALSWH participants have become increasingly different from the general population of women in their same age group. Therefore, we examined possible sources of bias and the extent to which they could impact on our findings.

Based on this evidence it seems that although just under half of the original participants remain in the cohort, attrition is very unlikely to affect the generalisability of ALSWH findings to women living in Australia who were born in the years 1921-26.

3.9. References

Ford, J., Spallek, M., & Dobson, A. (2007). Self-rated health and a healthy lifestyle are the most important predictors of survival in elderly women. *Age and Ageing*, 37, 194-200.

4. Changes in older women's physical health

4.1. Key Findings

- Approximately half of the women who remained in the study at Survey 5 maintained good physical health over the period from Survey 1 (when they were aged 70-75 years) to Survey 5 (aged 82-85 years).
- Those women whose health declined, or started low and continued low, had lower socio-economic status and poorer health at Survey 1.
- There was a small group of women who reported clear improvements in health which appear to be related to restorative surgery (e.g., of hips or knees) or recovery from acute conditions or episodes of illness.
- Women in this age group frequently reported having chronic conditions, and symptoms, and they were relatively heavy users of health services.
- Aspects of health related quality of life and use of health services were impacted differently by different conditions.
- Women with Alzheimer's disease needed more help with activities of daily living, had low scores on social functioning and general health, and were more likely to die.
- Women who had stroke or cancer were high users of services and had relatively low scores for all aspects of health related quality of life.
- Women who reported bronchitis/emphysema were not high users of health services, experienced some reduction in physical health scores, but no impact on mental health aspects.

4.2. Introduction

This section of the report presents an analysis of changes in women's physical health and the impact of different conditions and co-morbidities on these changes.

Decline in physical function and associated physical health-related quality of life is a common feature of older age, with important consequences in terms of physical health-related quality of life, disability in daily activities, falls, health care use, admission to residential care and mortality (Freeman et al., 2002; Gill & Kurland, 2003). However, among people of similar chronological age, some individuals appear to be resistant to decline in physical function while others appear more vulnerable [Paterson et al., 2004]. More information on the patterns and pace of age-associated changes in physical function, and the factors associated with different patterns of change, is important for planning for an ageing population.

4.3. Changes in physical health-related quality of life and physical function

Physical health-related quality of life reflects the extent to which physical activities are limited by health. In the ALSWH, health related quality of life is measured using the Medical Outcomes Study 36-item Short Form Health Survey Version 1 (SF-36 Australian Version) (McCallum, 1995). The SF-36 produces eight subscales each with a score range of 0 to 100. The subscales measure physical function, social function, mental health, pain, role limitations due to physical health, role limitations due to emotional health, vitality and general health. A high score on the physical function subscale reflects the ability to walk various distances, climb stairs, dress/bathe, carry groceries and engage in moderate and vigorous levels of activity (Ware, 1994).

SF-36 scores from Survey 1 to Survey 5 for all women who had completed Survey 5 are presented in Figure 4-1. Scores declined for most sub-scales, and declined more steeply between Survey 4 and Survey 5 than between Survey 1 and Survey 2.

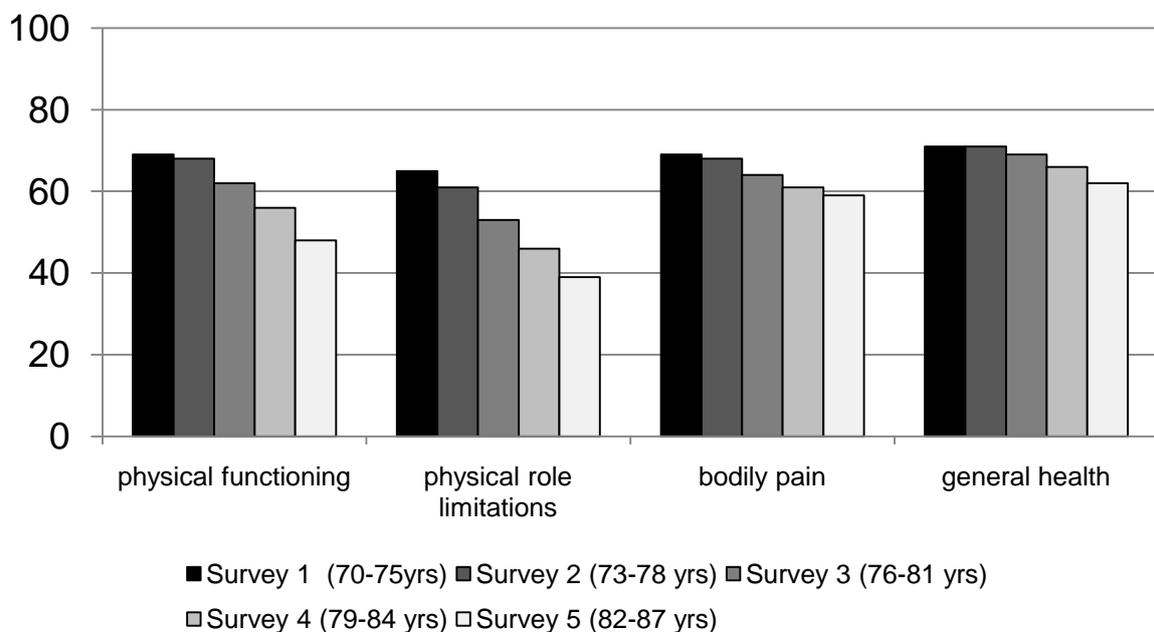


Figure 4-1 Physical health related SF-36 scores for each survey for 5557 women who responded to Survey 5.

While average physical health-related scores for quality of life for the cohort decreased over the five surveys, the pattern of change in scores varied from woman to woman. Overall, most women showed a small decrease in physical function between each survey. However, many had no change in scores, some women showed a large decrease, while others showed large improvements.

An analysis of the change over all five surveys (using latent profile analyses) identified four main patterns in the scores (see Figure 4-2):

1. Consistently higher scores showing relatively stable high scores up to Survey 3 followed by a slow decline between Survey 3 and Survey 5 (50% of women);
2. Declining scores, showing high scores at Survey 1 declining to low scores by Survey 5 (27% of women);
3. Consistently low scores, showing low scores at Survey 1 followed by further decline from Survey 2 onwards (20% of women);
4. Increasing scores, showing low scores at Survey 1 increasing to high scores by Survey 5 (3% of women.)

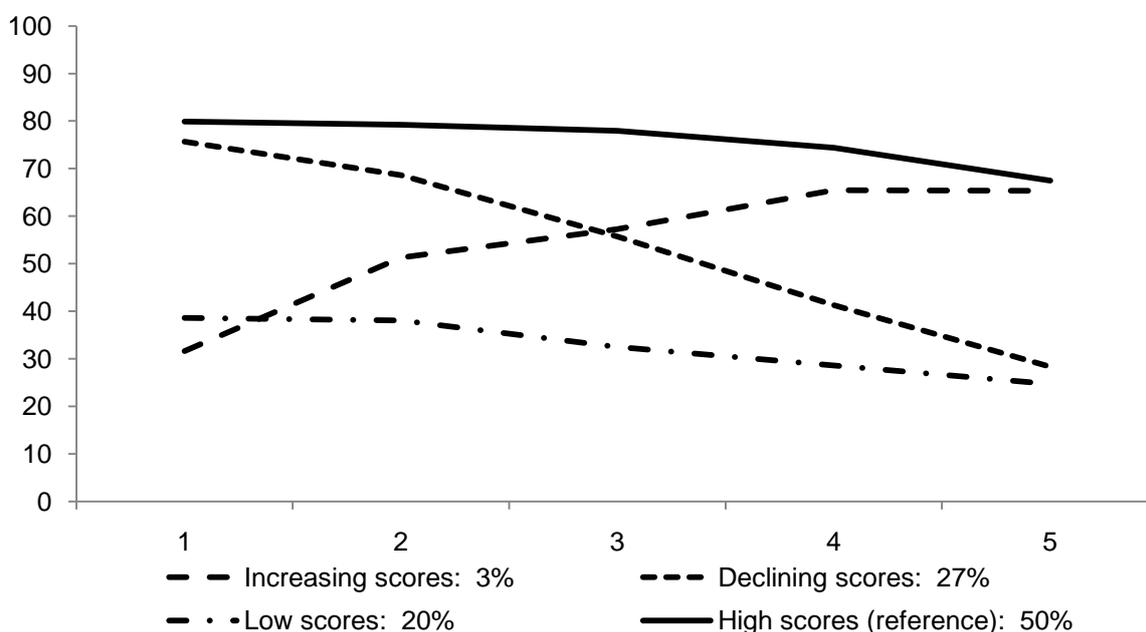


Figure 4-2 Patterns of change in SF-36 physical function scores.

4.3.1. Factors associated with patterns of change in physical function score

Women with different patterns of change in physical function score were compared with women with consistently high scores, whose physical function scores started high and did not change greatly during the 12 years from Survey 1 to Survey 5. Patterns of change were significantly associated with socio-demographic factors such as age, education and marital status, with health risk behaviours such as smoking, body mass index and physical activity, and with a number of conditions, symptoms and health service use (see Table 4-1, Table 4-2 and Table 4-3).

Table 4-1 Socio-demographic factors associated with patterns of change in physical function (compared to women with continuously higher scores): effects adjusted for age; statistically significant effects in bold.

	Declining scores (27%)	Consistently Poor scores (20%)	Increasing scores (3%)
	Odds ratio (95%CI)		
Age (continuous)	1.1(1.1-1.2)	1.1(1.0-1.1)	1.0(0.9-1.1)
Marital Status#			
Married*	1	1	1
Defacto	0.9(0.4-1.8)	0.2(0.1-1.0)	1.9(0.4-8.0)
Never Married	1.1(0.7-1.6)	0.9(0.6-1.4)	0.3(0.04-2.2)
Separated/Divorced	1.2(0.9-1.5)	1.2(0.9-1.7)	1.2(0.6-2.7)
Widowed	1.1(1.0-1.3)	1.3(1.1-1.5)	1.2(0.8-1.7)
Education			
Higher school certificate or higher qualification*	1	1	1
No formal qualifications/School (intermediate) certificate	1.3(1.1-1.4)	1.5(1.3-1.8)	1.2(0.8-1.8)

* reference category

Table 4-2 Health risks and behaviours associated with patterns of change in physical function (compared to women with continuously higher scores at Survey 1): effects adjusted for age, education and marital status; statistically significant effects shown in bold.

	Declining scores (27%)	Consistently Poor scores (20%)	Increasing scores (3%)
	Odds ratio (95%CI)		
Smoking			
Never smoker*	1	1	1
Ex-smoker	1.1(0.9-1.2)	1.2(1.1-1.5)	1.4(1.0-2.1)
Current smoker	1.4(1.0-1.9)	1.6(1.1-2.3)	1.5(0.6-3.8)
Body Mass Index			
Healthy*	1	1	1
Underweight	1.0(0.7-1.6)	1.0(0.5-1.8)	0.8(0.2-3.4)
Overweight	1.8(1.6-2.1)	2.7(2.2-3.2)	1.4(0.9-2.1)
Obese	2.9(2.3-3.7)	10.3(8.2-13.0)	4.0(2.4-6.6)
Physical Activity			
Low-high*	1	1	1
Nil/very low	1.5(1.3-1.7)	4.1(3.5-4.9)	1.6(1.1-2.4)

* reference category

Table 4-3 Health factors associated at Survey 1 with patterns of change in physical function scores (compared to women with consistently higher scores): effects adjusted for age, education and marital status; statistically significant effects in bold.

	Declining scores (27%)	Consistently Poor scores (20%)	Increasing scores (3%)
	Odds ratio (95%CI)		
Conditions			
Arthritis (Survey 2)	1.7(1.5-2.0)	3.9(3.4-4.6)	2.8(1.9-4.0)
Heart disease	1.7(1.4-2.0)	3.7(3.0-4.5)	3.1(2.0-4.8)
Diabetes	1.6(1.2-2.1)	2.3(1.8-3.1)	3.2(1.9-5.6)
Stroke	1.9(1.3-2.8)	3.5(2.4-5.0)	3.6(1.7-7.4)
COPD/asthma	1.2(1.1-1.5)	2.0(1.7-2.3)	1.2(0.8-1.8)
Cancer	1.3(1.0-1.7)	1.3(1.0-1.8)	1.6(0.9-2.9)
Symptoms:			
Foot problems (Survey 2)	1.6(1.4-1.9)	3.3(2.8-3.9)	1.5(1.0-2.2)
Vision	1.2(1.1-1.4)	2.4(2.1-2.8)	1.9(1.3-2.7)
Hearing	1.2(1.1-1.4)	1.6(1.4-1.9)	1.2(0.8-1.8)
Incontinence	1.4(1.2-1.6)	2.5(2.1-3.0)	1.5(1.0-2.3)
Back pain	1.4(1.3-1.6)	3.3(2.9-4.0)	2.5(1.7-3.6)
Events:			
Fall (Survey 2)	1.4(1.1-1.6)	1.8(1.5-2.2)	1.5(1.0-2.4)
Fall with injury	1.3(0.9-1.8)	2.1(1.5-2.9)	4.9(2.8-8.4)
Other injury	1.3(0.9-2.1)	3.3(2.3-4.8)	4.7(2.3-9.4)
Hip surgery	2.9(1.6-5.3)	8.8(5.2-15.2)	12.3(5.4-28.4)
Eye surgery	1.2(1.0-1.5)	1.5(1.2-1.9)	1.3(0.8-2.3)
Knee surgery or arthroscopy	1.5(1.0-2.2)	3.8(2.7-5.3)	4.0(2.0-7.9)
Hospital past 12 months	1.3(1.1-1.5)	2.6(2.2-3.0)	2.8(1.9-4.1)
Health care:			
Four or less* medications	1	1	1
Five or more prescription medications	1.8(1.5-2.0)	4.6(4.0-5.4)	3.3(2.3-4.7)
Four or less GP visits*	1	1	1
Five or more GP visits	1.5(1.3-1.7)	3.9(3.3-4.5)	3.2(3.3-4.5)

* reference category

Cancers include breast, bowel and lung cancer.

4.3.2. Factors associated with declining physical function scores

Factors associated with declining scores for physical function, compared to continuously higher scores, are shown in the first columns of Tables 4.1, 4.2 and 4.3. Odds ratios for declining physical function scores were higher for women who were older, had lower education, were current smokers, were overweight and obese, and who had no or very low levels of physical activity. For women who were overweight, the odds ratio was 1.8 and for obese women the odds ratio was 2.9 for declining scores compared to maintaining high physical function scores. For women with lower levels of physical activity the odds ratio for declining scores was 1.5.

The odds ratios for declining scores compared to maintaining high scores were 1.2-1.7 for women with self-reported conditions (arthritis, heart disease, diabetes, stroke, chronic obstructive pulmonary disease (COPD) / asthma). Symptoms such as problems with one or both feet, vision and hearing problems, incontinence and back pain were associated with odds ratios of 1.2-1.6 for declining scores. Falls (reported at Survey 2) were associated with an odds ratio of 1.4 for declining scores, and for women reporting hip surgery the odds of declining scores was almost three times higher than for women without hip surgery. Likewise women who had been in hospital in the last 12 months had odds ratios of 1.3 for declining scores. Those who reported five or more prescription medications or five or more GP visits were also more likely to experience declines in subsequent scores in physical function scores.

4.3.3. Factors associated with consistently poor physical function scores

Factors that differentiated women with consistently poor physical function scores and those with consistently higher physical function scores are shown in the middle columns of Tables 4.1, 4.2 and 4.3. These factors were similar to those associated with declining scores. Odds ratios for having consistently poor scores were higher if participants were widowed, had lower education, were ex-smokers or current smokers, overweight or obese, and if they had no or very low physical activity. There was a very strong association between overweight and obesity and having consistently poor scores with overweight women being almost 3 times as likely to have poor scores, and obese women being more than 10 times more likely.

Odds ratios for having consistently poor scores were higher if participants reported arthritis, heart disease, stroke or bronchitis/emphysema/asthma. These effects remained after adjusting for comorbid effects of all other conditions in the model, and after adjustment for education, marital status, and body mass index.

Odds ratios for being in continuously poor health were higher if participants reported foot problems, vision problems, incontinence or back pain. Falls, falls with injury, other injuries, hip, eye and knee surgery, admission to hospital in the past 12 months, five or more medications, and five or more visits to a general practitioner were also associated with consistently poor scores. There was a very strong association between hip surgery and poor scores, with those who reported hip surgery being almost nine times as likely to have poor physical function scores.

4.3.4. Factors associated with increasing physical function scores

A small minority of women showed improving scores, with low scores at Survey 1 and high scores by Survey 5 (3% of women). Factors associated with this pattern are shown in the final columns of Tables 4.1, 4.2 and 4.3. Statistically the factors associated with having increasing scores, rather than consistently high scores, included being obese BMI at Survey 1, no or low physical activity, arthritis, heart disease, diabetes, stroke, vision problems, back pain, fall with injury, other injury, hip surgery, knee surgery, admission to hospital, taking five or more medications and five or more visits to a general practitioner. Hip surgery was very strongly associated with improvement in scores, with those who reported hip surgery having an odds ratio of more than 12.

Examination of comments made by women with this pattern of change in physical function scores indicates that many had experienced an acute event, followed by a recovery, or had restorative surgery such as hip or knee replacement. For example, one woman made the following comments on successive surveys:

Survey 1: 4 weeks ago I had a fall and fractured my arm. Normally I am a very healthy person for my age.

Survey 2: I have a bladder problem ...

Survey 3: My main problem is incontinence ...

Survey 4: I have recently celebrated my 80th birthday. My health has deteriorated slightly in the last 18 months but has not hampered me in my way of life.

Another woman made the following comments:

Survey 1: My only health problem is arthritis ... I have had one successful hip replacement (1991) and have been told I need the other hip replaced...

Survey 2: I think I am quite healthy apart from osteoarthritis ...

Survey 3: I have benefited greatly from my hip replacements ...

Survey 4: ...I mostly feel very well, and able to live my normal life and do the things I enjoy doing.

4.4. The impact of multiple conditions on health-related quality of life, health care use and death

One of the strongest and most consistent factors affecting women's physical health as they age is the type and number of health conditions and symptoms they experience. In this section of this report we look at the association between these conditions and health-related quality of life, health care use and death by the time of Survey 2 in 1999 (Tooth et al., 2008).

The association between chronic conditions and these outcomes is represented in Tables 4-4 and 4-5. In these tables, a tick (√) represents when a chronic condition was associated with (or predictive of) a particular health outcome: The more ticks, the stronger the relationship between the chronic condition and the outcome.

Seven chronic conditions were predictive of death (first column of Table 4-4). The chronic conditions with the strongest relationship with death were cancer and Alzheimer's disease. A large range of chronic conditions were associated with high numbers of GP visits, whereas more serious conditions such as cancer, heart disease and stroke were more likely to be associated with specialist visits or hospitalisations. Stroke, Alzheimer's disease, falls and cancer were also the strongest predictors of need for help with activities of daily living (see Table 4-4).

While many chronic conditions were associated with the SF-36 health-related quality of life subscales, the nature of the associations varied (see Table 4-5). The subscales reflecting the more psychosocial aspect of health-related quality of life, namely role limitations due to emotional problems, mental health, vitality and social functioning, had consistent associations with anxiety and depression. The subscales reflecting the more physical aspects of health-related quality of life, namely physical functioning, role limitations due to physical problems, general health and bodily pain, were associated with a larger range of chronic conditions (i.e. with a more uniform distribution of ticks). Alzheimer's disease was only associated with four of the subscales but had very strong associations with social functioning and general health.

Table 4-4 Chronic conditions and the outcomes (death, GP visits, specialist visits, hospitalisation, help with activities of daily living (ADL) they were related to.

Chronic condition	Deaths	9+ GP visits	Specialist visits	Hospitalisations	Help with ADL
Heart Disease	√	√√	√√	√√	√
Chest Pain		√	√	√	√
Stroke	√	√√	√√	√√	√√
Hypertension		√			
Fall caused serious injury		√	√	√√	
Fall (medical attention)		√	√		
Fall (fractures)				√√	√√
Urinary incontinence		√	√	√	√
Low Iron	√	√√	√	√	√
Arthritis		√	√	√	√
Osteoporosis		√	√		√
Bronchitis/emphysema	√	√	√		√
Asthma		√√		√	
Diabetes	√	√√			√
Other Cancer	√√	√√	√√√	√√	√√
Skin Cancer		√	√√	√	
Depression		√√	√		√
Anxiety		√			√
Alzheimer's	√√				√√√√

Table 4-5 Chronic conditions and associated SF-36 sub-scales.

Chronic condition	Physical Functioning	Role Physical	Social Functioning	Vitality	General Health	Role Emotional	Bodily Pain	Mental Health
Heart disease	√	√√	√	√	√√		√	
Chest Pain	√	√√	√√	√√	√√	√√	√√	√
Stroke	√√	√√	√√	√√	√√			
Hypertension	√	√		√	√	√	√	
Fall caused serious injury	√		√					
Fall (medical attention)								
Fall (fractures)	√	√√	√√	√	√		√√	√
Urinary incontinence	√√	√√	√√	√√	√√	√	√√	√
Low Iron	√	√√	√√	√√	√√	√	√√	√
Arthritis	√√	√√	√	√√	√	√	√√√	√
Osteoporosis	√	√√	√	√√	√√		√√	√
Bronchitis/emphysema	√	√	√	√	√			
Asthma	√	√		√	√		√	
Diabetes	√	√√	√	√	√	√	√√	√
Other Cancer	√	√√	√√	√√	√√	√√	√	√
Skin Cancer		√		√			√	√
Depression	√	√√	√√	√√	√	√√√√	√√	√√
Anxiety	√	√√	√√	√√	√√	√√√	√	√√
Alzheimer's disease	√√		√√√√		√√√			√√

4.5. Summary

In this report we examined changes in physical health of women as they move from being in their 70s (70-75 years at Survey 1) to their 80s (82-87 years at Survey 5). Approximately half of the women maintained good physical health throughout this period. A clear finding is that women whose health declined or started low and continued low had lower socio-economic status. They were more likely to be overweight or obese, undertake little physical activity and be current or ex-smokers. They suffered multiple chronic conditions and were heavy users of the health services.

There was a small group of women who reported clear improvements in health which appear to be related to restorative surgery (e.g. of hips or knees) or recovery from acute conditions or events. Different conditions impacted in different ways on women's health-related quality of life and their use of health services. For example, women with Alzheimer's disease needed more help with activities of daily living, had low scores on social functioning and general health, and were likely to die sooner. Women who had stroke or cancer were high users of services and had relatively low scores for all aspects of health-related quality of life. In contrast, women who reported bronchitis/emphysema were not high users of health services, but they experienced some reduction in physical, but not mental health scores.

From a long-term policy perspective the implications of these findings is that reducing socio-economic differentials in health status and health behaviour early in life and throughout adulthood holds the best prospect for reducing the impact in old age of chronic conditions and their consequences on health care costs and services.

4.6. References

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5. Chronic conditions facing older women

5.1. Key Findings

This section provides more information on some of the key conditions that affect women as they age, including arthritis, diabetes, sleep disturbance and incontinence. These conditions were selected because they are common and they impact on women's quality of life in different ways.

Arthritis

- Arthritis is one of the most common conditions affecting older women; it was reported by 63% of respondents to Survey 4 (conducted in 2005 when the women were aged 79-84 years).
- Women who reported arthritis were more likely to be overweight or obese, smoke, and had more co-morbid conditions than women who did not have arthritis.
- Arthritis has a significant impact on women's quality of life in terms of general health, role limitations due to physical health problems, and pain.
- Arthritis also has a significant impact on women's social function and vitality.
- Arthritis is associated with significant increases in health care costs.
- Walking and other moderate intensity physical activities were associated with lower rates of arthritis.

Diabetes

- Among women who responded to Survey 4, 15% had reported on at least one survey that they had diabetes.
- Women with diabetes tended to have lower levels of education.
- Women with diabetes were more likely to also report hypertension, heart disease and eyesight problems.
- Women with diabetes were more likely to be overweight or obese, and less likely to have adequate levels of physical activity than women without diabetes.
- Between 1997-2002, fewer than 60% of women with diabetes had a record of having a HbA1C test billed through Medicare, and only 9% of women had tests for HbA1C, microalbuminuria and serum lipids as recommended for good diabetes care.
- A large proportion of older women with diabetes did not engage in appropriate self-management and preventive activities.
- A large proportion of older women with diabetes reported poor outcomes associated with diabetes.

- Women with better knowledge of diabetes care also had better risk behaviours and preventive activities, and better outcomes.
- Women with more knowledge of diabetes had more education, received multidisciplinary diabetes care, nutritional advice from a dietitian, had HbA1c tests and eye tests, and had visited a diabetes education centre.
- Women with Type 1 diabetes were more likely to report better risk and preventive behaviours, receiving care from a specialist and/or multidisciplinary care, receiving nutrition advice and having visited a diabetes education centre.
- Diabetes is associated with substantial increases in health care costs.

Sleep disturbance

- Sleep disturbance is common among older women with 17% of women reporting they often had difficulty sleeping at Survey 1.
- The prevalence of sleeping difficulty increased over time.
- Sleeping difficulty is associated with poorer health-related quality of life on both cross sectional and longitudinal analyses.
- Use of sleeping medication, usually hypnotic sedatives, was reported by 15% of the women who responded to Survey 2.
- Use of sleeping medications was associated with poorer health-related quality of life, falls, more doctor consultations and more days in hospital.
- Sleeping difficulty was a long standing problem for many women.
- Women attributed their sleep disturbance to a number of events and factors including being widowed, periods of illness or an accident, moving house, and to worry or fear.
- Women with sleeping difficulty reported a range of other symptoms that interfere with sleep including pain, difficulty breathing, bad dreams, having to get up to use the bathroom, coughing/snoring, being too cold or too hot.
- Women with sleeping difficulties had poorer survival rates than other women, but not after other factors that affect survival are accounted for.

Incontinence

- Among women who participated in Survey 4, 27% of reported leaking urine 'sometimes' or 'often'.
- Women were almost twice as likely to report leaking urine at Survey 4 as at Survey 2.
- Between Survey 1 and Survey 4, 15% of women developed incontinence.
- Women reporting of leaking urine at one survey did not necessarily report this condition at other surveys.

- Incontinence was strongly associated with problems such as dementia, reduced physical functioning history of falls to the ground, high BMI, constipation, urinary tract infection, prolapse repair, and history of prolapsed bladder or bowel. Parity, hysterectomy, stroke and number of visits to the GP were less strongly associated with incontinence.
- Incontinence was not significantly associated with area of residence, education, smoking, diabetes or attending social groups or support groups.
- Women with incontinence had lower scores than other women on several health-related quality of life measures. However, for women who reported incontinence for the first time the scores had been lower even before they reported incontinence, indicating that some factor that preceded their incontinence may have contributed to their poorer social and physical functioning.

5.2. Introduction

Many chronic diseases increase in prevalence in older age. These may be non-fatal conditions that people have carried from earlier life or conditions that have been newly diagnosed in older age. In this section of the report we consider some of the more prevalent conditions and symptoms affecting women in older age and explore the impact of these conditions on women's quality of life. The conditions all impact on women's quality of life, but in different ways.

Most of the older women in the study are living with at least one chronic condition, and many are living with multiple conditions. While the presence of one or more chronic conditions does not preclude ageing well, there is an increased risk of physical health decline. The more conditions a woman has, the higher the probability of poor health-related quality of life and functional decline.

Diagnoses and symptoms most commonly reported by women at Survey 1 in 1996 are presented in Figure 5-1 and Figure 5-2. The most common condition was hypertension, which was reported by about half the women in the study. Arthritis was the next most common condition, and diabetes was the 10th most common condition on the list, affecting around 9% of the women at age 70-75 years. Around half of the women reported painful joints, back pain, difficulty sleeping and eyesight problems (see Figure 5-2).

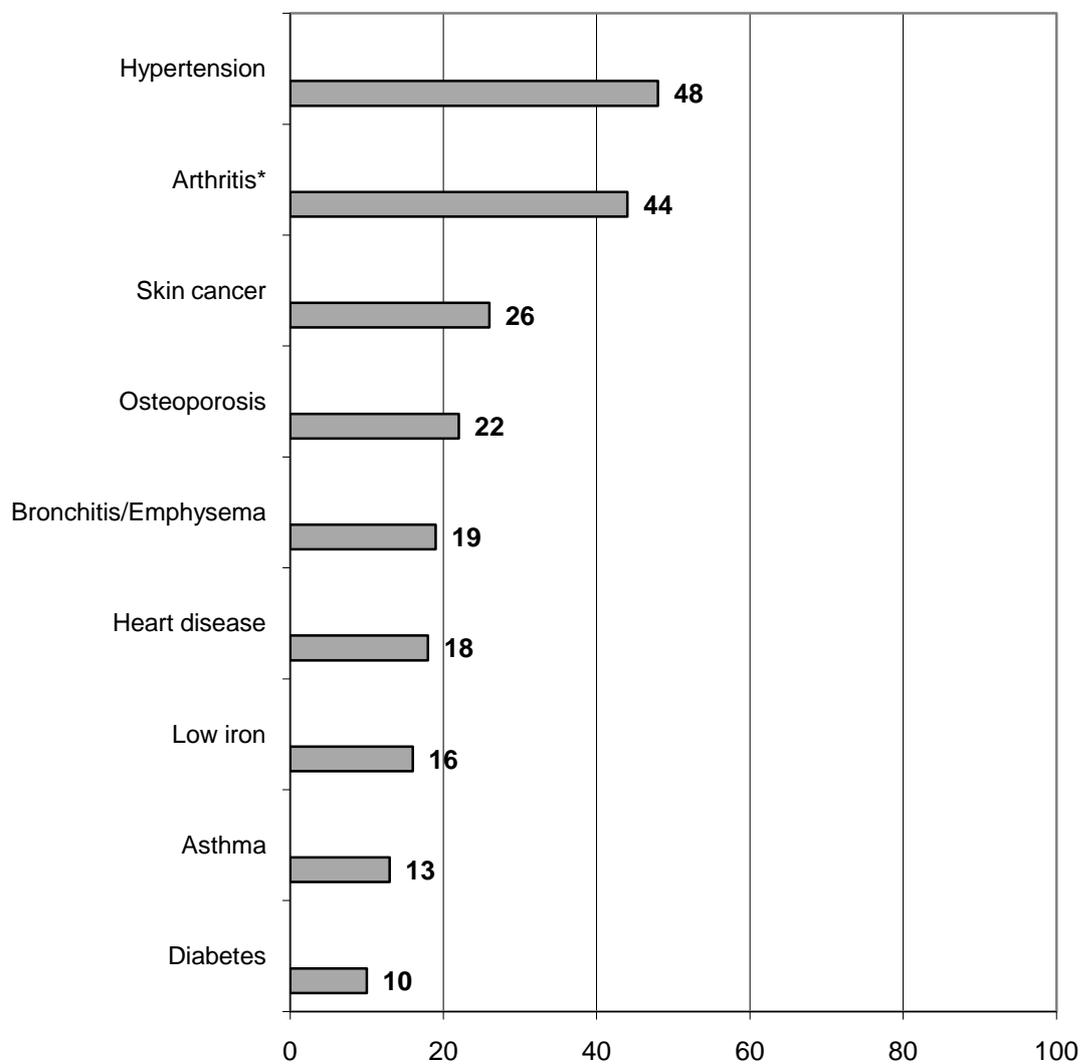


Figure 5-1 Prevalence of common self-reported diagnoses at Survey 1 in 1996, N=12,432 women aged 70-75 years (*arthritis assessed at Survey 2 in 1999).

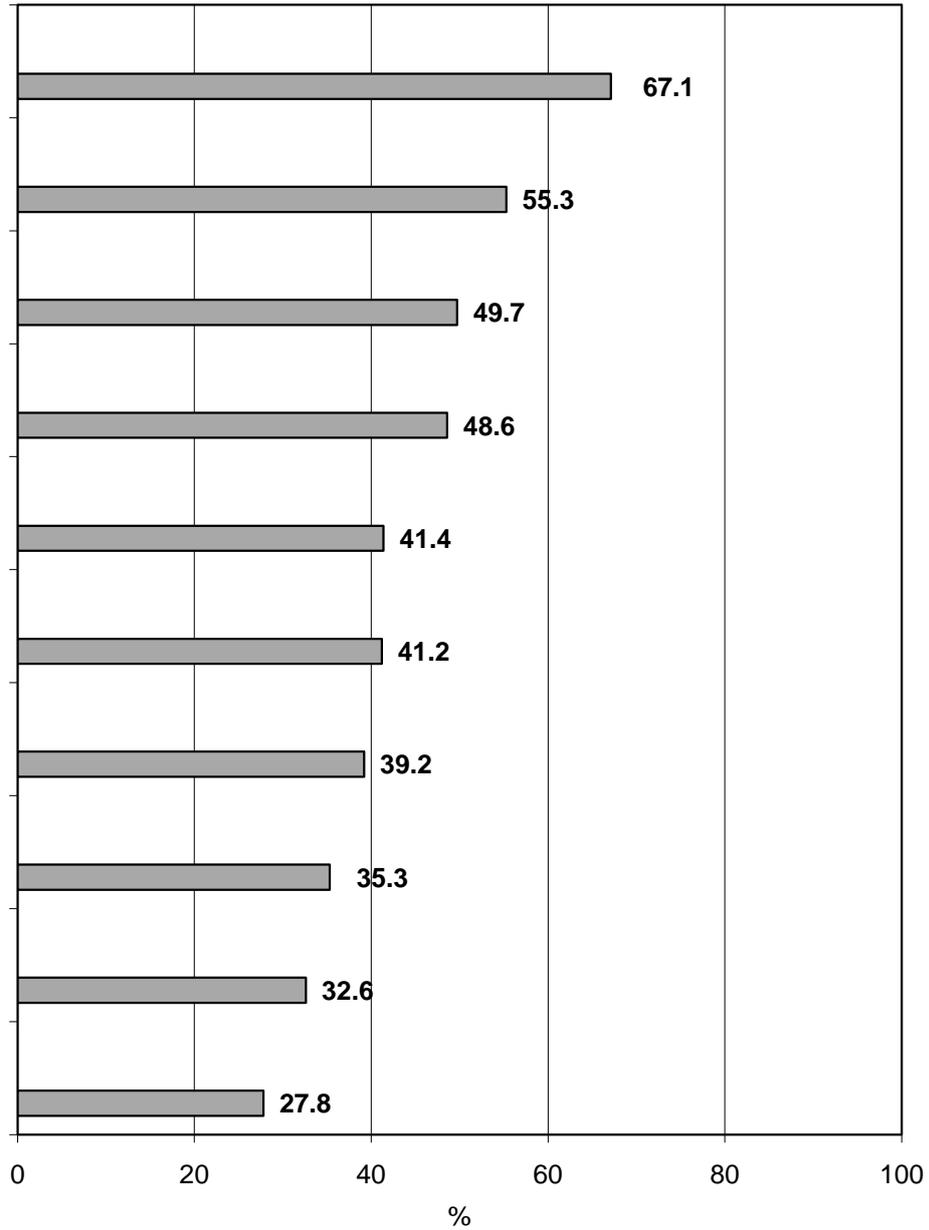


Figure 5-2 Common symptoms reported at Survey 1 in 1996, N=12,432 women aged 70-75 years.

As seen in Section 3 of this report, a number of women died over the course of the study and the existence of chronic conditions at Survey 1 was one of the important predictors of mortality. Among the survivors, there was a significant increase in the prevalence of many of these conditions over time, and these conditions had serious impact on women’s quality of life as they aged.

Here we will examine more closely how some common conditions (arthritis, diabetes, sleeping difficulty and incontinence) have affected the quality of life of women who stayed in the study from Survey 1 to Survey 4.

5.3. Arthritis

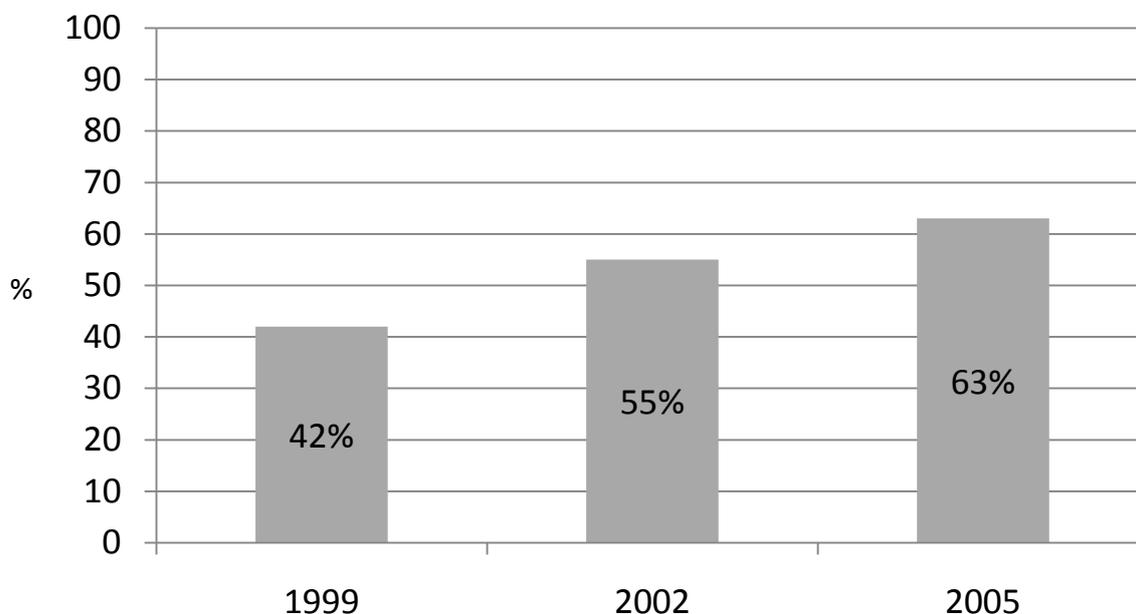
Arthritis is Australia's major cause of disability and chronic pain, and is the most common cause of activity limitation and disability among older women in developed countries. In 2004, arthritis affected around 3.4 million Australians (18.4% of women and 15.1% of men) and it is estimated that over 50% of Australians aged 75 or over have arthritis. It is expected that demographic ageing will increase the proportion and number of Australians with arthritis by 35% to around 4.6 million (to one in every five people) by 2020.

The prevalence of arthritis is significantly higher for women than for men; more than 60% of those with arthritis are women. The negative impact of arthritis has been well described in cross sectional surveys and among clinical populations, but few longitudinal studies have tracked the impact of arthritis on the health of women in the community. Here we show the changes in the prevalence and incidence of arthritis and the cumulative impact of this condition on women's lives.

5.3.1. Self reported doctor diagnosis of arthritis

In Surveys 2, 3 and 4 for the 1921-26 cohort, women were asked: "In the past three years have you been diagnosed or treated for Arthritis?" "Doctor diagnosed arthritis" is an internationally accepted measure of arthritis and is used in World Health Organisation (WHO) surveys (WHO, 2002). Type of arthritis was not asked as self-reported data on arthritis type have been shown to be inaccurate (Wailitt et al., 2008). Women's reports of arthritis could therefore include all arthritis types: osteoarthritis, rheumatoid arthritis, psoriatic arthritis and septic arthritis. Arthritis reported by older women would be expected to be predominantly osteoarthritis.

Figure 5-3 shows the prevalence of self reported doctor diagnosed arthritis across the three surveys (Survey 2, Survey 3 and Survey 4). In 1999 (Survey 2) when the women were aged 73-78 years, 42% reported arthritis, and by 2005 (Survey 4) 63% of these women, then aged 79-84 years, had reported arthritis. The prevalence of arthritis increased with age, as expected; however, the incidence (new cases) declined from 22% at Survey 3 to 18% at Survey 4 (Parkinson et al., 2010).



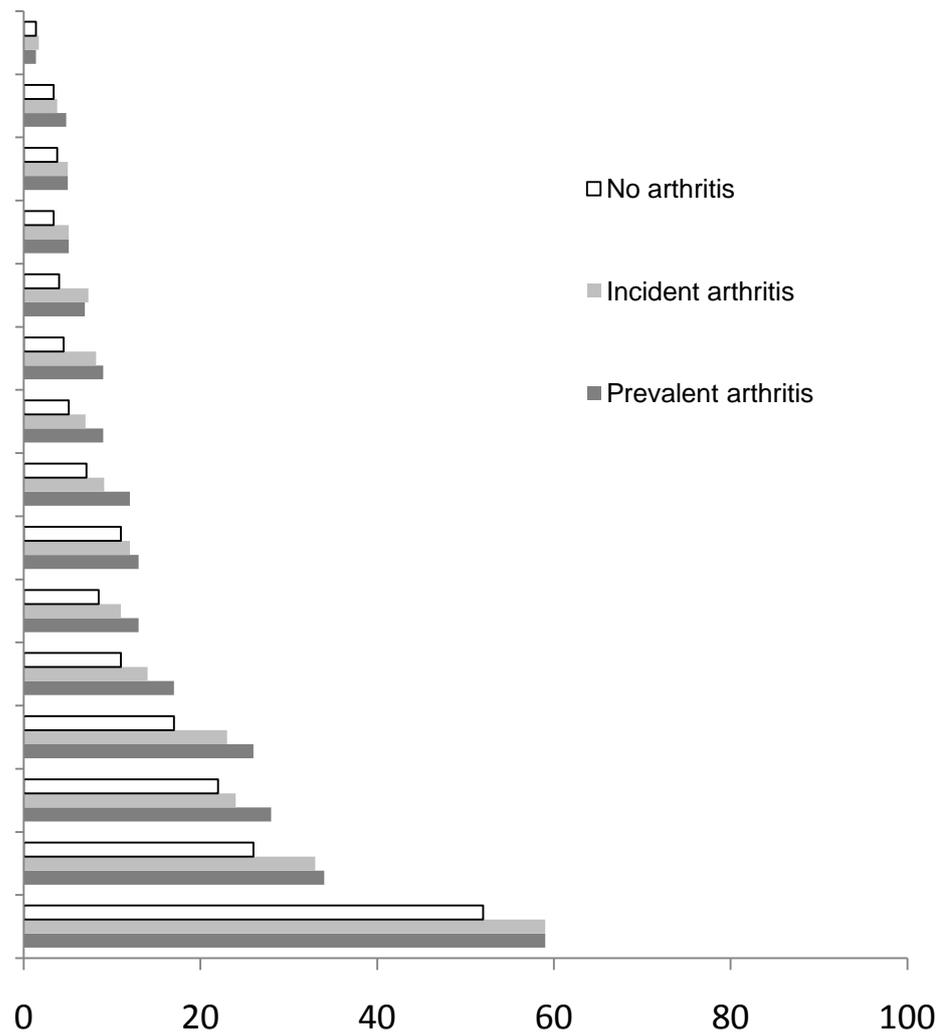
Source: Parkinson et al., (2010). Older women and arthritis: Tracking impact over time. *Australasian Journal on Ageing*

Figure 5-3 Prevalence of Arthritis for 1921-26 cohort across Surveys 2, 3 and 4.

5.3.2. Factors associated with arthritis

There were few demographic differences between women who did and did not report arthritis at any survey, except that those with arthritis were more likely to find it difficult to manage on their income (Parkinson et al., 2010). Women who reported arthritis were also more likely to be overweight or obese, to exercise less, and to be smokers, than women who did not report arthritis. Women with arthritis also reported more co-morbid diagnoses than those without arthritis (see Figure 5-4).

Women with arthritis were less likely to report their health as very good or excellent, more likely to be classified as depressed, and more likely to be categorised as anxious according to scores on the Goldberg Anxiety and Depression scale (Parkinson et al., 2010).



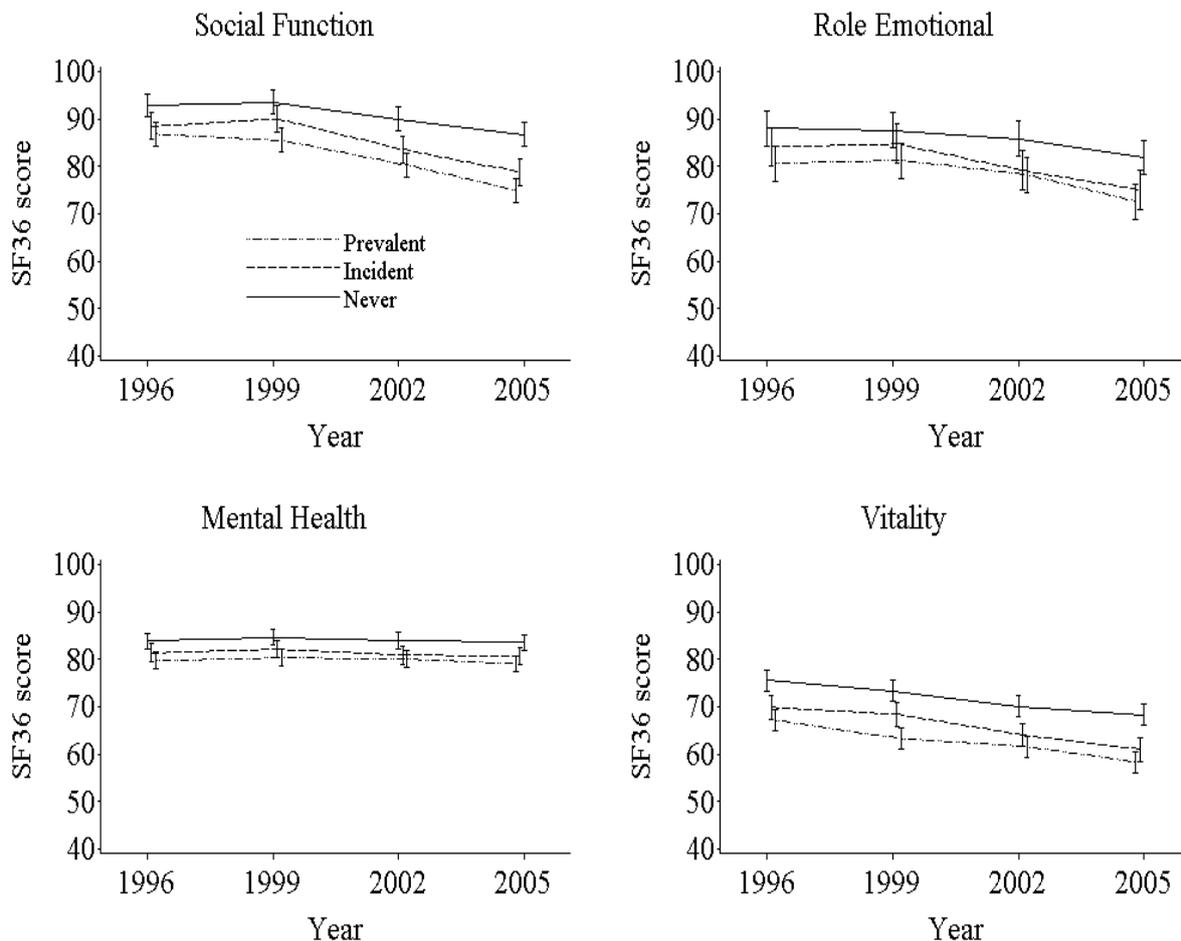
Adapted from: Parkinson et al., (2010). Older women and arthritis: Tracking impact over time. *Australasian Journal on Ageing*.

Figure 5-4 Other conditions reported at Survey 4 by women with prevalent arthritis (arthritis first reported at Survey 2), incident arthritis (arthritis first reported at Survey 3 or 4), and those who had never reported arthritis.

5.3.3. Impact of arthritis on women's health and quality of life

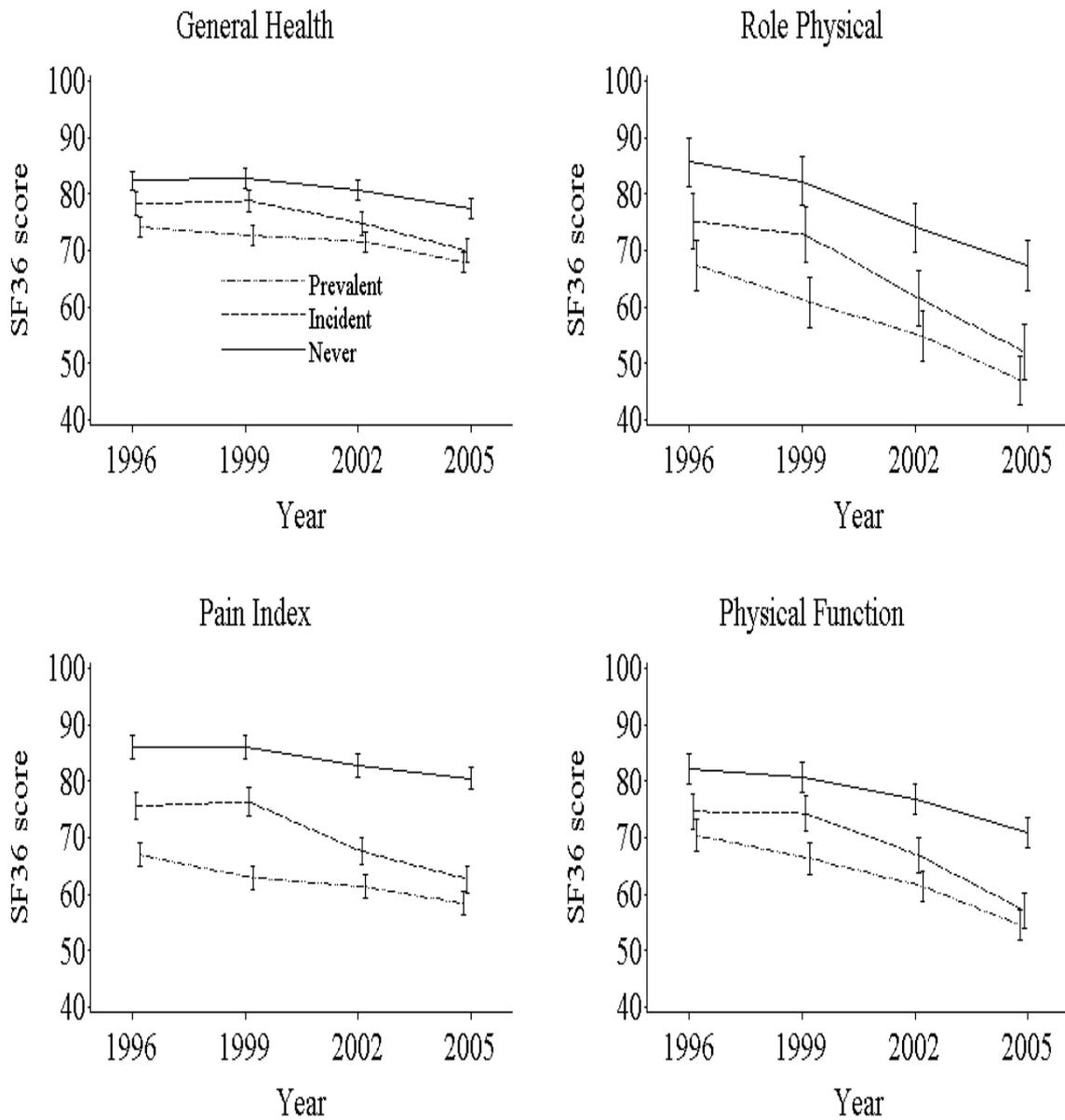
The impact of arthritis on women's health-related quality of life (measured using the SF-36 profile) is shown in Figure 5-5 A and Figure 5-5 B. Women with prevalent arthritis (arthritis first reported at Survey 2) and women with incident arthritis (arthritis first reported at Survey 3 or 4) started with significantly lower scores for physical function, pain, and the role physical subscale (reflecting role limitations due to physical health problems) than women who never reported arthritis. Women with incident arthritis had a greater decline in all these measures, with their scores at Survey 4 (2005) for physical function, pain, general health, and the role physical subscale reaching those for women with existing arthritis.

Mental health, as measured by the SF-36, appears to be more resilient to the impact of arthritis than the measures of physical-health related quality of life, with only small differences between scores for the three groups of women. The scores for the social function subscale, however, show substantial decline for women with arthritis. Vitality scores declined over time for all groups, with scores for those with arthritis remaining lower than those without arthritis at all time points. Differences in role emotional scores between the groups did not become statistically significant until Survey 4 (2005), and then only for those with prevalent arthritis compared with those with no arthritis.



Source: Parkinson et al.,(2010).Older women and arthritis: Tracking impact over time. *Australasian Journal on Ageing*

Figure 5-5A Health-related quality of life scores for women with prevalent arthritis (arthritis reported at Survey 2) incident arthritis (arthritis first reported at Survey 3 or 4), and those who had never reported arthritis.



Source: Parkinson et al.,(2010).Older women and arthritis: Tracking impact over time. *Australasian Journal on Ageing*

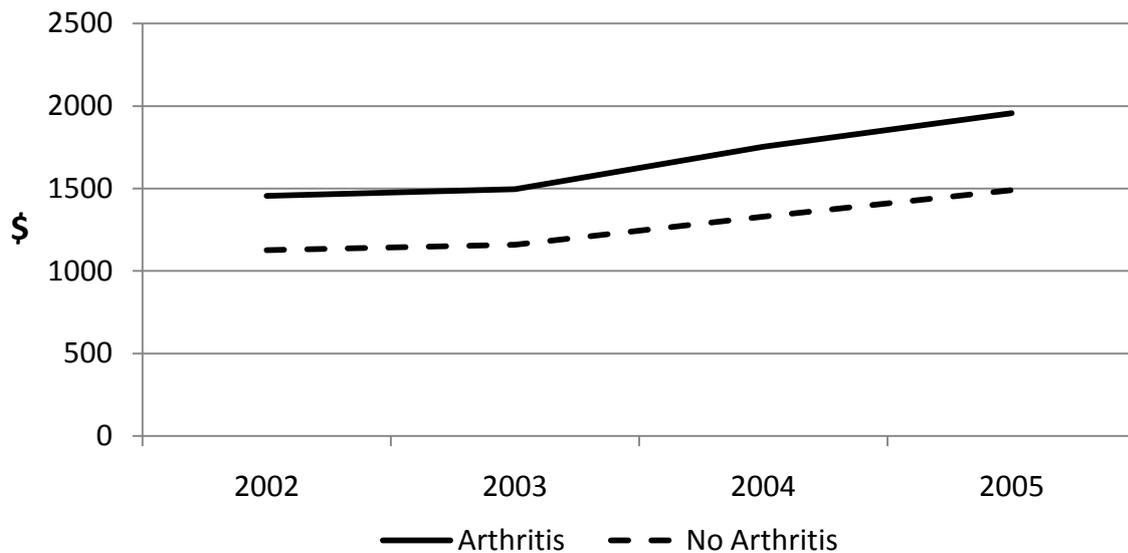
Figure 5-5B Health-related quality of life scores for women with prevalent arthritis (arthritis reported at Survey 2) incident arthritis (arthritis first reported at Survey 3 or 4), and those who had never reported arthritis.

5.3.4. Arthritis and Physical Activity

There is conflicting evidence about the role of leisure-time physical activity (LTPA) in the prevention of arthritis in older women. Data from 3613 women who did not report arthritis at Survey 2 in 1999 were analysed to examine the prospective relationships between both LTPA and walking, with incident arthritis over the next six years. The odds ratios for self-reported arthritis were lowest for women who reported the equivalent of 75-<150 minutes of moderate-intensity LTPA per week. Slightly higher odds of incident arthritis were seen in women who reported higher activity levels. For women whose only activity was walking, there was an inverse dose-response relationship between walking and arthritis. These findings suggest that older women who are able to walk should be encouraged to engage in walking or other moderate-intensity physical activities to decrease the risk of arthritis in old age. (Heesch et al., 2008)

5.3.5. Impact of arthritis on government health care costs

Women who reported arthritis had higher health care use and higher Medicare costs in general, and were likely to have more family doctor and specialist doctor visits per year. In 2005, average (mean) total Medicare costs (to the health system) were \$1957 for women with arthritis and \$1491 for women without arthritis, making costs for women with arthritis 31% higher than for those without this condition (Parkinson et al., in press). See Figure 5-6.



Source: Parkinson et al., *Australian New Zealand Journal of Public Health*, (under editorial review).

Figure 5-6 Medicare costs for women with and without arthritis (2005 Australian Dollars).

5.3.6. Discussion

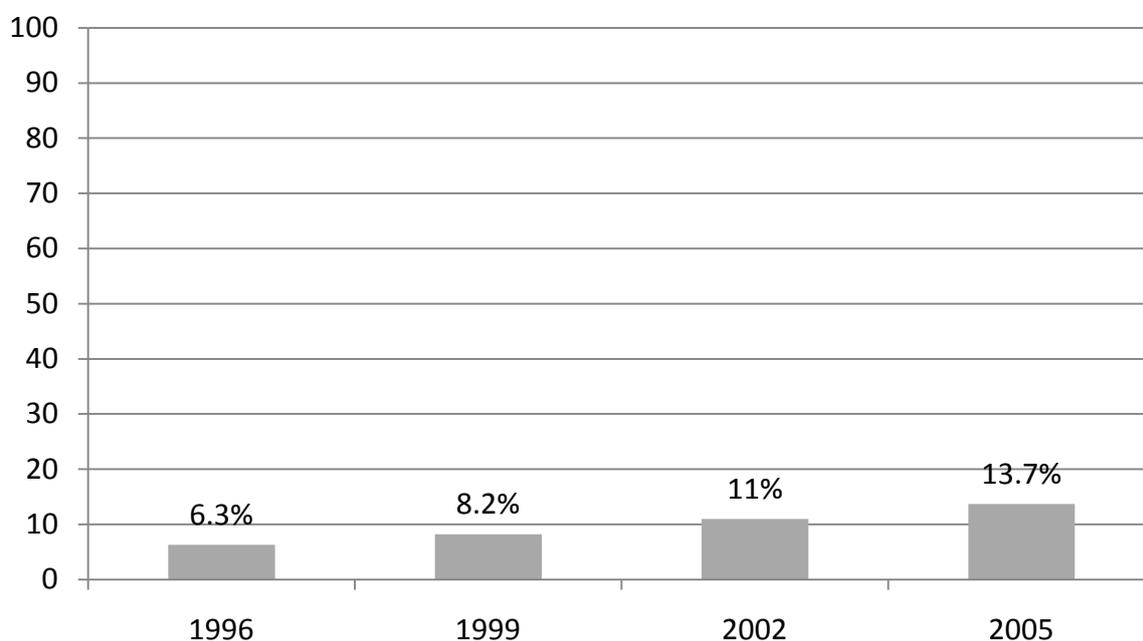
Arthritis is associated with significant negative impact on health and quality of life, and higher health care costs for older women in Australia. Moreover, self-reported arthritis and arthritis symptoms are highly prevalent among Australian women, where 63% of this group of women, aged 77-85 years, reported arthritis in 2005. Obesity is more common among women who report arthritis than those who do not. As obesity may be a risk factor for arthritis, the prevalence and costs of arthritis may also increase as obesity becomes more prevalent among the Australian population. Conversely, arthritis is a risk factor for low rates of physical activity and may therefore predispose older women to obesity and other consequences of sedentary behaviour. The fact that women with arthritis are also likely to have other conditions is an important consideration in the prevention and management of both the arthritis and the associated co-morbidities.

5.4. Diabetes

The ageing of the population, reductions in physical activity and increase in obesity have all contributed to the increased prevalence of diabetes among older people. Diabetes is a costly chronic disease and is associated with a variety of complications and premature mortality. Consistently high blood sugar levels can, over time, lead to blindness, kidney failure, heart disease, limb amputations, and nerve damage. Diabetes is the seventh most common problem managed in general practice and the cost of diabetes has been predicted to rise dramatically over the next decade in Australia unless measures are taken to reduce complications from poorly controlled diabetes and prevent or delay its onset.

5.4.1. Self reported doctor diagnosis of diabetes

In each survey, 7-13% of women in the 1921-26 cohort who stayed in the study at Survey 4 reported they had been told by a doctor that they had diabetes (in the past three years), and 15% reported they had diabetes at any Survey (see Figure 5-7).

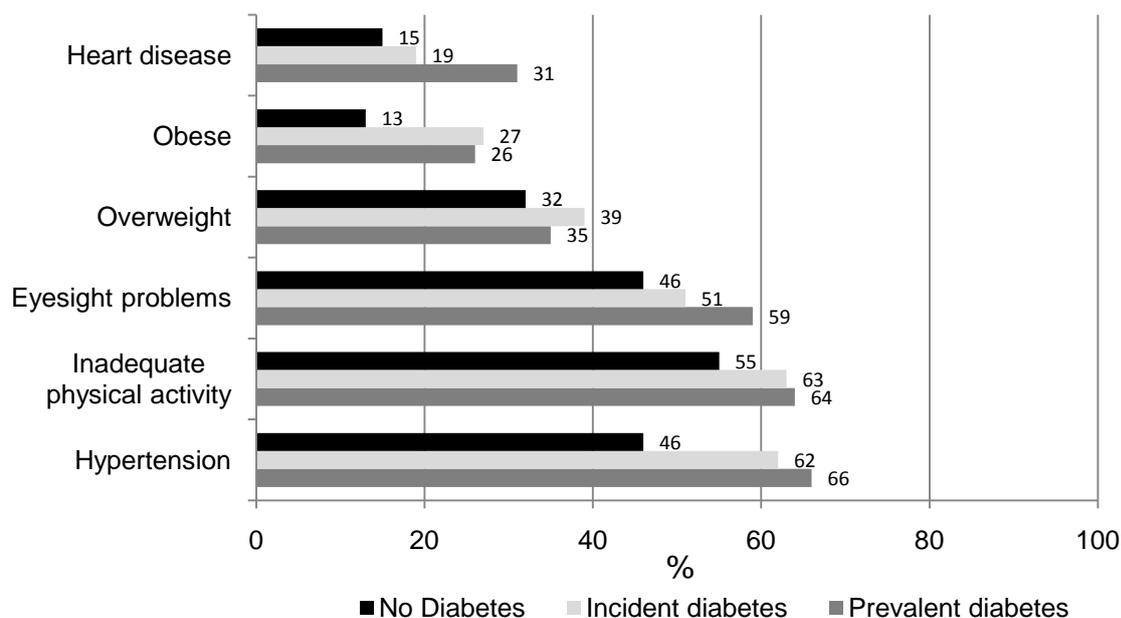


Source: Byles et al. (2008). *Use and costs of medications and other health care resources: findings from the Australian Longitudinal Study on Women's Health*. Report prepared for the Australian Government Department of Health and Ageing, 2 June 2008.

Figure 5-7 Prevalence of diabetes for 1921-26 cohort across Surveys 1, 2, 3 and 4.

5.4.2. Characteristics of women with diabetes

Young et al. (2005) compared the characteristics of women with diabetes at Survey 2 with the characteristics of women who did not have this condition. Women with diabetes tended to have lower levels of education. They were also more likely to have hypertension, heart disease and eyesight problems. There were striking differences in body mass index and physical activity levels between women with and without diabetes with more than 60% of women with diabetes not meeting the current physical activity guidelines (30 minutes of moderate activity /day).



Adapted from: Young et al., (2005). *Australian and New Zealand Journal of Public Health*.

Figure 5-8 Characteristics of women with prevalent diabetes (diabetes first reported in 1996), incident diabetes (diabetes first reported in 1999) and those with no diabetes at Survey 2 (1999).

5.4.3. Quality of care for diabetes management

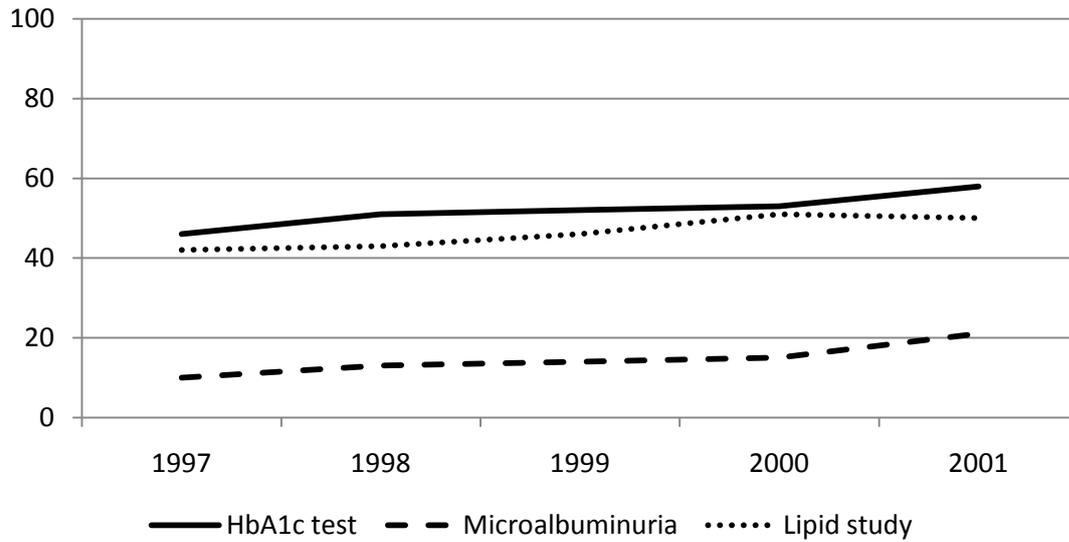
Current Australian guidelines for quality management of diabetes include testing glycosylated haemoglobin (HbA1c) every 3- 6 months for insulin-treated patients and every 6-12 months for non-insulin treated patients, and testing blood lipids and microalbuminuria once a year.

Young et al. (2005) linked survey data for the 10,421 women from the 1921-26 cohort who completed Survey 2 in 1999 with Medicare Australia data on medical practitioner and pathology service use to describe the use of general practitioner and specialist services, and the compliance with best practice guidelines for testing HbA1c, lipids and microalbuminuria for women with diabetes. Of the 10,421 women in this analysis, 840 women (8.1%) reported they had been diagnosed with diabetes prior to Survey 1 in 1996 and 266 new cases (2.6%) were diagnosed between 1996 and Survey 2 in 1999.

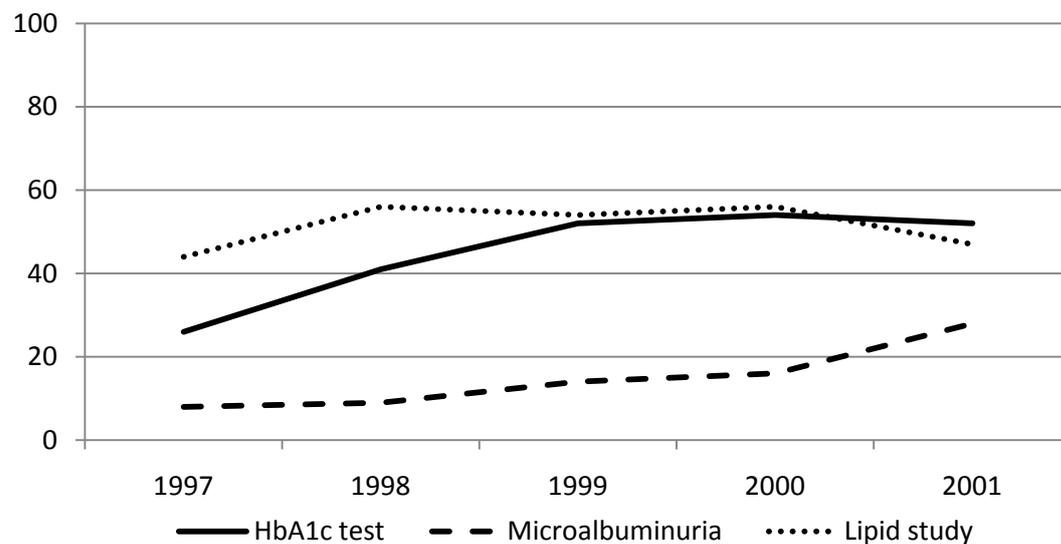
Measures of health service utilisation and diabetes care are shown in Figure 5-9. Use of HbA1c tests was less than the recommended 6-12 monthly, with fewer than 60% of the women with diabetes having a record of this test in each year from 1997 to 2001. However, there was a trend over the five-year period for a greater percentage of women with diabetes to have the test at least once a year. Rates of testing microalbuminuria were low, rising from about 10% in 1997 to 20% in 2001. Similarly, rates of lipids testing increased over the five-year period but were far from conforming to the best practice guidelines of at least annual testing (Young et al., 2005).

In total, only 9.1% of the women had all three tests performed. Having more frequent consultations with a general practitioner was the one variable significantly associated with having all three recommended tests for best practice care (Young et al., 2005).

a) Percentage of women with prevalent diabetes (first reported at Survey 1 in 1996) who had each test



b) Percentage of women with incident diabetes (first reported at Survey 2 in 1999) who had each test

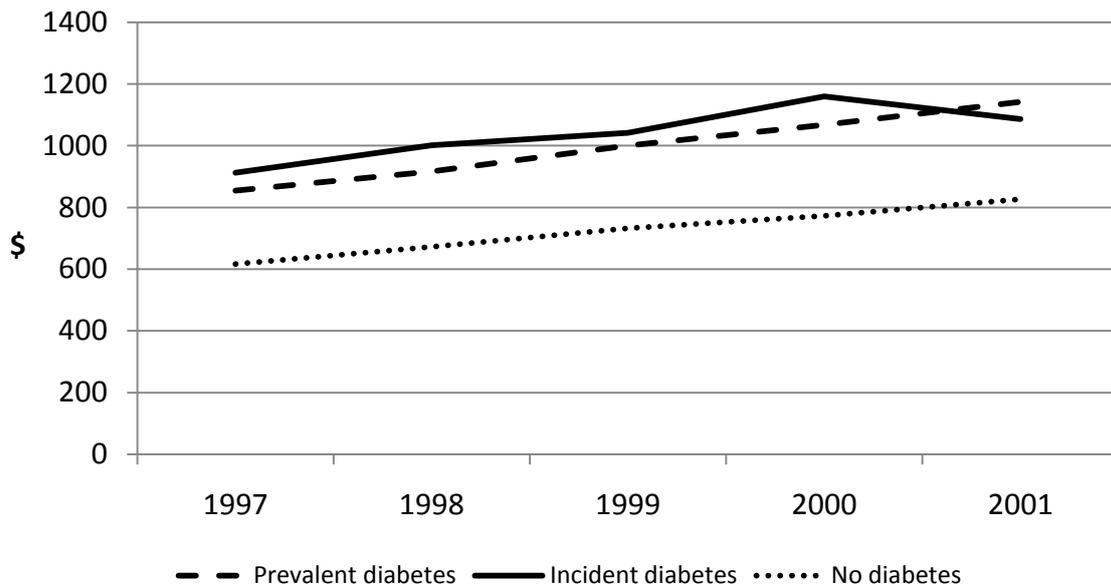


Source: Young et al., (2005) *Australian and New Zealand Journal of Public Health*.

Figure 5-9 Measures of health service utilisation from 1997-2001 according to diabetes status.

5.4.4. Impact of diabetes on government health care costs

Young et al. (2005) also calculated the average amount of money spent each year on medical services subsidised by Medicare (outside hospital) for women with and without diabetes. These costs to government are shown in Figure 5-10. To allow for the effects of inflation, costs for all years were adjusted to 2001 dollar values using the consumer price index published by the Australian Bureau of Statistics for the June quarter of each year. Costs increased each year and were substantially more for women with diabetes than women without diabetes.



Source: Young et al., (2005). *Australian and New Zealand Journal of Public Health*

Figure 5-10 Medicare costs (total costs to the government) for women with diabetes at Survey 2 (2001 Australian Dollars).

5.4.5. Knowledge and self-management of diabetes and impact on diabetes outcomes

Self management of diabetes is an essential component of diabetes care, and to achieve good self-care, people with diabetes should be knowledgeable about the purpose and clinical utility of diagnostic tests and monitoring (Funnell & Anderson, 2004). In 2001 a sub-study was undertaken to identify and describe women's attitudes to diabetes, their knowledge of diabetes, their self management behaviours, and their health outcomes and, to explore the interrelationship between these factors. The study involved analysis of data from 655 women aged 75-80 years participating in the ALSWH, who reported having diabetes (Byles et al., 2010). Among these women, 92% had Type 2 diabetes, 40% had diabetes for more than ten years, and 64% felt that their diabetes was well controlled.

Most women expressed positive attitudes about the impact of diabetes on their lifestyle and their adjustment to having the condition (see Table 5-1). However, 26% of the women believed that the proper control of diabetes involved a lot of sacrifice and inconvenience. Furthermore, 35% of the women in both age groups did not like being told what to eat, when to eat, and how much. One fifth of the women said they tried not to let people know they had diabetes.

Table 5-1 Percentage of women who agree with positive and negative statements about having diabetes.

Statement	%
Positive	
I believe I have adjusted well to having diabetes	86
Diabetes is not really a problem because it can be controlled	85
Having diabetes has encouraged me to improve my lifestyle	71
My diabetic diet does not really spoil my social life	62
Negative	
I try not to let people know about my diabetes	21
Most doctors really don't understand what it's like to have diabetes	19
The proper control of diabetes involves a lot of sacrifice and inconvenience	26
I do not like being told what to eat, when to eat, and how much	35

Source: Byles et al., Nova Science Publishers (in press)

In general, women had less than optimum levels of knowledge, and a large proportion did not engage in appropriate behaviours and preventive activities (see Table 5-2). Although most of the women understood the risk that being overweight had on their health, less than one-third were familiar with the HbA1c test and only half could correctly identify the normal range for blood glucose.

A large proportion of the women reported poor outcomes associated with diabetes including poor glucose control, poor circulation and retinopathy (see Table 5-3).

Table 5-2 Knowledge, behaviours and activities for women with diabetes.

	%
Knowledge	
Heard of HbA1c (long term sugar) test	29
Knew normal range for blood glucose	49
Understood risk of overweight to health	76
Understood good control of diabetes	68
Behaviour	
Sugar levels tested at least 2-6 times weekly	59
Blood tested by meter at home	78
Taking more than seven medications	24
BMI \geq 30	24
Preventive activities	
Feet examined in past year	72
Back of eyes examined in past year	62
Attended a diabetes education centre	66

Source: Byles et al., Nova Science Publishers (in press)

Table 5-3 Selected Health Outcomes among women with diabetes.

Health Outcomes	%
Blood tests mainly 4-10 mmol/L past month	68
More than one hypoglycaemic episode in past year	5
More than 7 days in hospital in last year	16
Currently being treated for hypertension	67
Ever had high cholesterol/triglycerides	50
Poor circulation to the feet/legs	43
Suffered from/treated for retinopathy	25
Had heart bypass surgery	9

Source: Byles et al., Nova Science Publishers (in press)

Knowledge scores for these women were positively correlated with behaviour and outcomes scores, indicating that women with better knowledge of diabetes self-management had better self-management and also had better outcomes (i.e., better diabetes control, fewer complications and hospitalisations). However there was no association between current diabetes care behaviours and health outcomes.

Responses to the Diabetes Care Sub-study were used to derive scores to reflect knowledge of diabetes, self-management behaviours, and outcomes. Higher knowledge scores were associated with having more education, receiving multidisciplinary diabetes care, receiving nutritional advice from a dietitian, having HbA1c tests and eye tests, and having visited a diabetes education centre. Higher behaviour scores (better behaviour) were associated with having Type 1 diabetes, receiving care from a specialist and/or multidisciplinary care, receiving nutrition advice and having visited a diabetes education centre.

5.4.6. Discussion

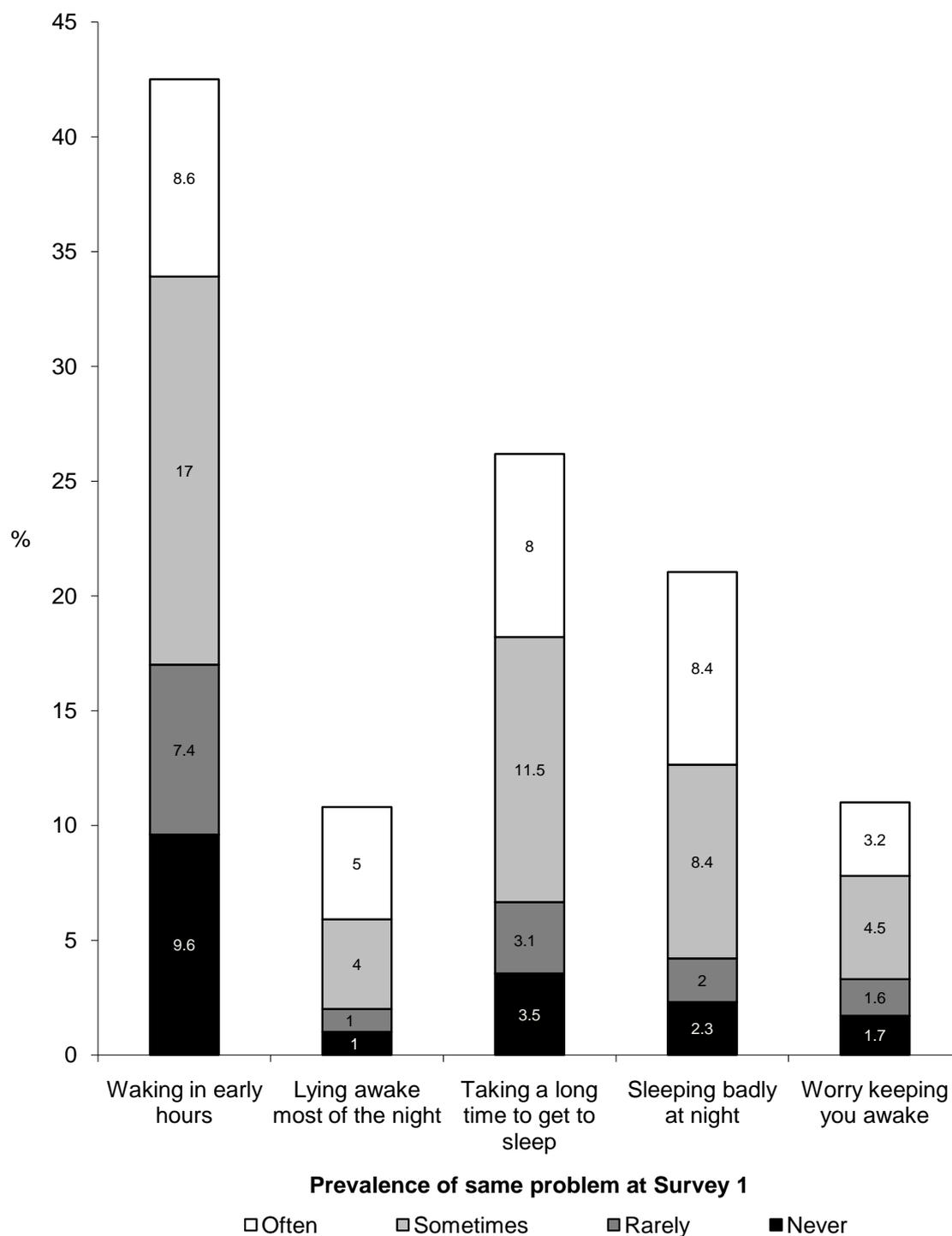
Diabetes is a common and costly condition that is likely to increase as the prevalence of obesity increases (Mishra et al., 2007). Prevention of diabetes in mid-age will result in fewer older people with diabetes. For those who already have diabetes, our results show that at a community level there is a great need to improve knowledge and behaviours among the growing population of women with diabetes, particularly those with Type 2 diabetes. Better knowledge is associated with better behaviours and with better health outcomes. Better knowledge was also associated with having attended a diabetes education centre, providing strong support for the work of these centres.

Women in this older age group have a particular need for diabetes education (American Association of Diabetes Educators, 2003). It has been suggested that proactive management of patients with diabetes requires an interdisciplinary approach with the expertise and cooperation of several healthcare professionals. Only around 25% of older women in the ALSWH studies reported receiving such multi-disciplinary care.

5.5. Sleep Disturbance

It is well known that sleeping difficulty is common among older people, particularly women. At Survey 1 of the ALSWH, when the women were aged 70–75 years, approximately 50% reported some degree of difficulty sleeping, and 17% reported they often had difficulty sleeping. There were also strong statistical associations between self-reported sleeping difficulty and health-related quality of life, and between use of sleeping medications and quality of life (Hasan et al., 2001).

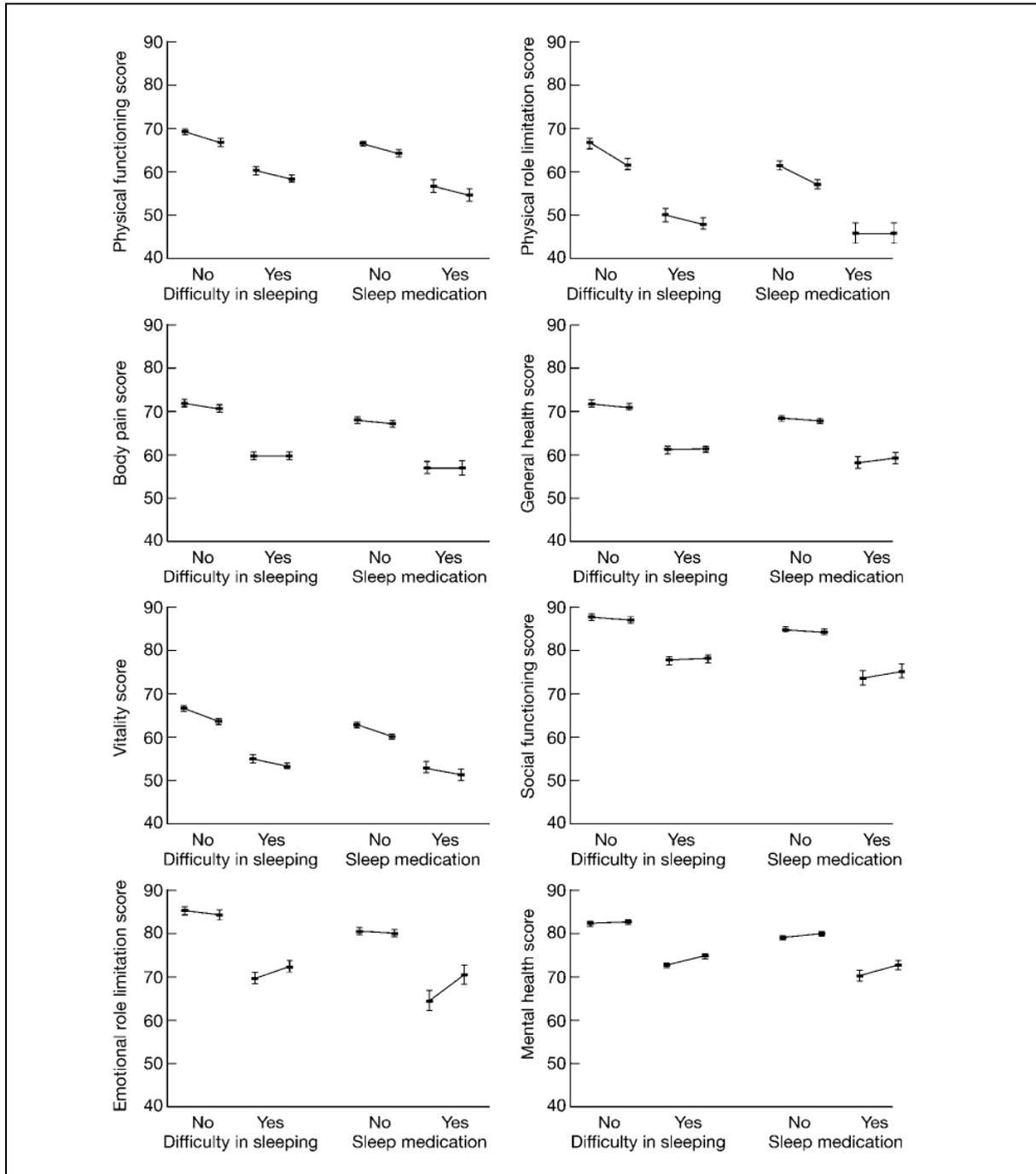
At Survey 2 in 1999, women were asked whether they had any of five sleep related problems. Overall, 63% of women reported at least one sleeping problem: 33% reported one problem only, 16% reported 2 or 3 items, and 14% reported more than 3 items (Byles et al., 2003). Responses to individual items provide more detail on the types of difficulty reported, with 42% of women reporting 'waking in the early hours', 26% 'taking a long time to get to sleep', 21% 'sleeping badly at night', and 11% 'lying awake most of the night'. Eleven percent of women reported 'worry keeping you awake' was a problem for them (See Figure 5-11). Use of sleeping medications was reported by 15% of the women and women were most likely to use medications if they reported they were 'sleeping badly at night' or 'taking a long time to get to sleep'. Women were less likely to use medication for 'waking in the early hours'.



Source: Byles et al., (2003) *Age and Ageing*.

Figure 5-11 Self-reported prevalence of sleeping difficulty at Survey 2 by prevalence of sleeping difficulty at Survey 1 among Australian women aged between 73-78 years of age at Survey 2.

Women who reported sleeping difficulty at Survey 1 in 1996 had lower mean scores for all the eight dimensions of SF-36 health-related quality of life than those with no sleeping difficulty. Similar trends were also present for those taking sleeping medication (See Figure 5-12). Sleeping medication, but not sleeping difficulty, was also significantly associated with falls, doctor consultations and days in hospital.



Source: Byles et al., (2003) *Age and Ageing*.

Figure 5-12 Means and 95% confidence intervals for eight dimensions of the SF-36 health-related quality of life by sleeping difficulty at Survey 1, and the use of sleeping medications at Survey 1 (line joins the Survey 1 mean to Survey 2 mean).

Given the prevalence, persistence and impact of sleeping difficulty on the lives of older women, a further study was undertaken to explore women's experience of sleeping difficulty and the relationship between this symptom and women's quality of life. This study involved a sample of 1210 women (1011 respondents) who had responded to Survey 2 of the ALSWH. These women were randomly selected from four mutually exclusive groups, stratified according to their reports of sleeping difficulty and use of sleeping medications. Among women with any sleeping problems at Survey 2, the average self-reported duration of problems was approximately 10 years (mean=13.6, median 10, interquartile range 4-20), indicating that the sleeping difficulties experienced by women in the study were often longstanding. Around one-third said that their sleeping problems commenced when they were widowed, and 24% said their problems started during a period of illness. Approximately 8% of women said their problems started after moving house, and roughly 5% said their problems started after an accident. Approximately 10% said their sleeping problems started after some other event, and around 30% could not attribute their problems to a cause. Around 20% to 30% said they are "too worried" to sleep, and 10% said they are "afraid to sleep." Most women with sleeping difficulty agreed that it is harder to sleep when you get older, and less than half of the women felt they were able to get all the sleep they needed.

Because of sampling strategy, a majority of women in the selected sample were using medications to help them sleep. Classification of the medications used by women in the study during the previous month indicated that 87% of the women in the study who reported using medications were using hypnotic sedatives (e.g., temazepam 42%, nitrazepam 12%, oxazepam 21%), with the remainder using over-the-counter medications (8%), herbal remedies (10%), or both.

5.5.1. Symptoms that interfere with sleep.

Women with sleeping difficulty reported a range of other symptoms (see Table 5-4), most notably pain, breathing discomfort or coughing/snoring, and bad dreams that they associated with difficulty sleeping. Having to get up to use the bathroom was reported by a large proportion of women in these groups.

Table 5-4 Percentages of 1011 women who reported experiencing symptoms that may be related to sleeping difficulty at least once a week.

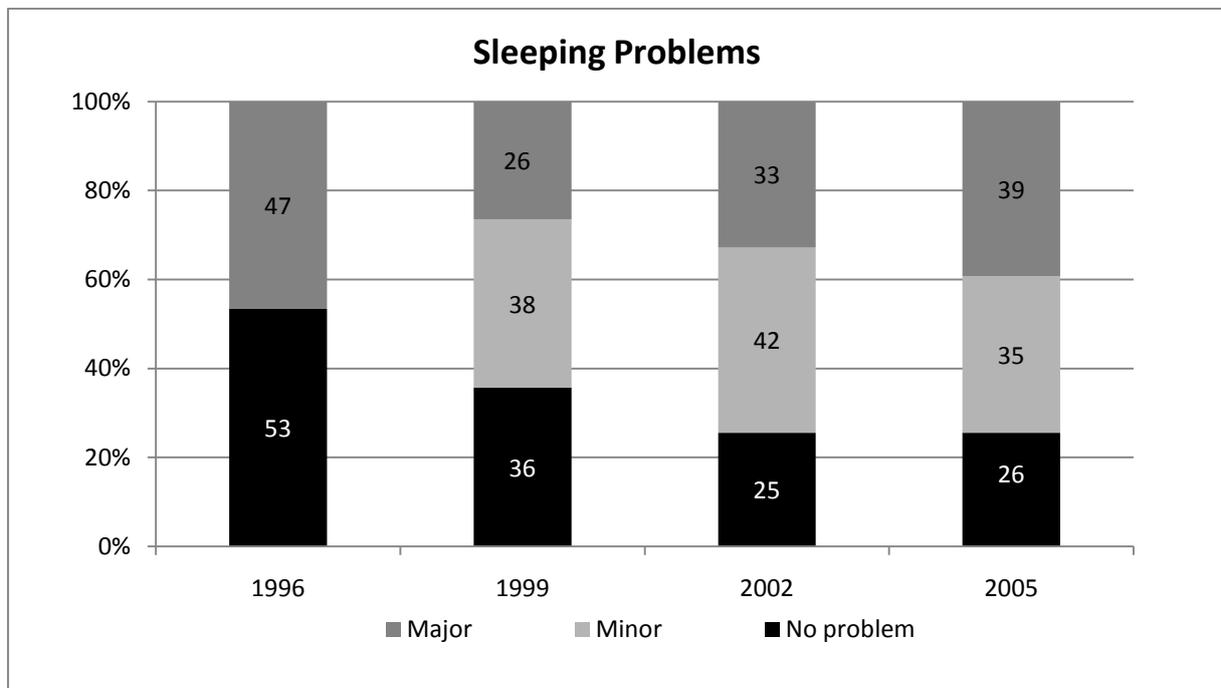
	Group 1	Group 2	Group 3	Group 4
	Sleeping badly: sleeping medications (n=125)	Not sleeping badly; sleeping medications (n=376)	Sleeping badly; no sleeping medications (n=258)	Not sleeping badly; no sleep medications (n=252)
Trouble sleeping because of:				
Pain	40.4	23.3	29.4	10.9
Cannot breath comfortably	9.2	4.0	9.9	2.9
Bad dreams	14.3	4.8	9.9	2.9
Having to get up to go to the bathroom	14.3	4.8	13.1	5.4
Coughing/snoring	12.6	8.5	13.1	6.3
Too hot	3.4	2.8	4.8	2.5
Too cold	10.1	4.8	7.9	5.0
Other	5.0	2.0	2.8	2.9

Source: Byles et al., (2005), *Sleep*.

This study also confirmed our earlier findings of a strong association between sleeping difficulty and quality of life. In this analysis we examined the association between women’s scores on the Pittsburgh Sleep Quality Index (Buysse et al., 1989) which has been measured in the substudy, and the change in SF-36 health-related quality of life scores between Survey 1 (in 1996) and the substudy scores measured four years later (2000). Higher scores for sleeping difficulty were associated with a greater decline in quality of life on all eight SF-36 subscales. Except for the Social Functioning subscale these associations remained statistically significant after comorbid conditions, Geriatric Depression Scale scores, and life-events scores were added to the models, and after adjusting for the use of sleeping medications in the past month. The association between sleeping difficulty and Physical Functioning was not statistically significant once sleeping medication use was added to the models (Byles et al., Sleep 2005).

5.5.2. Sleep Problems across Surveys 1-4

Further analyses have been undertaken as the women have increased in age (from 70-75 years at Survey 1 to 79-84 years at Survey 4). Figure 5-13 shows the increase in the percentage of women having sleeping problems. The percentage of women having no problems decreased (although there were some differences in the questions between Survey 1 and subsequent surveys). Once women reported sleeping problems they tended to continue to report them.



Source: Fitzgerald (Unpublished data)

Figure 5-13 Increase in sleeping problems from ALSWH Surveys 1 to 4.

These most recent analyses show that sleeping problems at any one survey are associated with decreases in health-related quality of life at the next survey. They also show that women with major sleep problems have a lower survival than other groups of women, however this difference is not significant when other factors that affect survival are accounted for.

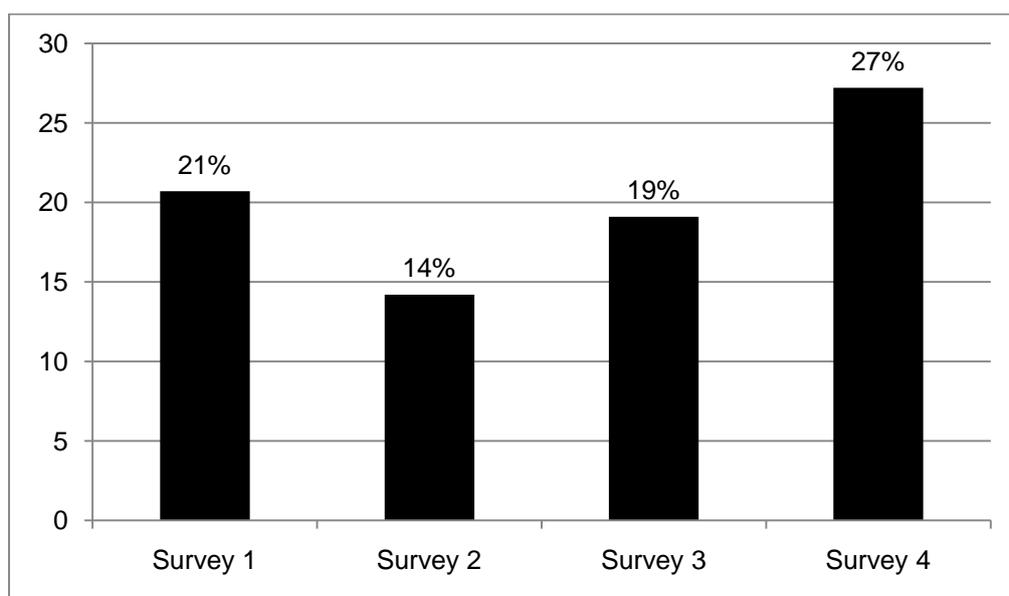
5.5.3. Discussion

Difficulty sleeping was commonly and persistently reported by the older women, with waking in the early hours being the most commonly reported manifestation. This difficulty does not appear to be an entirely benign complaint, as it is associated with significant reduction in the women's quality of life. In longitudinal analyses, reported difficulty sleeping was associated with negative health outcomes as measured by the SF-36 health related quality of life profile. While much of this reduction in quality of life appears to be accounted for by associated symptoms, co-morbidity, age, or life events, the association between sleeping difficulty and the SF-36 subscales 'emotional role limitation' and 'general mental health' remained statistically significant even after adjustment for these factors. However, while sleeping difficulty, per se, appears to have negative impact on quality of life, 'treatment' of this symptom with medication does not appear to be an effective measure.

5.6. Incontinence

Urinary incontinence is a common problem in our community and it is estimated that almost two million community dwelling women in Australia have problems with urinary incontinence (Doran et al., 2001; Chiarelli et al., 2005; Perry et al., 2000). Incontinence is a major factor leading to placement in nursing homes (Smith, 1998). This is not surprising, because urinary incontinence is part of many disease complexes which are common in elderly women and the fact that age-associated changes within the lower urinary tract make a significant contribution to continence status (Resnick et al., 1995; Wagg, 2004). In the 1996 surveys of the ALSWH, 36% of mid-age women (45–50) and 35% of older women (70–75) reported leaking urine ‘rarely’, ‘sometimes’ or ‘often’ (Miller et al., 2003a). An in-depth study of these women has identified cross-sectional associations between incontinence severity and body mass index (BMI), other urinary symptoms, smoking, hormone replacement therapy and hysterectomy (Miller et al., 2003b). This study also showed that many women who had incontinence were employing methods to prevent incontinence that may have other detrimental health outcomes. For example, many women reduced their fluid intake (Miller et al., 2003b) and avoided physical activity (Brown & Miller, 2002) in an attempt to reduce their symptoms.

Among women who participated in Surveys 1 to 4, incontinence continued to be a common problem with 27% of women participating in Survey 4 in 2005 reporting leaking urine ‘sometimes’ or ‘often’ (see Figure 5-14).



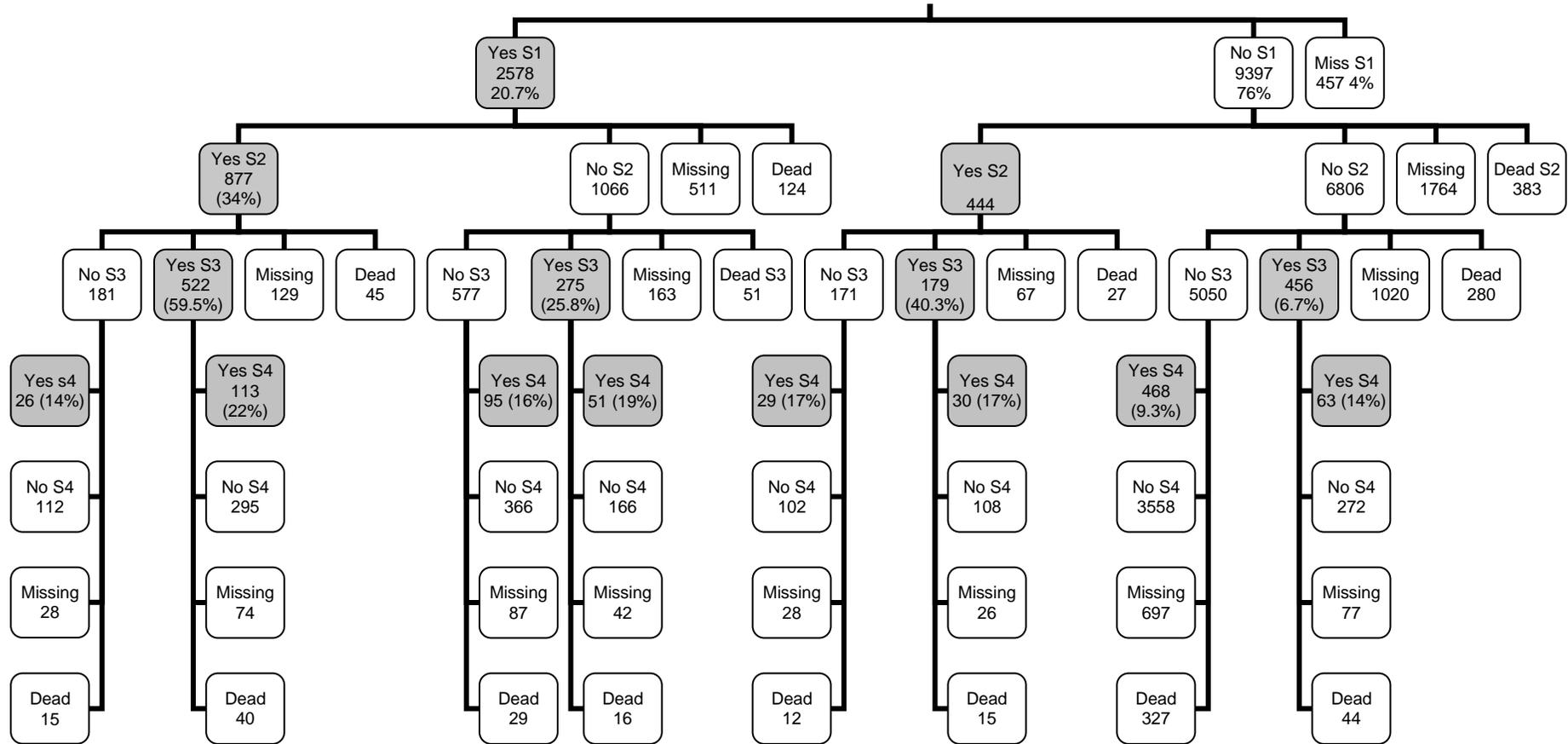
Source: Byles et al., (2009) *Age and Ageing*.

Note: At Survey 2, response options for this question were slightly different to other surveys, however the question remained the same.

Figure 5-14 Prevalence of incontinence (leaking urine “sometimes” or “often”) - Surveys 1 to 4.

Between Survey 1 and Survey 4, 15% of the women in the study who had previously reported leaking urine ‘rarely’ or ‘never’ developed incontinence. However, reporting of leaking urine was not consistent for all surveys, with some women who reported leaking urine in one survey reporting this was ‘rarely’ or ‘never’ a problem in the next one. Only 34% of women who reported leaking urine sometimes or often in the first survey continued to report this problem at Survey 2, and a very small minority of women consistently reported leaking urine at all four surveys (see Figure 5-15).

In the past 12 months have you had **leaking urine**?



Source: Byles et al., (2009), *Age and Ageing*.

Figure 5-15 Reports of leaking urine 'sometimes' or 'often' in the past 12 months. N = 12,432.

The prevalence of incontinence increased with age, and women were almost twice as likely to report incontinence at Survey 4 as they were at Survey 2. Incontinence was also strongly associated with problems such as dementia, reduced physical functioning, history of falls to the ground, high BMI, constipation, urinary tract infection, prolapse repair, and history of prolapsed bladder or bowel. Parity, conditions such as stroke, hysterectomy and number of visits to the GP were less strongly associated with incontinence (Byles et al., 2009).

Incontinence was not significantly associated with area of residence, education, smoking, diabetes or attending social groups or support groups (Byles et al., 2009).

5.6.1. Impact of urinary incontinence on health-related quality of life

The impact of incontinence on the physical and social functioning subscales of the SF-36 health-related quality of life profile is shown in Figure 5-16. In this figure, women are classified as having prevalent, intermittent or incident incontinence, or as having never reported this condition, based on their answers to the question regarding leaking urine at each of Survey 2, Survey 3 or Survey 4. Women who reported leaking urine sometimes or often at Survey 2, and who did not subsequently indicate that they rarely or never experienced this symptom, were classified as “prevalent” cases at Survey 2. Women who reported leaking urine at Survey 2 but who subsequently reported that they rarely or never experience this problem were classified as ‘intermittent’ cases. Women who reported that they rarely or never experienced leaking urine at Survey 2 and who subsequently reported this problem sometimes or often were classified as “incident” (i.e., new) cases.

Women with incontinence had lower scores than other women on these health-related quality of life measures. However, women with incident incontinence had scores that were lower even before they reported incontinence, indicating that some factor that preceded their incontinence may have contributed to their poorer social and physical functioning.

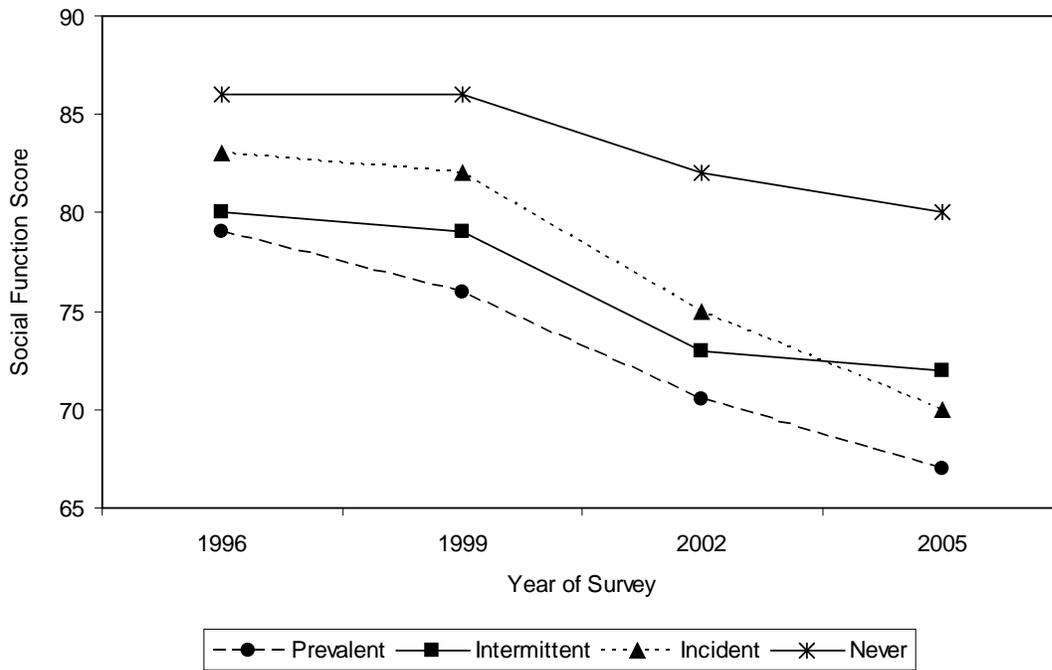
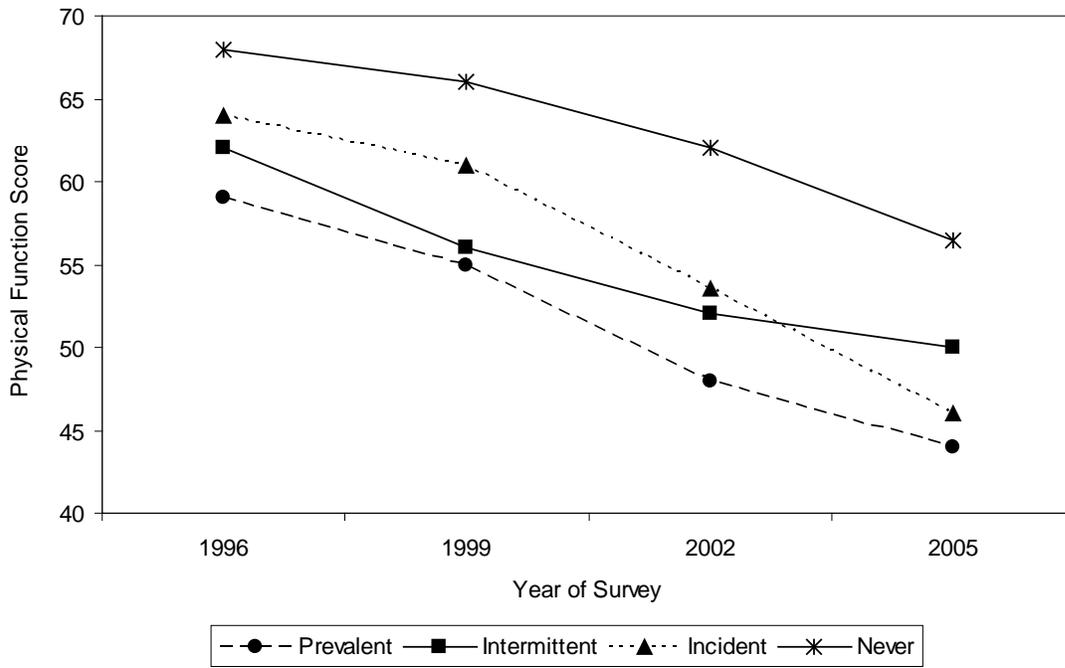


Figure 5-16 SF-36 Physical and Social Function scores for women with and without incontinence.

5.6.2. Discussion

The lack of association between continence and some social factors is of particular significance. Incontinence is frequently described as a socially debilitating condition. However in ALSWH data women, with incontinence were no less likely to provide care for children, care for others, or to undertake volunteer work, and the proportions of women reporting each class of incontinence, among women who engaged in these activities, were similar to the proportions for the cohort overall.

There were differences in social functioning, but these preceded reports of incontinence and probably reflect the impact of underlying physical conditions that not only limit social function but which also contribute to the development of incontinence. The corresponding differences in SF-36 physical function scores support this argument.

5.7. Summary

Most of the older women in the study were living with at least one chronic condition, and many were living with multiple conditions that are associated with increased risk of physical health decline and other limitations on health-related quality of life. The more conditions a woman reported the higher the probability of poor health-related quality of life and functional decline.

To examine the effects of chronic conditions on the quality of life of older women, we considered four conditions in more detail: arthritis, diabetes, sleep problems and incontinence. These are common conditions which impact on different aspects of women's lives.

In 2005, 63% of ALSWH participants in the 1921-26 cohort reported diagnoses or symptoms of arthritis. Arthritis is associated with pain, physical limitations and greater costs of medications. There is some evidence that walking for leisure may reduce the risk of arthritis.

A common risk factor for arthritis, diabetes and incontinence is higher BMI. From a public health perspective prevention of overweight and obesity throughout adult life is a key national goal that could reduce disability in old age.

Data from the ALSWH show that medical management of diabetes fell well short of the guidelines. Women with good knowledge about diabetes management managed their condition better. There is a great need to improve knowledge and behaviours among the growing population of older women with diabetes, particularly those with Type 2 diabetes.

Sleep problems commonly affect women as they become older. Women with sleeping difficulties reported a range of symptoms that interfere with sleep including pain, difficulty breathing, bad dreams, having to get up to use the bathroom, coughing/snoring, being too cold or too hot. Use of sleeping medications did not appear to alleviate these problems for many women.

Incontinence is often described as a socially debilitating condition. In our data, incontinence was common and increased with age. The association between incontinence and social limitations, however, appeared to be more a consequence of underlying physical disability rather than the problem of incontinence.

These findings have implications for primary care and the need for health professional to work with older women patients to improve understanding and management of common conditions. This includes helping women to improve their own health literacy and capability for self management. It also includes considering effectiveness of medication, especially for multiple chronic conditions.

5.8. References

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6. Major risk factors affecting older women

6.1. Key Findings

- A woman in her 70's of average height will lose around 0.19 cm in height each year.
- Height loss was associated with osteoporosis, low BMI, being born in Europe and using medications for both sleep and anxiety.
- Height loss $\geq 2\%$ per 3 years was associated with a decline in self-rated health, heartburn/indigestion and constipation, urinary stress-incontinence.
- While rates of conditions such as hypertension and diabetes increased with increasing BMI, rates of osteoporosis were related to BMI in the opposite direction – women who were overweight or obese were at lower risk.
- Hospital admissions were lowest for women with BMI 22 to 24 kg/m².
- Mortality rates were lowest for women with BMI 25 to 27 kg/m².
- Women had an average 9 to 10 potential hazards for falls around their homes, and these hazards were associated with risk of falls after other health factors were accounted for.
- Only 9% of the women were engaging in high levels of physical activity and another 4% were engaging in very high levels, suggesting that these levels may not be obtainable for most women in this age range.
- Moderate and high levels of physical activity were associated with lower risk of falls among women aged 70-75 years.
- Very high levels of physical activity were associated with reduced odds of fractures among women aged 70-75 years.
- Smoking was strongly associated with mortality rates: the more women smoked the higher the mortality rate.
- Mortality rates decreased after women quit smoking, however even women who quit smoking more than 20 years ago had a higher mortality rate than women who had never smoked.
- Around one-third of women in the 1921-26 cohort were non-drinkers, and slightly less than one-third drank rarely.
- Among women who drank alcohol, most drank 1 or 2 drinks per day, consistent with current alcohol guidelines.
- Survival rates were lower among women who did not drink and women who rarely drank alcohol.
- Women who did not drink and women who rarely drank alcohol had lower health-related quality of life scores after adjustment for smoking, co-morbidity, education, BMI and area of residence.

6.2. Introduction

This section of the report takes a detailed look at some important risk factors including changes in height and weight, physical activity, falls, smoking and alcohol. A number of risk factors affect women's health in older age. In some instances these risk factors may be markers of more complex age-associated pathophysiological changes, while in other cases they may represent opportunities for health promotion in later life. Change in height, for example is indicative of osteoporotic changes to the axial skeleton and can be associated with a number of somatic symptoms as well as being a risk factor for low-impact fractures. Weight loss in older age can be a marker of poor nutrition, frailty or malignancy, and is associated with reduced survival and other adverse health outcomes. Likewise, falls and fall-related injuries can indicate increasing levels of frailty and risk, as well as being adverse health outcomes in their own right. Physical activity, smoking and alcohol represent potentially modifiable health behaviours that are strongly associated with changes in health throughout the life-course including older age.

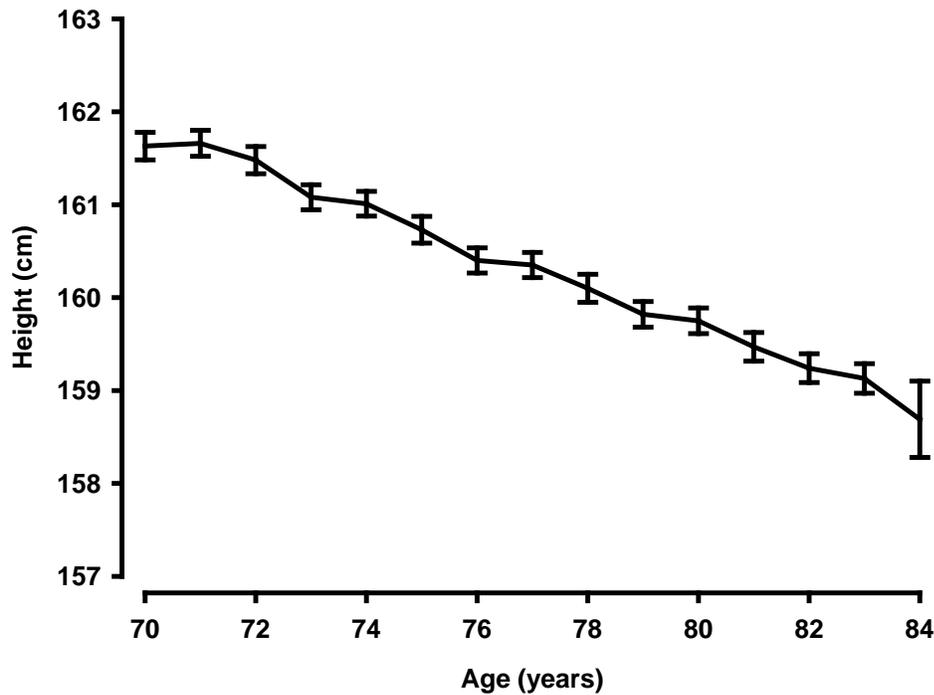
6.3. Height loss in older women

Height loss is a common at older ages. The loss of height is due to loss of skeletal mass and compression fractures, resulting in reduced height of the vertebral bodies, as well as a change in posture called kyphosis. Height loss is an important risk factor in older age because it can be a sign of osteoporosis providing an indirect marker of bone loss, with the associated risks of falls and fracture. Moreover, height loss can have direct effects in older age causing back pain and increased abdominal pressure.

Each survey of the ALSWH asks women to measure their height allowing the age-associated change in self-reported height to be determined, and factors associated with height loss to be explored.

6.3.1. Age-associated change in self-reported height

The data presented here describe the changes in height for women who participated in at least two consecutive ALSWH surveys. Among these women, the average height was 161.4 cm at Survey 1 (when the women were aged 70 to 75 years), 160.7 cm at Survey 2 (73 to 78 years), 160.2 cm at Survey 3 (76 to 81 years) and 159.6 cm at Survey 4 (79 to 84 years). Figure 6-1 shows the decline in self-reported height with increasing age. It would be expected that a woman of average height in her seventh decade of life would lose about 0.19 cm in height per year.



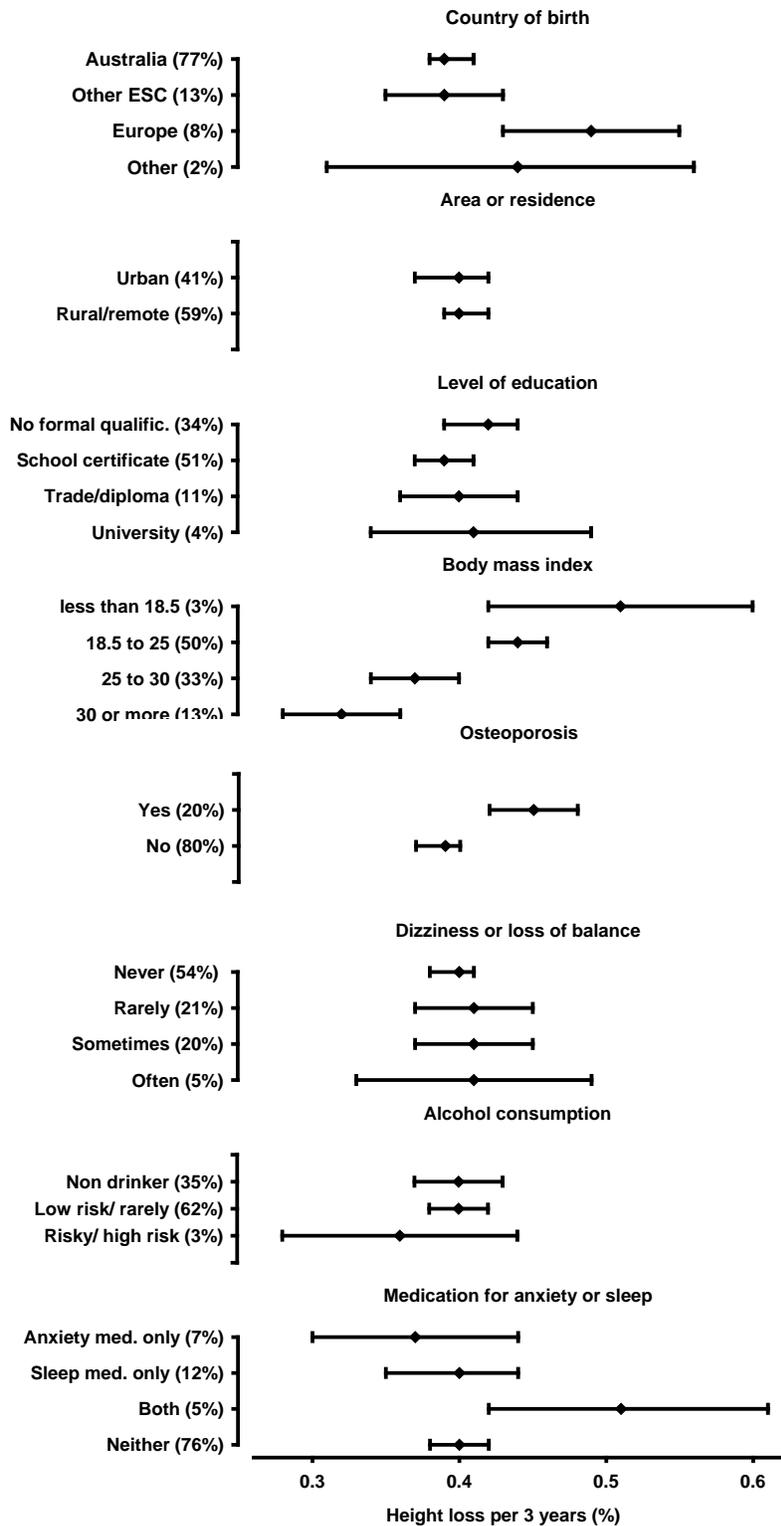
Source: Berecki-Gisolf et al., (2009) *Osteoporosis International*

Figure 6-1 Self-reported height in relation to age over 9 years for women aged 70-75 in 1996. Results of the longitudinal analysis of height: mean and 95% CI.

6.3.2. Factors associated with change in self-reported height

Potential risk factors for height loss which were examined over time included socio-demographic characteristics (e.g. level of education), medical conditions or symptoms such as osteoporosis, and health behaviours such as alcohol use. Results from statistical modelling of potential risk factors for height loss are shown in Figure 6-2. The percentages of women in the various risk factor categories at Survey 1 are also provided in this figure.

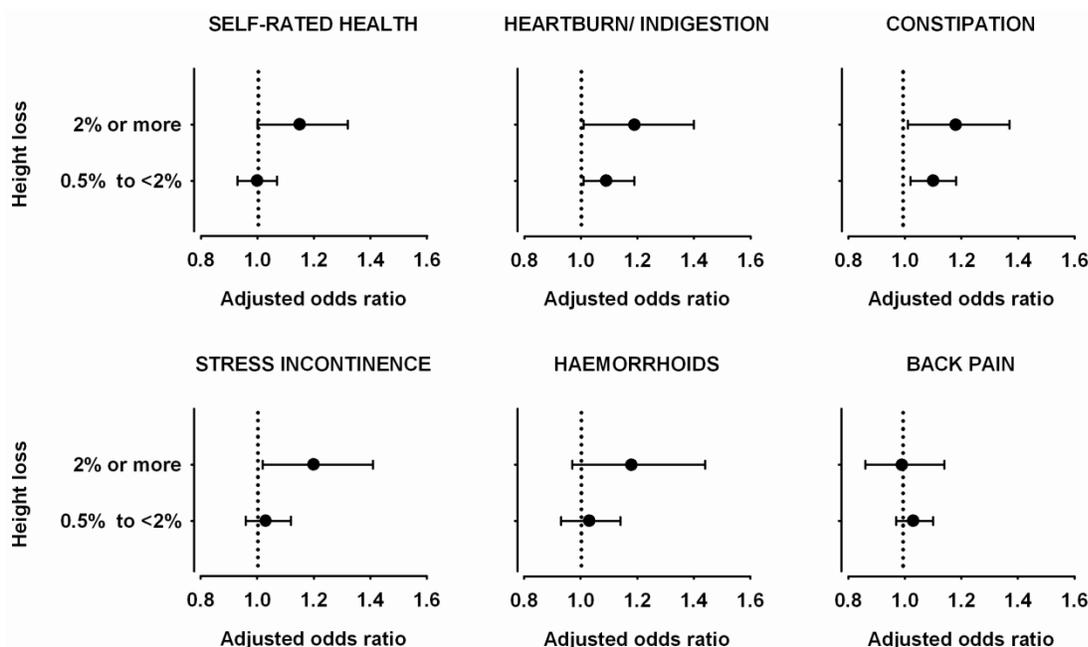
These data demonstrate that height loss was greater among women born in Europe compared with Australian born women; underweight women (compared with women in the healthy weight range); those with osteoporosis; and those taking medications for both sleep and anxiety compared to those taking neither. Height loss was less in overweight or obese women compared to those in the healthy weight range. Dizziness or loss of balance, alcohol intake, level of education and area of residence were not statistically significantly associated with subsequent height change.



Source: Berecki-Gisolf et al., (2009) *Osteoporosis International*

Figure 6-2 Percentage height change between four consecutive surveys (at 3-year intervals): means and 95% confidence intervals for potential predictors of height loss (at the survey preceding height loss). The percentage of women in the various categories at survey 1 is shown in brackets. Each risk factor is adjusted for other factors in the model.

Figure 6-3 illustrates the relationship between self-reported health and height loss as well as various symptoms related to height loss. At each survey women were asked to rate their health as 'excellent', 'very good', 'good', 'fair' or 'poor'. For the analysis of 'self-rated health', a decline in health was compared to health remaining the same or improving. For these analyses, height loss over 3 years was categorised as $\geq 2\%$ (experienced by 435, 331 and 437 women between surveys 1 and 2, Surveys 2 and 3, and Surveys 3 and 4, respectively), 0.5 to $<2\%$ (experienced by 3001, 2415 and 1937 women between Surveys 1 and 2, 2 and 3, and 3 and 4, respectively) or $<0.5\%$ (experienced by 6383, 5705 and 4499 women between Surveys 1 and 2, 2 and 3, and 3 and 4, respectively).



Source: Berecki-Gisolf et al., (2009) *Osteoporosis International*

Figure 6-3 Decline in overall self-rated health or increase in frequency of self reported symptoms associated with change in height over the same time period.

A decline in self-rated health was reported by 26%, 23% and 33% of women between Surveys 1 and 2, 2 and 3, and 3 and 4, respectively. Increased heartburn/indigestion was reported by 10%, 18% and 30%; increased constipation was reported by 9%, 23% and 34%; increased urinary stress-incontinence was reported by 8%, 18% and 29%; increased haemorrhoids was reported by 5%, 10% and 18%; and increased back pain was reported by 14%, 32% and 35% of women between Surveys 1 and 2, 2 and 3, and 3 and 4, respectively. The relation between self-rated health and height loss was adjusted for age, BMI, and self-reported indigestion, constipation and urinary incontinence. The relation between heartburn/indigestion and height loss was adjusted for country of birth, BMI, smoking and alcohol intake. The relation between constipation and height loss was adjusted for ability to walk 100 m. The relation between urinary (stress) incontinence and height loss was adjusted for BMI and parity. The relation between haemorrhoids and height loss was adjusted for BMI and constipation, and the relation between back pain and height loss was adjusted for BMI and arthritis.

Height loss of $\geq 2\%$ per 3 years was associated with a decline in self-rated health, with or without adjusting for confounders. Height loss was associated with heartburn/indigestion and constipation with or without adjusting for confounders. Height loss $\geq 2\%$ over 3 years was associated with urinary stress - incontinence after adjusting for confounders. The association between height loss $\geq 2\%$ over 3 years and haemorrhoids was statistically significant without but not with adjustment for confounders. Height loss was not associated with back pain.

An additional model adjusting for bisphosphonate use (a common medication for osteoporosis which is reported to cause gastrointestinal complaints) showed that height loss $> 2\%$ vs. $\leq 2\%$ per 3 years was associated with experiencing subsequent heartburn/indigestion 'often' vs. 'never/rarely/sometimes' at Survey 4.

In summary, osteoporosis, low BMI, being born in Europe and using medications for both sleep and anxiety were risk factors for height loss in older women living in Australia. Height loss was associated with a slight increase in experienced heartburn/ indigestion and constipation. Height loss of at least 2% in 3 years was also associated with urinary stress-incontinence and a decline in self-rated health. Although the magnitude of the association between height loss and specific symptoms was small, there was a 'dose-response' effect suggesting that those with greater height loss were at increased risk.

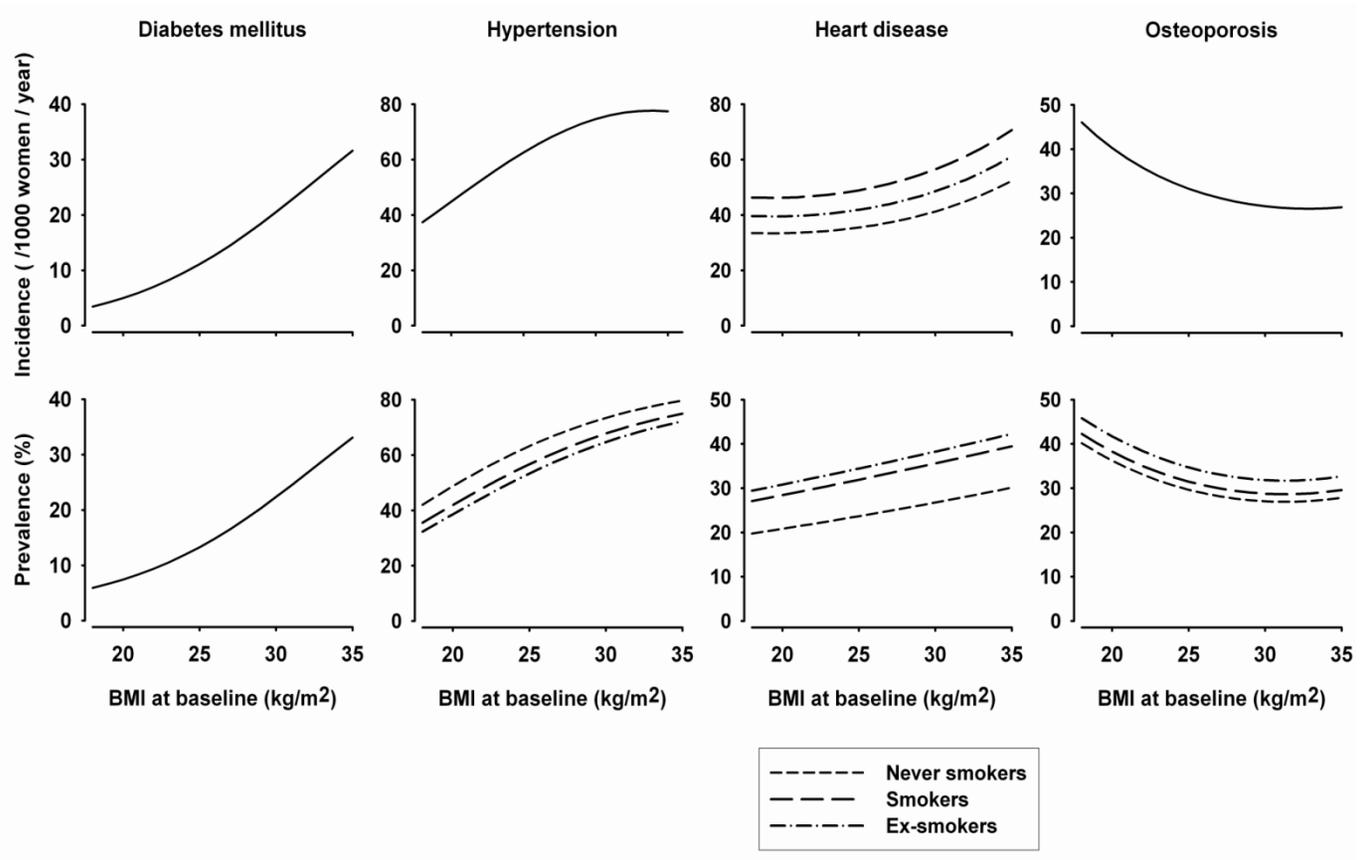
These findings indicate potential benefits in measuring height regularly in women in later life. In those with progressive height loss, bone mineral density measurements should be considered; in the case of established osteoporosis, treatment could be re-evaluated in light of changes in height. Furthermore, symptoms associated with height loss (heartburn/indigestion, constipation and urinary stress incontinence), which may not be presented by women spontaneously, can be explored. Early detection of these symptoms in patients at risk, and targeted lifestyle advice and treatment even of mild symptoms may help to improve quality of life.

6.4. Healthy body mass index for older women

Current WHO recommendations advise a Body Mass Index (BMI) range of 18.5 to 25 kg/m² for optimal health in adults aged 18+ years (WHO, 2000). While the WHO guidelines separately address the health consequences of overweight and obesity in childhood and adolescence and in adults, there are no distinctions for young, mid-aged or older adults. As older adults have already survived to a greater age and because older people experience age-associated loss of height, the optimal BMI-range for adults aged 18+ years may be less relevant for older people (Rossner, 2001; Zamboni et al., 2005). Several papers and systematic reviews have recently shown that, in older people, BMI in the range of 25-30 kg/m² is not associated with higher mortality risk compared with 'normal BMI' (18.5-25 kg/m²) and may even have a protective effect (Auyeung et al., 2010; Heiat et al., 2001; Janssen & Mark, 2007; Locher et al., 2007; Pischon et al., 2008). However, in other studies, BMI in the 'overweight' (25-30 kg/m²) and 'obese' (>30 kg/m²) range has been shown to be associated with increased risk of frailty and chronic conditions, disability and health complaints in older people (Zamboni et al., 2005; Andreyeva et al., 2007; Hubbard et al., 2009; Imai et al., 2008; Must et al., 1999; Patterson et al., 2004). Therefore, in older adults the patterns of association between BMI and several outcomes that are optimal for good health may not be as clear as in younger populations.

6.4.1. Body mass index and chronic conditions

Incidence and prevalence rates for four conditions (diabetes, hypertension, heart disease and osteoporosis), as a function of BMI in 1996, are shown in Figure 6-4. These graphs also show the effects of BMI according to women's smoking status which is another major risk factor for these conditions. Higher BMI was associated with higher incidence and prevalence of diabetes, hypertension and heart disease, and lower incidence and prevalence of osteoporosis. While the incidence and prevalence of hypertension flattened out for BMI ≥ 30 kg/m², incidence and prevalence of diabetes increased markedly in women with a BMI ≥ 30 kg/m². For example, diabetes prevalence ranged from 6% to 13% in women in the healthy BMI-range, whereas the prevalence ranged from 20% to more than 30% in women with a BMI of 30 kg/m² and higher. The rates for heart disease also increased with increasing BMI, but less sharply, and there were marked differences in rates according to smoking status, with the lowest incidence and prevalence in never smokers. The effect of smoking on hypertension was opposite to that expected, with highest prevalence of hypertension being among non-smokers across the BMI range.



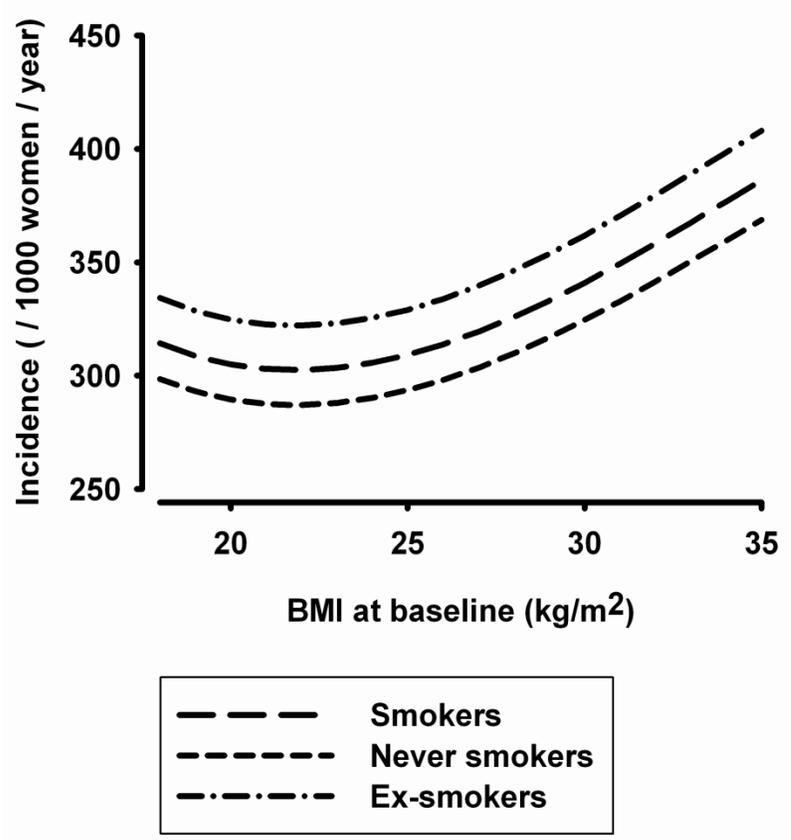
Source: van Uffelen et al. (unpublished)

Figure 6-4. Estimated incidence and prevalence rates per year of chronic conditions in relation to baseline Body Mass Index in women, Australian Longitudinal Study on Women's Health, 1996-2008.

There was an inverse association between BMI and osteoporosis, with the lowest risk of osteoporosis in women with a BMI ≥ 30 kg/m². For example, the incidence of osteoporosis for women with a BMI of 30 kg/m² was 27/1000 women/year, compared with 44 to 31/1000 women/year for women with a BMI between 18.5 and 25 kg/m². Prevalence of osteoporosis was lower in women who never smoked than in smokers and ex-smokers.

6.4.2. Body mass index and hospital admissions

The association between BMI and hospital admission in the last 12 months was J-shaped, with lowest rates in the BMI range 22 to 24 kg/m² (Figure 6-5). The risk of hospital admission was lowest in women in the healthy weight range who never smoked. Regardless of smoking status, hospital stay increased markedly for women with BMI ≥ 25 kg/m².

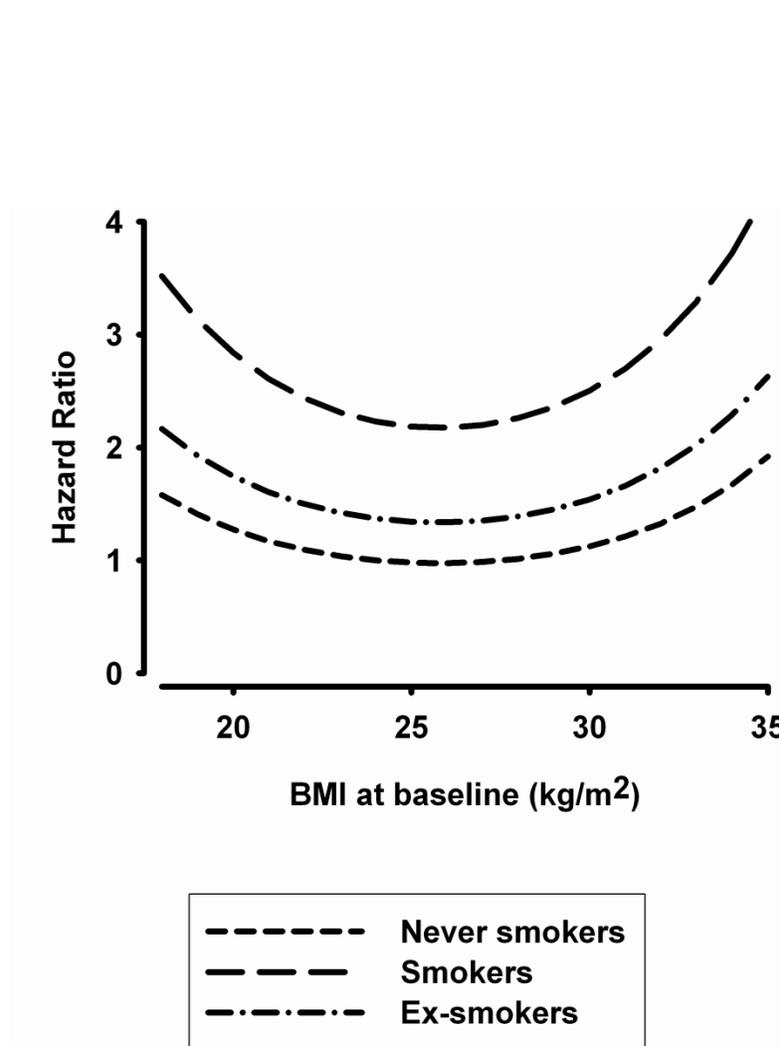


Source: van Uffelen et al. (unpublished)

Figure 6-5 Estimated rates of hospital admission in relation to baseline Body Mass Index in women, Australian Longitudinal Study on Women’s Health, 1996-2008.

6.4.3. Body mass index and death

The association between BMI and mortality was U-shaped, with the lowest risk of mortality for BMI between 25 and 27 kg/m² (Figure 6-6). Across the range of BMI, smokers were at much higher risk of death than ex-smokers or women who had never smoked.



Source: van Uffelen et al. (unpublished)

Figure 6-6 Hazard Ratios for All-Cause mortality in relation to baseline Body Mass Index in women, Australian Longitudinal Study on Women's Health, 1996-2008. (Reference: Never smokers, BMI=24).

6.4.4. Additional analyses

Excluding women with cancer did not result in changes in the association between BMI and incidence and prevalence of chronic disease, or BMI and mortality, but the higher risk of hospital admission in women in the BMI-range of 18.5 to 22 levelled out. Excluding the first five years of follow-up did not affect the BMI range associated with lowest mortality.

6.4.5. Discussion

It is predicted that there will be marked increases in burden of disease and demands on health care systems as a result of the growing percentage of overweight and obese older women in the population (Rossner, 2001; Arterburn et al., 2004; Bennett et al., 2004; Wang et al., 2007). If this increase is to be prevented, it is important to understand the associations between BMI and health in this age group, and to be clear about the advice given to older women about reducing risk of ill health. Although we found lower risk of three conditions was associated with lower BMI, lower levels of hospitalisation and death were observed for women with BMI a little above the WHO healthy weight range. BMI ranges and health promotion messages for older women should be adjusted accordingly. For high levels of BMI there may be benefits in losing weight at older ages, however, if weight loss advice is warranted, it should be accompanied by treatment for prevention of bone loss and loss of lean muscle mass (McTigue et al., 2006). A more important message is the need to maintain healthy weight across the lifespan to avoid the onset of chronic disease at older ages when weight loss may be inappropriate and/or ineffective.

6.5. Falls

Falls are a major cause of morbidity among older women and can have serious health and social consequences (ABS, 1996; Bergland et al., 2006; Hill et al., 1999; Campbell, Borrie et al., 1990; Campbell, Spears et al., 1990; Lilley et al., 1995; Sattin et al., 1990; Tinetti, 2003). Up to 49% of community-dwelling women aged 65 years and over will experience at least one fall over a 12-month period, and many of these falls will result in injury, including fracture.(Tinetti, 2003). Indeed, falls are the leading cause of injury-related death and hospitalization for people aged over 65 years (Lilley et al., 1995; Bell et al., 2000; Lord et al., 2000) and can lead to placement in residential care (Sattin et al., 1990; Donald & Bulpitt, 1999; Tinetti & Williams, 1997). Falls are estimated to account for 40% of the lifetime injury costs for women Moller, 2002). They may also have psychosocial consequences that result in isolation and loneliness (Lilley et al., 1995).

In Survey 1 of ALSWH, approximately 5% of women reported a fall that had caused serious injury, and these falls were associated with a number of other adverse consequences including decreased self esteem, reduced daily activity and social interaction (MacKenzie et al., 2004) In this section we report on some of the risk factors associated with falls and related events reported over subsequent surveys.

6.5.1. Falls, home hazards and other falls risk factors

Many physical, psychological and environmental factors are associated with falls (Lord et al., 2001; Tinetti et al., 1995). Some risk factors for falls are intrinsic to the individual, such as poor balance or eyesight, whereas others are more strongly related to the persons social and physical environment. A sub-study was undertaken to explore and apply the newly developed International Classification of Functioning and Health (ICF) developed by the World Health Organisation as a way to identify, define and test the multiple risk factors that have been associated with falls and related events. The ICF is a model that integrates how older people function within their environment with different health conditions, their levels of activity and participation, and personal factors. This approach considers an individual as a whole person, where function is the result of the interaction between body systems and structures, activity and participation, environment and personal characteristics. Therefore, the model can be used to investigate global and comprehensive risk factors for falls and the relationships among these risk factors.

To enable this research, additional data were collected from a sub-study of 568 women from the 1921-26 cohort, and these and earlier data collected from these women at Surveys 1-3 were used to predict self-reported falls and related events at Survey 4. The sub-study was undertaken between Survey 3 and Survey 4 and the mean age of the participants at the time of the sub-study was 79.7 years. The prevalence of fall events at the time of the sub-study is shown in Table 6-1, and around 65% of women reported some level of fear of falling.

Table 6-1 Events reported by participants in the previous 6 months (N=568).

Self-reported events	%
Slip/trip/stumble	32
Fall to the ground	19.5
Injury as a result of fall	12.5
Imbalance/dizziness	38
Medical attention for injury from fall	12
Injury from accidents	14
Broken bone	5.5

The sub-study was particularly useful for collecting detailed data on the women's home environment and the prevalence of home hazards that may lead to increased risk of falls. The home hazards were measured using a modified version of the Home F.A.S.T instrument that had been validated for use as a self-report measure. For scoring purposes, the self-report measure is converted to equivalent Home F.A.S.T. hazard items, and the prevalence of these hazards among women in the sub-study is shown in Table 6-2.

Table 6-2 Equivalent HOME F.A.S.T. endorsement rates (N=568).

HOME F.A.S.T. (self-report) items	Hazard present %
Cluttered walkways	41
Floor coverings in poor condition	4
Slippery floors	78
Loose mats	44
Unsafe bed transfers	20
Unsafe chair transfers	64
Poor lighting	21
Inaccessible bedside light	32
Outdoor path not well lit	43
Unsafe toilet transfers	77
Unsafe bath transfers	5
Difficulty using shower recess	32
No grab rail in shower	46
No slip-resistant mat	59
Toilet not in close proximity to bed	15
Difficulty reaching in the kitchen	63
Difficulty carrying meals	13
No indoor step rails	14
No outdoor step rails	13
Unsafe use of steps	19
Unclear stair edges	14
Difficulty with entrance door	38
Unsafe paths around the house	37
Unsafe shoes	48
Hazardous care of pets	22

Source: Afsoon Hassani Mehraban. An application of the International Classification of Functioning, Disability and Health for understanding falls risks among older community-dwelling women in Australia. PhD Thesis. The University of Newcastle, NSW, Australia.

No home was hazard free and a minimum of two home hazards were reported by participants in this study. Out of 25 possible hazards, nine hazards were present in 50% of the sample, and the mean number of hazards was 9.39 (SD=3.15, range=2-23). The question is: what is the critical number of hazards before they lead to falls?

The data suggested that the difference between fallers and non fallers, and those who tripped and those who did not, amounted to a mean of 1–2 HOME F.A.S.T. items (score of 9.1 home hazards for non-fallers and 10.5 for fallers). This difference was statistically significant, but whether or not the difference could be regarded as clinically significant is worthy of further investigation.

At Survey 4, 20% of the sub-study participants reported that they had experienced a fall in the previous six months and more than half the respondents stated they were afraid that they might fall and hurt themselves in the next year. In logistic regression models, falls were predicted by a large number of factors that had been measured in previous ALSWH surveys. Using a step-wise approach, the ICF framework was applied to identify those factors that were predictive of falls in multivariable models. In this process, a sub-model was developed for each ICF domain (including general health, body function, personal factors, activity and participation and environmental factors). This approach revealed that some factors from all domains of the ICF framework were associated with falls.

Results of the final composite model are shown in Table 6-3.

Table 6-3 ICF domains and risk factors associated with falls.

ICF domain/ Risk Factor	Odds Ratio (95% CI)
Health conditions	
Diabetes	0.14 (0.04-0.55)
Low iron level	2.00 (1.03-3.91)
Cataract	2.06 (1.19-3.55)
Body function	
High blood pressure medication	1.71 (1.10–2.88)
Environment	
HOME F.A.S.T. score	1.11 (1.02 – 1.20)
General Health	
Major illness/injury in last three years	2.91 (1.45-5.84)
Most time spent in bed/chair because of ill health	1.99 (1.14-3.49)
Activity and participation	
Lambeth disability score	1.09 (1.01-1.17)

This analysis was the first to assess and demonstrate the appropriateness of the ICF as a model for understanding risk of falls. The project also collected a large amount of information on environmental hazards associated with falls risk in and around the homes of older women. Common hazards included unsecured mats, shiny floors, inaccessible baths and showers, high cupboards, steps without rails, and unsuitable chairs and bed heights.

6.5.2. Association between falls and physical activity

Physical activity is central to most programs designed to reduce falls risk, and may work through improvement of strength and balance and through other physiological and psychological pathways (Gillespie et al., 2006; Latham et al., 2003; Sherrington et al., 2004). However, the role of physical activity in reducing falls risk remains controversial (Karlsson, 2004). There is concern that physical activity may increase falls risk in vulnerable older people (Faber et al., 2006), and it has been reported that older people who engage in vigorous-intensity physical activity have a lower falls rate but a higher risk of injuring themselves if they fall (Speechley & Tinetti, 1991). Here we present information on the relationships between physical activity and risks of falls and fractured bones among women in the 1921-26 cohort of ALSWH.

Table 6-4 presents levels of physical activity according to women's reports of falls and fall-related injury at Survey 2 in 1999. Most respondents (54%) engaged in very low to low physical activity levels that were below Australian and USA recommendations (Australian Government Department of Health and Aged Care, 1999; US Department of Health and Human Services, 1996)

Table 6-4 Physical activity levels among women who reported “no serious fall with injury in the previous year” in 1996 (Overall), and of these women, those who reported a fall to the ground, an injury from a fall, or a fractured bone in 1999.

Variables	Overall %	Had fall to the ground %	Injured from fall %	Fractured bone %
Physical activity				
None/very low	23.6	27.0	25.5	25.4
Low	30.4	30.3	29.4	26.1
Moderate	32.8	31.3	32.8	35.0
High	9.3	8.4	8.2	9.4
Very high	3.9	2.9	4.0	4.1

Source: Heesch et al. (2008). *Journal of Epidemiology and Community Health*.

Note: this table only includes data for women who responded to Survey 2 and who had not reported a fall on Survey 1.

Further statistical modelling of the association between physical activity levels reported in 1996 and falls reported in 1999 and in 2001 showed that respondents in the moderate to very high physical activity categories had lower odds of having a fall in 1999 than those in the none/very low physical activity category, and respondents in the very high category had lower odds of having a fall in 2001 (see Table 6-5). Physical activity levels in 1996 were not associated with reports of injury but very high levels of physical activity were associated with reduced odds of reporting a fracture in 2001.

Table 6-5 Association between physical activity in 1996 and reporting in 1999 and 2001 a fall to the ground within the previous 12 months.

Variable	Fall to the ground reported 1999	Fall to the ground reported 2001
	Odds ratio (95% CI)*	
Physical activity:		
None/very low	1.00	1.00
Low	0.88 (0.75-1.03)	0.89 (0.75-1.07)
Moderate	0.85 (0.73-0.99)	0.92 (0.77-1.11)
High	0.82 (0.65-1.03)	0.80 (0.62-1.04)
Very high	0.67 (0.47-0.95)	0.64 (0.43-0.96)

Source: adapted from Heesch et al. (2008). *Journal of Epidemiology and Community Health*.

Odds ratios and 95% confidence intervals (CI) are adjusted for area of residence to account for oversampling of women from rural and remote areas.

*Odds ratios and 95% CIs also adjusted for country of birth, leaking urine, number of stressful life events, number of chronic conditions, eyesight problems, and elder vulnerability score.

Older women who reported a very high level of physical activity had decreased odds of reporting a fall both 3 and 6 years later compared with women reporting no or very low levels of physical activity. At the 3-year follow-up, the odds for women in the very high physical activity category were reduced by 33% and at the 6-year follow-up, by 36%. We also found that the women reporting a moderate level of physical activity had a 15% reduced risk of reporting a fall to the ground 3 years later. This reduction in falls risk is similar in magnitude to that found for interventions developed to reduce falls risk (18%) by tailoring strategies based on individuals' personal risk assessment profiles (Chang et al., 2004).

In the ALSWH physical activity was not associated with having an injury as a result of a fall, however some other studies indicate that both high and low levels of physical activity put older adults at high risk of falls, (Karlsson, 2004; Speechley & Tinetti, 1991; Gregg et al., 2000). Given the conflicting results, more investigation of these associations is needed.

Our analyses indicated that women in the high/very high physical activity categories had 47% decreased odds of reporting a fractured bone 6 years later compared with those in the none/very low physical activity category. As in our study, Albrand et al. (2003) found in their prospective cohort study that older women who were moderately to vigorously active had decreased odds of fragility fractures compared with sedentary and lightly active women.

6.6. Smoking in older women

The purpose of this section is to examine the effects of smoking on the health of older women. Smoking has been linked to a number of cardiovascular and respiratory diseases such as chronic obstructive pulmonary disease, lung cancer and asthma. There are dose-response relationships between these diseases and cigarette consumption. For example, it has been shown in many studies that lung cancer risk increases with the increasing amount of cigarettes smoked daily, as well as with increased duration of smoking (Akiba, 1994; Doll & Peto, 1978; Freund et al., 1993).

Recent studies have provided contradictory evidence about the susceptibility of women to the effects of smoking. Some have suggested that lung cancer risk is higher in women than men at every level of smoking (Shriver, 2006), while others have concluded that there are no differences in the carcinogenic effects of smoking between women and men (Freedman, 2008).

At Survey 1, women were asked whether they currently smoked and if so how many cigarettes they smoked per day, and if they had ever smoked but did not do so currently, when they had stopped smoking.

6.6.1. Smoking and death

There were 11,686 women for whom we had sufficient data about smoking at Survey 1 to be able to classify their smoking status and for whom we were also able to ascertain their survival at October 2006 (when the most recent cause of death data were available). The numbers of women in each smoking category are shown in Table 6-6 together with the proportion of deaths (from any cause) that had occurred in the group. The corresponding survival curves (Kaplan Meier estimates) are shown in Figure 6-7 and Figure 6-8.

Table 6-6 Numbers of women classified by smoking status (current quantity and time since stopping) at survey 1 and proportion alive or dead by October 2006.

Smoking at Survey 1	Alive (%)	Dead (%)	Total (number)
Current quantity			
Never smoked	81.1	18.9	7303
Ex-smoker	75.2	24.8	3486
1-14 cigs per day	67.4	32.6	435
15-24 cigs per day	61.6	38.4	281
25 or more cigs per day	56.9	43.1	181
Time since quitting			
Never smoked	81.1	18.9	7303
Quit more than 20 years ago	79.0	21.0	1325
Quit 11-20 years ago	75.4	24.6	1101
Quit 6-10 years ago	71.6	28.4	517
Quit 0-5 years ago	69.7	30.3	522
Current smoker	63.4	36.6	908

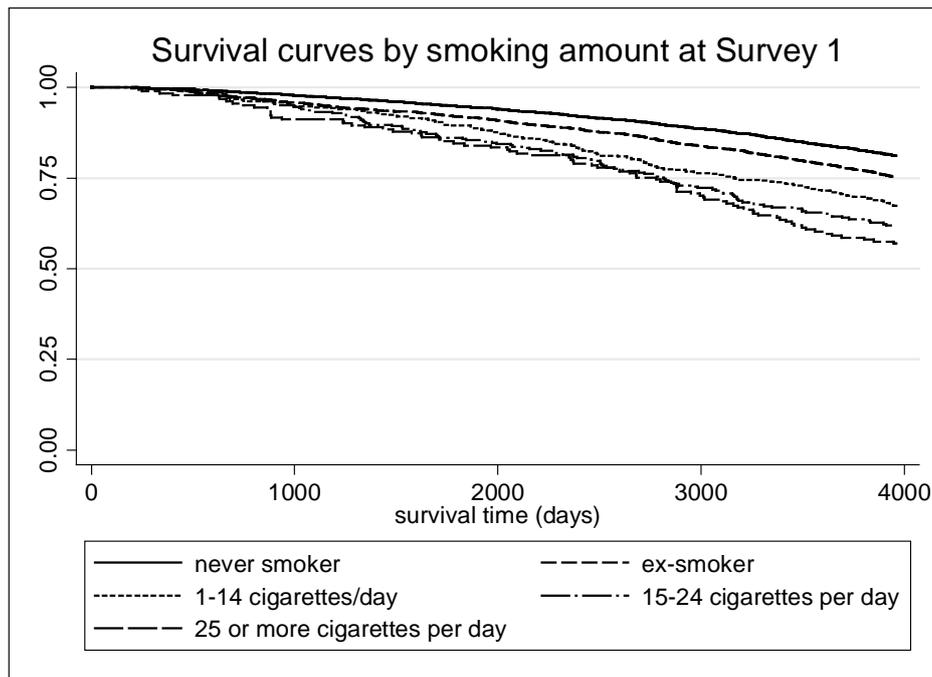


Figure 6-7 Survival curves (Kaplan Meier estimates) for women in the older ALSWH cohort, classified by quantity smoked at Survey 1.

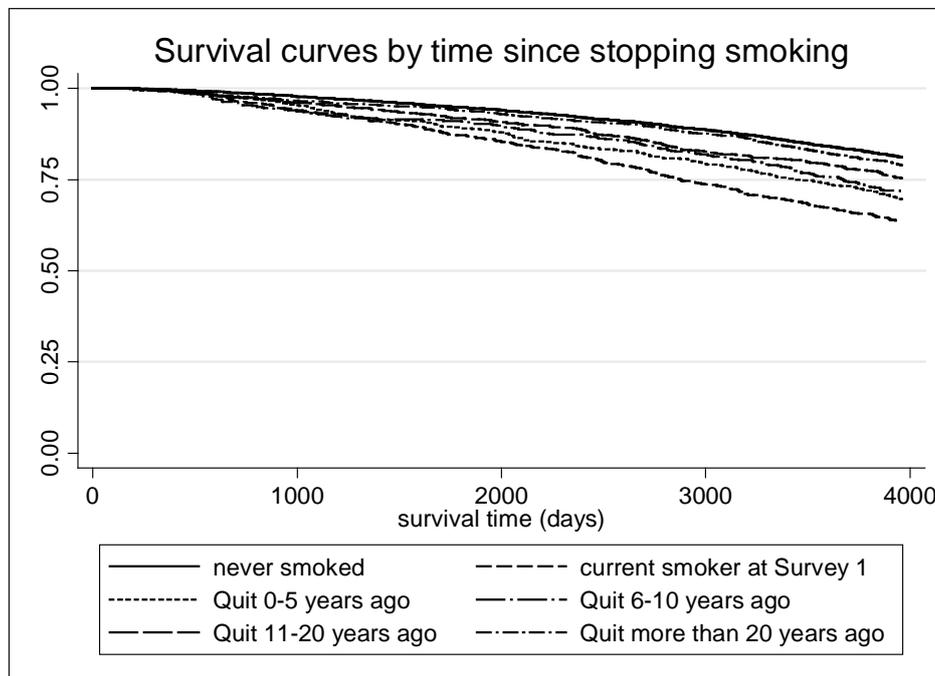


Figure 6-8 Survival curves (Kaplan Meier estimates) for women in the older ALSWH cohort, classified by time since stopping smoking.

These data show that the substantial risk of death increased with amount smoked and decreased with time since quitting although even women who quit smoking more than 20 years ago were at increased risk of death compared to women who never smoked. All these effects were statistically significant.

6.6.2. Discussion

While women generally survive longer than men, part of the underlying reason may be that the pattern of smoking among women differs from that of men. Surveys of smoking habits have indicated that historically, smoking has been significantly less prevalent among females (Staetsky, 2009).

The data from the ALSWH show the risks associated with smoking remained even in this group of older women who were already aged 70-75 when the study started. The implications for the health system are that the adverse effects of smoking on health last for decades. Smoking related disease will continue to impact on the population and health services for years to come – ‘the long shadow of smoking’.

Nevertheless the data also show that even for older women who reported quitting less than 5 years before Survey 1 the risk of death was lower. So the preventive health message is ‘it’s never too late to quit’.

6.7. Alcohol and older women

Women, and particularly older women, are more susceptible to the impact of alcohol consumption than men. For instance, there is a stronger association between alcohol use and risk of injury for women than for men, and there appears to be no threshold effect (Stockwell et al., 2002). Older people also have different biological reactions to alcohol, with a smaller volume of distribution due to reduced lean body mass, reduced hepatic metabolism, potential for interaction with medicines, and a greater susceptibility to falls and injury (Ticehurst, 1990, Atkinson, 1987). Alcohol use has been reported in approximately 10% of patients aged 65 years and over who present to emergency departments (Bell et al., 2000). Alcohol is estimated to be a causal factor for cancers (Corrao et al., 2004) and has been implicated in many other problems of ageing, including dementia (Adams, 1999) and cataract (Cumming & Mitchell, 1997).

Current Australian guidelines for alcohol consumption acknowledge that there is no level of drinking alcohol that can be guaranteed to be completely 'safe' or 'no risk', and suggest drinking no more than 2 standard drinks on any day reduces the lifetime risk of harm from alcohol-related disease or injury (NHMRC, 2009). While heavy alcohol use by older people is a cause for concern, evidence of the health effects of lower levels of alcohol use by older persons remains equivocal (Fink et al., 2001), with moderate alcohol consumption associated with health benefits in a number of longitudinal studies (Doll et al., 1994, Gaziano et al., 2000). Evidence-based 'sensible' and 'dangerous' alcohol consumption limits for older women are still lacking (Wesson, 1992), with one barrier to developing evidence-based recommendations being the lack of relevant data.

The ALSWH is well placed to provide longitudinal data on health outcomes for a large cohort of older women to assess the relationship between alcohol intake and mortality and to explore the relationship between level of alcohol use and changes in physical and mental health-related quality of life.

6.7.1. Alcohol use

At Survey 1, more than one-third (35%) of the women were non-drinkers, 29% rarely drank and only 3% were in the high intake group who consumed three or more drinks per day 5-7 days of the week. There was little change in reported drinking habits over a six-year follow-up period. One quarter (26%) of the women were perpetual non-drinkers and 69% drank rarely or at low levels of intake at all of the first three surveys.

Table 6-7 Alcohol use among women aged 70-75 at Survey 1.

Category	Definition	%
Non-drinker	Never drink alcohol	35
Rare drinker	Drink rarely or less than every week	29
Low risk 1	1-2 drinks per day on 1-2 days per week	13
Low risk 2	1-2 drinks per day on 3-6 days per week	9
Low risk 3	1-2 drinks per day, every day	8
Higher than rec'd	3 or more drinks per day, 1-4 days per week	2
Risky intake	3 or more drinks per day, 5-7 days per week	3

6.7.2. Alcohol use and survival

Survival rates were lower in women who did not consume alcohol. Compared with the women in the 'low risk 2' reference category, non-drinkers were about twice as likely to die over the six years between Survey 1 and Survey 3 and women who rarely drink were about 1.6 times as likely to die. There was no significant difference in survival for women with other levels of alcohol consumption, although it should be noted that the number of older women who had high alcohol consumption was relatively small.

6.7.3. Alcohol use and health-related quality of life

Women who were non-drinkers and those who rarely drank alcohol had lower scores on the General Health and the Physical Functioning subscales of the SF-36. As well, non-drinkers scored lower on the Mental Health and the Social Functioning subscales. The covariates of smoking and having a chronic condition were associated with lower scores on all eight health-related quality of life subscales of the SF-36 after adjustment for smoking, co-morbidity, education, BMI and area of residence.

6.7.4. Discussion

A study of six year longitudinal data on alcohol consumption, survival and health related quality of life showed that older women in the ALSWH mostly maintained stable levels of alcohol consumption during the study period. In these analyses, women who did not consume alcohol or who drank rarely were more likely to die, or if they survived they had lower health related quality of life compared to women who had 1-2 drinks per day on 3-6 days per week, after adjustment for smoking, co-morbidity, education, BMI and area of residence. There were no significant differences in outcomes for women in other categories suggesting that there is no evidence against applying current alcohol consumption recommendations for women in general to women in these older age ranges. These findings are consistent with and add to previous studies involving men, and/or smaller samples of women (Thun et al., 1997, Simons et al., 2000, Fuchs et al., 1995), and the association with health-related quality of life is similar to cross-sectional studies of younger women (Van Dijk et al., 2004, Gronbaek et al., 1999).

The results of this study indicate that moderate alcohol intake in keeping with current guidelines may carry some health benefits for older women in terms of survival and quality of life. While no evidence was found for poorer outcomes associated with higher intakes, evidence from studies in younger women would suggest that maintaining the recommendation to avoid these higher consumption levels would be prudent. Among non-drinkers, there is no evidence to suggest they should take up drinking, and a common sense case-by-case approach for women with particular medical conditions and medications should still be applied.

6.8. Summary

As women reach their 70s and 80s their health may become affected by risk factors and health behaviours accumulated over their lifetimes. Some of these factors act in conflicting ways. For example, osteoporosis, low BMI, being born in Europe and using medications for both sleep and anxiety were risk factors for height loss in older women. In turn, height loss was associated with increased risk of heartburn/ indigestion and constipation, urinary incontinence and a decline in self-rated health.

Height loss can also affect BMI, as BMI will increase as height reduces. Although a high BMI is associated with chronic conditions, a healthy BMI range for older women may be slightly higher than that recommended for younger adults. For example, hospital admissions were lowest for women with BMI 22 to 24 kg/m², and mortality rates were lowest for women with BMI 25 to 27 kg/m².

Falls are another risk affecting women at older ages, and are associated with common hazards around the home. These hazards include unsecured mats, shiny floors and poor bathroom design. Older women have an average around 9 to 10 potential falls hazards around their homes. Falls and fractures may be prevented through moderate to high levels of physical activity. However, few women in the 1921-26 cohort engaged in sufficiently high levels of physical activity to prevent falls and fractures.

Smoking is a major risk factor at all ages. The impact of smoking on women in ALSWH was seen in the earlier mortality for smokers compared with non-smokers in the study. Mortality rates decreased after quitting smoking, however even women who quit smoking more than 20 years ago had an increased mortality rate compared with women who never smoked.

Moderate alcohol intake in keeping with current guidelines may carry some health benefits for older women in terms of survival and quality of life. Around one third of women in the 1921-26 cohort reported regularly drinking alcohol, and most of these women drank 1 or 2 drinks per day on some or most days of the week. Survival rates and health related quality of life were lowest among women who did not drink and women who rarely drink alcohol. There were no significant differences in outcomes for women in other categories of alcohol consumption providing no evidence against applying current alcohol consumption recommendations to women in these older age ranges.

The preventive implications of these findings for older women are broadly in line with those for all other sectors of the population: for optimal health avoid being overweight or obese, do not smoke, use alcohol in moderation, undertake regular physical activity, and avoid household hazards. The difference for older women is that the opportunities for change may be reduced. For example, arthritis, osteoporosis and other chronic conditions may limit their ability to exercise. Additionally, while some changes may produce short term health benefits (e.g., quitting smoking) for many risk factors, evidence about time lags between behaviour change and risk reductions is weak. "Lifetime prevention is better than cure".

6.9. References

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7. Social inclusion and the health of older women

7.1. Key Findings

Social support

- Having a larger social network was associated with
 - being a widow
 - being born in Australia or another English speaking country
 - reporting the major decline in the health of a close family member or friend
 - having adequate mobility (not limited in walking 100 metres)
 - not having a major personal illness; and
 - experiencing better mental health.
- Greater satisfaction with the quality of social interactions was associated with
 - having a partner or being widowed compared with being separated, divorced or never married
 - being born in Australia or another English speaking country
 - not moving house or experiencing a decrease in income recently
 - not being limited in mobility, hearing, eye sight, incontinence, or recent personal illness
 - having better mental health.
- Network size decreased over time, but many of the factors identified as important at Survey 1 remained significantly associated with larger networks.
- Women with partners reported significantly more emotional and instrumental support from their children/spouse/relatives whereas women without partners reported larger network size and higher levels of instrumental support from friends.

Widowed women

- In the first 12 months following the death of their spouse, widows scored lower on SF-36 physical and mental health-related quality of life measures compared with women of the same age who were still married.
- In contrast, women who had been widowed for 12 months or more had scores not significantly different to those of married women.

Women driving themselves

Driving and other forms of transport are crucial for maintaining social connectedness.

- At Survey 3 (when the women were aged 76-81) driving themselves was their main form of transport, especially for women in rural and remote areas.
- Being driven by someone else was the next most common form of transport.
- Even in urban areas few women used public transport.

- While the proportion of drivers decreased slightly by Survey 4, few women who stopped driving used public transport.
- Women who stopped driving between Survey 3 and Survey 4 were more likely to have reported greater use of medications, limited mobility, stroke, arthritis or poorer vision at Survey 3 than those who continued to drive.
- Women who stopped driving subsequently reported loss of independence, considerable restrictions on their social activities and worse self-rated health.

Volunteering

- Among women who completed Survey 4 in 2005, 25% reported they had participated in voluntary activities.
- When women's responses were compared across Surveys 1-4, 16% had reported volunteering on two or more surveys, 8% reported participation in volunteering for the first time at Survey 4, 15% reported volunteering on some surveys and not others, and 35% had never reported volunteering on any survey. The remaining women did not complete all surveys.
- Volunteering was associated with higher quality of life scores and higher levels of social support.
- Women were more likely to continue volunteering over time if they lived in a rural area, had indicators of higher socioeconomic status, and better physical and mental health.

Elder abuse

- At Survey 1 the prevalence of indicators of potential elder abuse were: vulnerability (7.5%), coercion (6.4%), dependence (17.5%) and feeling dejected (21.6%).
- Women who reported any of these characteristics had less education and difficulty managing on their income.
- Widows and women with smaller social networks were more likely to feel dejected.
- Women who reported indicators of elder abuse also reported poorer mental health and more chronic conditions and were more likely to have died during the study period.
- While the data show clear associations between indicators of potential elder abuse and poorer health, the analyses are not adequate to distinguish between direct causation and other factors, such as lower socio-economic status, that may be associated with both elder abuse and poorer health.

7.2. Introduction

This section looks at a number of aspects of social inclusion and how they may impact on women's health and well-being, and their use of health services. It covers various dimensions of social support; the role of transport, especially women's ability to drive themselves; volunteering; and the extent to which some older women experience elder abuse.

7.3. Social networks and support

7.3.1. Social support in older women: cross sectional analysis

It is important to examine social support in older people because they are at risk of declining social support networks due to the death of friends, retirement, declines in physical health and decreased mobility. Social support has an important role in maintaining good health and well being.

However, there are ongoing discussions about how best to ascertain a person's social support. Is social support best reflected by its size (for example, how many people are in a person's social network), or is the quality of a person's social interactions (for example, how satisfied people are with their social interactions) more important?

Additionally, the relationship between mental health and social networks is reciprocal, in that decreases in social network support can result in declines in mental health which may result in further reductions in social connections as affected people withdraw from their communities.

Social support has been measured in the ALSWH using a variety of instruments. Data from Survey 1 of the 1921-26 cohort are shown in Table 7-1. The main factors found to be associated with greater size of social network (i.e. network score) were:

- being a widow
- being born in Australia or another English speaking country
- reporting the major decline in the health of a close family member or friend
- having adequate mobility (not limited in walking 100 metres)
- not having a major personal illness; and
- experiencing better mental health.

Many of the positive factors (e.g., being mobile and not being ill) certainly enhance social networks. However, being widowed was also associated with larger social networks, as social networks are likely to increase in response to the women's increased need for support and assistance. This finding also suggests that women are benefiting from the responsiveness of the social networks they have put into place. However, individuals with poorer mental health have smaller social networks. This may reflect increased resistance to approaches from within their network, or an inability to effectively engage with their networks.

The analyses also showed greater satisfaction with the quality of social interactions to be associated with:

- having a partner or being widowed compared with being separated, divorced or never married
- being born in Australia or another English speaking country
- not moving house or experiencing a decrease in income recently
- not being limited in mobility, hearing, eye sight, incontinence, or recent personal illness
- having better mental health.

Table 7-1 Network and Satisfaction scores at Survey 1 for various baseline characteristics: mean and 95% confidence interval for each level and p-value for variable.

Characteristic	n	Network Score	Satisfaction Score
Marital Status*			
Married/DeFacto	3753	8.79 (8.74, 8.84)	16.98 (16.93, 17.03)
Separated/Divorced/Never Married	550	8.82 (8.68, 8.96)	16.48 (16.29, 16.66)
Widowed in the past year	184	9.20 (8.97, 9.43)	16.81 (16.51, 17.11)
Widowed more than 1 year ago	1861	9.25 (9.18, 9.32)	16.91 (16.83, 16.99)
		<0.0001	<0.0001
Moved house			
Yes	379	8.74 (8.57, 8.92)	16.47 (16.25, 16.69)
No	5994	8.95 (8.91, 8.99)	16.94 (16.90, 16.98)
		<i>0.016</i>	<0.0001
Country of birth			
Australian born	5006	9.03 (8.99, 9.08)	16.97 (16.92, 17.02)
Other English speaking	870	8.76 (8.64, 8.87)	16.82 (16.70, 16.94)
Europe	397	8.25 (8.08, 8.41)	16.50 (16.29, 16.72)
Asia	64	8.34 (7.88, 8.81)	16.41 (15.93, 16.89)
Other	36	8.28 (7.76, 8.80)	16.72 (16.15, 17.30)
		<0.0001	<0.0001
Decreased income in past 12 months			
Yes	1190	8.96 (8.87, 9.06)	16.69 (16.58, 16.81)
No	5183	8.93 (8.89, 8.97)	16.96 (16.92, 17.01)
		<i>0.54</i>	<0.0001
Major decline in health of close family member or friend in past 12 months (not spouse)			
Yes	1882	9.09 (9.02, 9.16)	16.82 (16.74, 16.90)
No	4491	8.87 (8.82, 8.92)	16.95 (16.90, 17.00)
		<0.0001	<i>0.006</i>
Limited in walking 100m			
Yes	1098	8.62 (8.53, 8.72)	16.48 (16.35, 16.61)
No	5275	9.00 (8.96, 9.04)	17.00 (16.96, 17.05)
		<0.0001	<0.0001
Hearing problems in past 12 months			
Yes	2276	8.91 (8.85, 8.98)	16.74 (16.66, 16.81)
No	4097	8.95 (8.90, 9.00)	17.01 (16.96, 17.06)
		<i>0.42</i>	<0.0001

Characteristic	n	Network Score	Satisfaction Score
Sight problems in past 12 months			
Yes	4139	8.90 (8.85, 8.95)	16.80 (16.74, 16.86)
No	2234	9.01 (8.94, 9.07)	17.12 (17.06, 17.19)
		<i>0.01</i>	<0.0001
Incontinence			
Yes	2127	8.86 (8.79, 8.93)	16.74 (16.66, 16.82)
No	4246	8.97 (8.92, 9.02)	17.00 (16.95, 17.05)
		<i>0.01</i>	<0.0001
Major personal illness			
Yes	737	8.77 (8.65, 8.89)	16.58 (16.43, 16.73)
No	5636	8.96 (8.92, 9.00)	16.96 (16.91, 17.00)
		0.003	<0.0001
Mental health score			
≥53	5834	9.02 (8.98, 9.06)	17.06 (17.02, 17.10)
< 53	539	8.06 (7.91, 8.20)	15.34 (15.11, 15.58)
		<0.0001	<0.0001

* 25 women had missing marital status at Survey 1, but marital transition status could be determined

Adapted from: Pachana et al., *Age and Ageing* 2008.

The results of this cross-sectional analysis provided insights into the factors associated with social network size and satisfaction with social interactions as measured at one survey time point. Whether these associations remain the same over time is examined in the next section.

7.3.2. Social support in the older cohort: longitudinal analysis

It has been suggested that social networks decline over time as people selectively maintain relationships that maximise emotional support (Carstensen, 1991). However, other research suggests that network size remains relatively constant over the lifespan until late in life (Antonucci, 2001) at which time, natural attrition reduces the number of network participants (Lang, 2001), and relationships of longevity and intimacy are not easily replaced. In the previous section we showed a number of factors associated with size and satisfaction with social networks as measured at a single survey time point. These were all factors that may change over time. Other factors may also be important. For example, for many older adults ageing occurs concomitantly with the need to care for a frail or ailing spouse and this is particularly true for older women (Lee, 2002). Adopting a caregiver role, women may subsequently reduce their social activities to concentrate more of their emotional and physical energy on the person they care for, often their partner. After a period of caring which may last for many years, the distress of bereavement can elicit supportive behaviour from friends and family, thus increasing the size of social networks (Scott et al., 2007).

Using data from successive surveys we investigated factors that were significantly associated with changes in the size of the women's social networks. The analyses shown in Table 7-2 were based on data from Survey 2 (1999) when the women were aged 73-78, Survey 3 (2002, aged 76-81) and Survey 4 (2005, aged 79-84). Network size decreased over time (Survey 2-4 effect) and many of the factors identified as important at Survey 1 remained significantly associated with larger networks (i.e., positive regression coefficients). These were: having better mental health, being widowed or separated, experiencing death or decline in the health of a friend or family member, not being limited in walking and being born in Australia. Smaller networks (i.e., negative regression coefficients) were associated with being born in another country (including English speaking countries), having sight problems and moving house.

Table 7-2 Regression coefficients for factors associated with network size from longitudinal model using all available data.

Effect	Regression coefficient	95% Confidence Interval	P- value
Intercept	7.28	(7.03, 7.54)	<.0001
Survey (2-4)	-0.11	(-0.13, -0.09)	<.0001
Mental Health	0.02	(0.02, 0.02)	<.0001
Marital Status			
Divorced	0.02	(-0.12, 0.16)	<.0001
Separated	0.30	(0.09, 0.51)	
Single	0.16	(-0.01, 0.32)	
Widowed	0.42	(0.37, 0.47)	
Married/Partnered ^a	0.00		
Decline in health of friend or family member			
Yes	0.12	(0.08, 0.17)	<.0001
No ^a	0.00		
Death of friend or family member			
Yes	0.09	(0.05, 0.13)	<.0001
No ^a	0.00		
Limited in walking 100m			
Limited a little	0.12	(0.05, 0.20)	<.0001
Not limited	0.36	(0.28, 0.43)	
Limited a lot ^a	0.00		
Managing on income			
Difficult always	0.01	(-0.22, 0.24)	0.0006
Difficult sometimes	0.15	(-0.08, 0.37)	
Not too bad	0.19	(-0.04, 0.41)	
Easy	0.22	(-0.01, 0.44)	
Impossible ^a	0.00		

Effect	Regression coefficient	95% Confidence Interval	P- value
Country of birth			
Asia	-0.47	(-0.75, -0.19)	<.0001
Europe	-0.51	(-0.62, -0.40)	
Other	-0.50	(-0.85, -0.16)	
Other English speaking	-0.18	(-0.26, -0.10)	
Australia	0.00		
Sight problems			
Yes	-0.10	(-0.15, -0.05)	0.0003
No ^a	0.00		
Moved house			
Yes	-0.11	(-0.17, -0.06)	<.0001
No ^a	0.00		

^a Effects for categorical variables are given as differences from the reference category.

Adapted from: Pachana et al., *Age and Ageing* 2008.

7.3.3. Comments from the women about social support

To help contextualise the quantitative results, comments from the women that related to the factors that were significantly associated with the size of the women's social networks over time are included. These comments were drawn from Survey 4 and were based on the final page of the questionnaires sent to the women which was left blank and headed 'Have we missed anything? If you have anything else you would like to tell us, please write on the lines below.'

Network size

The quantitative analysis showed that the size of the women's networks declined from 1999 to 2005. Although the decline was statistically significant, overall it was not substantial. Many of the women in this study reported a decline in social network size because of the increasing loss of close ties through death and ill health and this is consistent with findings reported in previous research (Lang, 2001). As one woman whose network size had reduced considerably commented:

In the last two or three years most of my good long term friends, male and female, have passed away. I now only have three or four and some don't drive or go out much. At 81 these gaps are hard to fill and new friends don't happen along.

Mental health

The statistical analysis showed that better mental health was associated with larger social networks over time for these women. Individuals with poor psychological functioning may be unable to access their networks effectively, or may in fact be resistant to approaches from within their network, particularly if the individual is withdrawing socially due to depression, for example. This is consistent with research suggesting that people with depression may repel social support from existing networks (Pachana et al., 2008). A number of women commented that although they were not particularly happy at the changes wrought by time, they maintained a positive outlook and just got on and 'made the best of it'.

Depression or loneliness were cited by some of the women as being the reason they had few social contacts, as the following quote illustrates:

I have no support like many old people. I think loneliness is the biggest problem for old people which is (likely to lead to) depression.

Although the losses that are concomitant with late adulthood may lead to depression, this is by no means a certain progression. Some women, while acknowledging their grief and sadness, find that loss is also associated with an increase in social support, as members of their social network rally to provide emotional and instrumental support.

Loss and bereavement

Widowhood and bereavement appear to be a time in which women garner greater social support from their networks. The comments from the women reinforce the impact of bereavement and provide evidence for the theory that emotional release that occurs after the physical and emotional burden of caring for a loved one is removed. The illness or death of a loved family member or friend also increased social support, although not to the extent engendered by widowhood. It may be that the women's networks responded to a time of emotional need, providing a level of support consistent with the experienced loss.

The major change in my life since you last surveyed me is the long illness and death of my husband. We had a long time to think and talk about it together, but it is worse than I imagined. I am fortunate to have more personal and social resources than many people of my age and I get comfort from them as I always have. I don't think I am unhappy but I find his absence more difficult than I have words for. I do believe I am managing on the whole but it is tougher than I was able to imagine.

Many women explained how the death of a beloved partner could be interpreted and experienced as a release, as illustrated by this woman's words:

My husband was ill (cancer) for a very long time and suffered so much so it was a relief to not see him suffer any more.

Access to social networks: mobility

An important aspect of social networks is that older women need to have the ability to physically access them. This factor was underscored by the decrease in network size for those women who had limited mobility. Restrictions in mobility caused by increasing frailty or ill health may lead to the relinquishment of driving licences and limit an older woman's ability to access public transport. To be able to walk, drive or easily access public transport is an essential element in maintaining membership in social groups. As these two women explained:

Can't walk without a walking stick. Won't go out on public transport.

I have slowed up and do not now go walking, especially on my own. Shopping is now left to family members and activities have been restricted.

Financial resources

The quantitative data indicated that most of the respondents had little difficulty managing on their income and this lack of financial stress was associated with more extensive social networks. A number of women made comments that indicated that emotional resources were more important than financial ones, as this woman's quote clearly illustrated:

As family grew, married, and had children I had to learn not to feel guilty about not buying grandchildren, then great grandchildren, Xmas and birthday presents. We can only give our love. Our children in turn give us sensible gifts at gift giving times that help our budget.

Immigrants

Women from countries other than Australia were likely to have smaller networks than those born in Australia, possibly reflecting the shrinking over time of the cohort of peers from their country of origin. Even women with no language barrier and who have spent the larger part of their life in Australia may find themselves isolated through circumstance: as this woman commented, some old friends have been left behind and new friends have been lost.

I have several very dear and kind lifelong friends but they all live in the UK! ... there were two special people locally but both have passed away.

Access to social networks: sight

The fading of sensory faculties, such as sight, resulted in significantly smaller social networks. Visual impairments caused problems for these women as they struggled to cope with the external world with limited visual acuity. In the words of one woman:

I am very limited in my activities on account of my eyesight.

Families and friends were supportive in providing assistance, as the following quote illustrated:

My vision impairment means that I do need help with some shopping and of course, transport, which I get from friends.

Moving house

A relatively frequent occurrence in later adulthood is relocation, either to a retirement complex or a smaller unit or home closer to family members. Although such a movement can provide some additional instrumental support, leaving behind friends of many years can be emotionally wrenching and making new friends is not always an easy process in later years:

Recently paid a deposit on a self-care retirement home for husband and myself. We really don't want to leave our home and wonderful neighbours but some of them are in a similar position and may also be moving.

I have just moved to a self-care unit in a retirement village, far from former friends and activities....it is hard to start again at 82.

These comments complement the quantitative analyses and provide detail that helps contextualise the statistical results. The women who provided the open-ended responses were a self-selected group whose responses may not represent the opinions of all participants. However, their comments are consistent with the themes identified by the quantitative analyses and with earlier research indicating that social networks in late adulthood are affected by a number of psychological and physical variables.

7.3.4. Social support in older women with, and without, partners

In the previous section, a women's marital or partnership status, in particular widowhood, was related to social support. With the death of a partner the bereaved spouse loses one of the most important sources not only of emotional, but also of social, support and must rely on other relationships for support (Ha, 2008). Although much research has examined how social support buffers the distress of spousal loss, little attention has focussed on how widowhood brings changes to different types of social support.

Social support has been categorized in a variety of ways, however instrumental and emotional social support are studied most often. Several theoretical frameworks for social support have been advanced. For example, Litwak's (1985) task-specific model of social support suggests that different sources of support (e.g., friends vs. family) typically provide different types of support (e.g., companionship vs. domestic tasks).

In this analysis we examined the association between women's marital or partnership status and

1. the types of social support (emotional, instrumental) women receive
2. the sources they receive the support from (children, spouse, relatives, friends)
3. the size of their social networks.

The data were from Survey 4 at which time the women were asked more detailed questions about their sources of social support. The results are shown in Table 7-3.

Table 7-3 Sociodemographic and social support variables for women with partners and those without partners at Survey 4.

Variable	Women with partners (n = 1718)	Women without partners (n = 2801)	Mean difference	95% CI for the mean difference
Age (in years)	80.97 (0.034)	81.29 (0.027)	-0.32	(-0.40, -0.23)
Income	0.97 (0.004)	0.95 (0.004)	0.02	(0.01, 0.03)
Social support (Emotional)				
Children/Spouse/Relatives	5.50 (0.018)	5.31 (0.018)	0.19	(0.14, 0.25)
Friends	4.91 (0.024)	4.96 (0.019)	-0.05	(-0.11, 0.01)
Social support (Instrumental)				
Children/Spouse/Relatives	4.75 (0.027)	4.35 (0.024)	0.40	(0.32, 0.47)
Friends	3.58 (0.028)	3.68 (0.022)	-0.10	(-0.17, -0.03)
Network size	8.8 (0.036)	9.09 (0.029)	-0.29	(-0.38, -0.20)

Women with partners reported significantly higher levels of emotional and instrumental support from their children/spouse/relatives. On the other hand, women without partners reported higher levels of instrumental support from friends and a larger network size.

Further analyses of these data (details not shown) showed that for older women, the presence of a partner affected the provision of emotional and instrumental support received from family and friends, as well as reducing the size of their social network. Women received less instrumental support from friends which, together with emotional support, was provided by family members, who were also able to provide assistance with extended activities of daily living.

7.4. Widowed women

Increasing numbers of women in Australia are living substantial portions of their lives as widowed independent-living women. These women experience significant life events which require differential levels of adjustment and transition beyond the immediate period of grief that follows the death of their husband. The Australian Longitudinal Study on Women's Health provides an important opportunity to explore and understand the changing needs of women as they age, and following the death of their partner.

Cross-sectional analysis of data from the 12,624 women aged 70-75 who participated in Survey 1 of the study revealed specific needs for the 35% women who had been widowed, across three major dimensions of life: health, financial, and social circumstances (Byles et al., 1999). These analyses also identified important differences between women who had been widowed for less than 12 months compared with those who had been widowed for more than 12 months. However, there were few differences between women widowed for longer than 12 months and married women of the same age.

Women in the first 12 months following the death of their spouse scored lower on SF-36 physical and mental health-related quality of life measures compared with women of the same age who were still married (see Figure 7-1). In contrast the scores for women who had been widowed for 12 months or more were not significantly different to the scores for married women.



Source: Byles et al., (1999), *Women and Health*.

Figure 7-1 SF-36 subscale scores for married women, those widowed in the previous 12 months, and those widowed longer: Survey 1.

While a reasonably high proportion of all women indicated they had difficulty managing on their income, widowed women were more likely to report this difficulty than married women regardless of the amount of time since the death of their spouse (Byles et al., 1999). Widowed women were also more likely to report stress resulting from relationships with children or other family members, than married women (adjusted OR 1.4; 95% CI: 1.1-.1.7) (Byles et al., 1999).

Many women who were widowed at Survey 1 took the opportunity to write about their lives on the final page of the questionnaire. Some women reflected on how the release from caring responsibilities had a positive effect on their emotional and physical health. A woman widowed for four years commented:

My husband had leukemia and was very ill toward the latter part of his life. I found this part of my life very stressful....My life is much better now.

And another widowed less than two years:

My husband passed away in March last year after me looking after him 24 hours a day for 10 years...I was very tired but I am getting much better now.

Many of the women described the responsibilities that confronted them in the first months following the death of their spouse as daunting and stressful (Feldman et al., 2000). Death of a loved one is a stressful event regardless of age and personal resources.

Further longitudinal qualitative and quantitative data provided by the women in subsequent surveys and sub-studies provided insight into the health and social changes made by widowed women as they re-established themselves following the death of their husband. The data also highlighted the importance of health care providers and other community services in assisting women through this major life transition, as well as the need to maintain social contact and community participation. In-depth study of 250 widowed women quantified a broad range of health and social needs within three years following the husband's death (Feldman et al., 2002). While most widows still lived alone and in their own homes, almost one-fifth of the women had moved house since being widowed for financial or social reasons. The women reported high prevalence of need for health and legal services, assistance with financial matters, and home maintenance. However, most women described themselves as "coping", some better than others.

Generally, the women felt they had maintained or increased their level of social contact and participation in activities since becoming widowed and these activities were seen to be critical to the emergence of "a new way of life". Fifty-five percent of women said they did something they really enjoyed most or every day of the week; 37% at least once a week and 5% less than once a week. The most commonly indicated activities were gardening (89%), handiwork (60%), eating out (56%) and going to meetings of clubs or groups (49%). Most women belonged to clubs or organisations, the most common being church or religious groups (39%), Legacy (28%), Returned Services League (19%) and sporting clubs (17%).

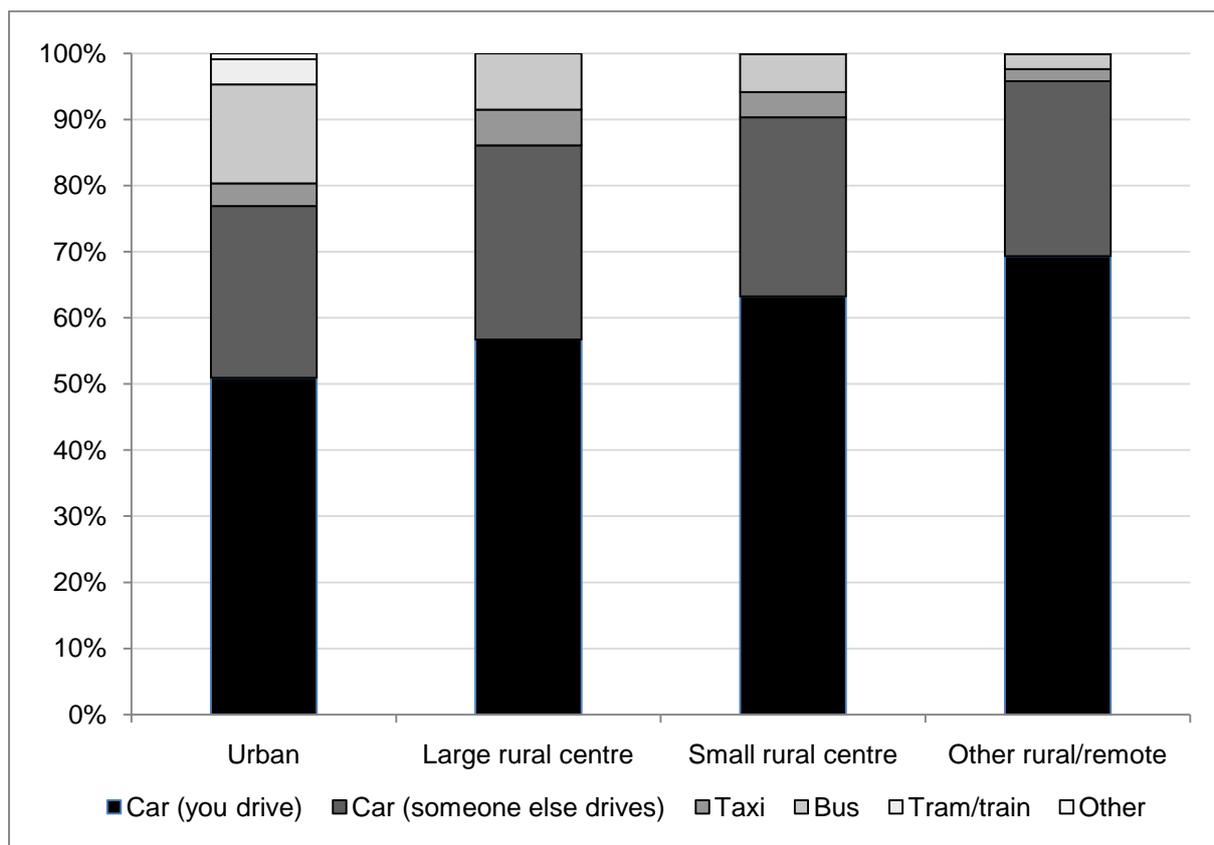
7.5. Driving and other forms of transport

Transport is a major concern for older people. For many, driving is not only a means of transport, but also a means of independence and identity. Moreover, alternative forms of transport may not be acceptable because of difficulties with physical access, availability, convenience or cost. These problems are particularly true in rural areas where subsidized public transport is less frequently available.

In this research we aimed to describe trends in the proportion of women who drive themselves as their main means of transport, identify what alternative means of transport older women adopt when they cease to drive themselves and determine the sociodemographic, health, lifestyle and social factors associated with giving up driving. Data from Surveys 3 and 4 were used for this analysis.

7.5.1. Trends in the proportion of women who drive themselves as their main means of transport and the alternative means of transport older women adopt when they cease to drive themselves

Driving was the main means of transport for most women in the 1921-26 cohort. At the time of Survey 3 when the women were aged 76-81 years, 60% of women in this cohort reported driving themselves as their main means of transport. Figure 7-2 shows how the main means of transport was strongly associated with area of residence with women in more rural and remote areas being more likely to drive themselves at Survey 3, and less likely to use public transport.



Source: Byles et al., (2007) Driving Myself: Main Forms of Transport Among Older Women in Rural and Remote Australia. Refereed paper at the 9th National Rural Health Conference, Albury, 7-10 March, 2007

Figure 7-2 Main means of transport for women aged 76-81 years (Survey 3).

Three years later, at Survey 4, 86% of these women were still driving themselves, but 10% reported they were now being driven by someone else, and a small percentage were using taxis, buses and other options as their main means of transport (see Table 7-4).

Table 7-4 Change in main means of transport of older women in Australia between Survey 3 (2002) and Survey 4 (2005): results are row percentages.

Main means of transport at Survey 3	Main means of transport at S4					
	Car (self) %	Car (other) %	Taxi %	Bus %	Tram/Train %	Other %
Car (self)	86	10	1.0	1.6	0.38	0.56
Car (other)	5.5	86	3.1	3.3	0.27	2.1
Taxi	1.2	17	72	6.0	0.00	3.6
Bus	2.0	18	7.6	68	0.87	3.5
Tram/Train	4.1	27	4.1	14	49	2.7
Other	2.6	40	13	7.8	0.00	36

Source: Source: Byles et al., (2007) Driving Myself: Main Forms of Transport Among Older Women in Rural and Remote Australia. Refereed paper at the 9th National Rural Health Conference, Albury, 7–10 March, 2007.

7.5.2. Health factors associated with cessation of driving

Women were also more likely to cease driving if they were taking five or more medications; were limited a lot in walking 100 metres; reported stroke, arthritis, or other chronic conditions; or if they had poor vision at Survey 3 – see Table 7-5. Among those who ceased driving 18% reported poor vision at Survey 3, and 9% of those who continued driving had also reported poor vision at Survey 3. Driving cessation was not associated with area of residence, however women with higher levels of education were less likely to cease driving between Survey 3 and Survey 4.

Table 7-5 Association between changes in driving and symptoms and conditions in older women in Australia at Survey 3 and changes in driving between Survey 3 and Survey 4.

Symptom/condition at Survey 3	N	Still Driving at Survey 4	Ceased Driving at Survey 4	OR(95%CI)**
		N=2909(86%)	N=474 (14%)	
N* and % reporting symptom/condition at Survey 3				
Stiff and painful joints	1952	59	64	1.2(1.1-1.5)
Back pain	1705	52	52	1.0(0.9-1.1)
Problems with one or both feet	1127	34	37	1.2(0.9-1.4)
5 or more medications	698	20	27	1.6(1.3-2.0)
Fall to the ground	501	15	17	1.1(0.9-1.5)
Limited a lot in walking 100m	155	4	11	2.9(2.0-4.2)
Hypertension	1895	55	60	1.2(1.0-1.5)
Arthritis	1759	51	59	1.4(1.1-1.7)
Stroke	172	4.5	8.4	2.1(1.4-3.0)
Heart disease	667	19	23	1.3(1.0-1.6)
Diabetes	314	8.9	12	1.3(1.0-1.9)
Poor vision	347	9	18	Not available

* Denominators (total N) vary due to different amounts of missing data for each item

** Odds of ceasing driving if experienced symptom or condition compared with odds of ceasing driving if not experiencing symptom or condition.

Bolding indicates statistical significance

There was no interaction between area of residence, driving and other variables in Table 7-5.

Source: Byles et al., (2007) Driving Myself: Main Forms of Transport Among Older Women in Rural and Remote Australia. Refereed paper at the 9th National Rural Health Conference, Albury, 7–10 March, 2007.

Cessation of driving was also associated with changes in other characteristics between Survey 3 and Survey 4 (See Table 7-6). Compared with women who continued driving, women who ceased driving as their main means of transport between surveys were more likely to show a change to worse self-rated health, to needing help with daily tasks, and they were less likely to have commenced caring for someone else. Ceasing driving was associated with improvement in vision between surveys, and women with poor hearing at Survey 4 were more likely to report ceasing driving (data not shown). There was no association between ceasing driving and change in marital status, or difficulty in managing on income.

Women who ceased driving by Survey 4 were more likely to report improvement in their rating of the availability of transport than women who continued to drive, perhaps reflecting their greater awareness of transport availability.

Table 7-6 Associations between changes in driving and transitions in other health and lifestyle factors between Survey 3 and Survey 4.

Transition	N	Still Driving at Survey 4	Ceased Driving at Survey 4	OR(95%CI)**
		N=2909(86%)	N=474 (14%)	
N* and % with change in health/lifestyle factor				
Change in Marital status	531	7.8	6.4	0.8(0.5-1.2)
Finding managing on income 'easier'	724	10	12	1.2(0.9-1.7)
Finding managing on income 'more difficult'	462	60	6.7	1.2(0.8-1.5)
Transition in self-rated health: improved health	322	9.5	10	1.1(0.8-1.5)
Transition in self-rated health: worse health	454	13	18	1.5(1.1-1.9)
Transition to needing help with daily tasks	434	3.1	16	5.9(4.1-8.1)
Commence providing care for someone else	840	16	9.7	0.6(0.4-0.8)
Cease providing care for someone else	796	15	17	1.2(0.9-1.5)
Vision improved	362	10	16	1.7(1.3-2.3)
Vision worsened	826	4.7	6.4	1.5(0.95-2.2)
Availability of public transport: improved from 'none/'a little of the time'	308	4.4	7.8	2.0(1.4-3.0)

* Denominators (total N) vary due to different amounts of missing data for each item

** Odds of ceasing driving if experienced symptom or condition compared with odds of ceasing driving if not experiencing symptom or condition.

Bolding indicates statistical significance

There was no interaction between area of residence, driving and other variables in Table 7-6.

Source: Byles et al., (2007) Driving Myself: Main Forms of Transport Among Older Women in Rural and Remote Australia. Refereed paper at the 9th National Rural Health Conference, Albury, 7–10 March, 2007

7.5.3. Social factors associated with cessation of driving

Women who ceased driving were more likely to be limited in their social and leisure activities when compared with women who continued to drive. They were also less likely to be caring for someone else either in their own home or elsewhere, less likely to have been outside their home or outside their immediate neighbourhood, and less likely to have taken part in activities such as going to movies, theatre etc, a sporting event, a restaurant, or attending a class or course.

Women who ceased driving were also more likely to report trouble getting to places at night, getting to shops and services, and getting beyond their local neighbourhood.

Table 7-7 Lifestyle factors for women who were still driving themselves and women who had ceased driving.

Lifestyle factor	N*	Still Driving at Survey 4	Ceased Driving at Survey 4	OR(95%CI)**
		N=2909 (86%)	N=474 (14%)	
N and % reporting lifestyle factor at Survey 4				
More than 5 GP visits	1956	58	66	1.4(1.1-1.8)
Specialist visits	1572	46	57	1.6(1.3-1.9)
Care for someone who lives with you	392	13	7.6	0.6(0.4-0.9)
Care for someone who lives elsewhere	769	26	11	0.4(0.3-0.5)
Trouble getting to places at night	733	23	28	1.3(1.0-1.6)
Trouble getting to shops and services	130	2.3	17	9.2(6.3-13)
Trouble getting beyond the local neighbourhood	427	12	28	3.0(2.3-3.8)
Not been beyond property or apartment building in past month	152	3.7	9.4	2.9(2.0-4.2)
Not been outside immediate neighbourhood in past month	362	9.4	19	2.5(1.9-3.3)
Not gone to movies, theatres, concerts	2019	59	71	1.8(1.4-2.2)
Not gone to a sporting event	2733	81	92	2.7(1.9-3.9)
Not eaten at a restaurant	890	26	31	1.3(1.0-1.4)
Not attended a religious service	1776	53	57	1.2(1.0-1.4)
Not attended a class course	2614	77	88	2.1(1.6-2.9)

* Denominators (total N) vary due to different amounts of missing data for each item

** Odds of ceasing driving if experienced symptom or condition compared with odds of ceasing driving if not experiencing symptom or condition.

Bolding indicates statistical significance

There was no interaction between area of residence, driving and other variables in Table 7.7.

7.5.4. Comments from women about driving and other forms of transport

These results suggest that a majority of older women will maintain driving as long as their health will allow it. Conditions such as arthritis and stroke which are associated with physical limitations were strongly associated with driving cessation. Similarly, women who had trouble walking and who had declines in their self-rated health and increases in their need for assistance with daily tasks were more likely to cease driving. These factors may be interrelated as women with arthritis and stroke are also likely to have mobility limitations and disability on activities of daily living.

Poor vision at Survey 3 was also strongly associated with driving cessation. This association with vision has been reported in other research (e.g. Anstey et al., 2006; Ross et al., 2009) and it is noted that vision accounts for 95% of driving capability (Laux & Brelsford, 1990). In their comments the women highlighted the importance of good vision for maintaining driving.

My biggest problem is my poor eyesight, because of which I have had to give up driving and rely on my husband and family members and friends.

A number of women commented on the positive effect of cataract removal in enabling them to continue or resume driving. However, it is notable that 9% of the women who continued driving had indicated they 'could not read a newspaper, even with glasses' at Survey 3. But, we do not have information about these women's distance vision.

While women in more rural and remote areas were more likely to drive themselves than urban women, there were no differences in the probability that these women would cease driving by Survey 4, and there were no significant interactions between health and lifestyle factors, driving cessation and area of residence. Women living in rural and remote areas noted that although driving is essential to their lifestyle, they could often no longer drive the long distances to get to health care and other services. Others noted the frustration and difficulty finding alternative forms of transport in smaller country towns. Mostly women who did not drive had to rely on their husbands, if they were alive and fit to drive, and/or family and friends.

The women's comments highlighted other associations between driving, health and lifestyle. Some women wrote about the interaction between their driving, their health and their husband's health. One urban woman described her need to have her cataract removed because of her need to drive herself and her ill husband. Another woman discussed her lack of social activity with her husband who had dementia

'We never go out together anymore as I will not go in the car when he is driving!!'

As in other research (Johnson, 2003), the women in our study identified driving as a source of concern. This concern is illustrated by one urban woman who said:

'I find myself a nervous driver. Should I be driving? Afraid of being housebound though. Only driving locally, avoid freeways. Never drive at night now. Using taxis for unknown destinations in case I get lost'

One rural woman described 'voluntarily' giving up her licence because of poor vision and how she 'drenched the form in tears'. Another discussed her 'real fear' that she may not be able to continue driving and the threat this would pose to 'my independence that I value'.

As another woman said:

.... while I'm still able to drive I feel I have wings.

Women who ceased driving reported greater difficulties accessing shops and services and had relatively more limited life space and activities with almost one in five women not venturing beyond their local neighbourhood. In their comments, the women also discussed the limits placed on their lives by inability to drive, lack of suitable public transport and inability to afford taxis. These comments were not limited to rural and remote areas, but were more pronounced in these areas where public transport options are limited or non-existent. As one rural woman wrote:

'We have no public transport so its legs or car we have to use.'

Ceasing driving has a significant impact on women's lives, and is a major concern for older women. Importantly, women who are no longer driving are also those who have had major deteriorations in health. So these women have lost not only their main means of transport, but ceasing driving is also a marker of decline in other capacities and an increase in need for care and assistance. There is a need for greater understanding of how we can respond to the changing needs of older women around this important life change, as well as considering the safety of other road users and members of the community.

7.6. Volunteering and older women: Psychosocial and health predictors of participation.

7.6.1. Introduction

Staying active and socially connected has been shown to have positive health benefits in later life (Corporation for National and Community Service, 2007) and one important way that older people stay active and involved in their communities is through volunteering - defined as willingly giving unpaid help in the form of time, service or skills, through an organisation or group (Australian Bureau of Statistics (ABS), 2008). Participation in volunteering generally declines with age, however significant proportions of people over 70 years continue to take part in voluntary work and older volunteers tend to volunteer more hours on average than younger volunteers (Goddard, 1994; Warburton & Cordingley, 2004; ABS, 2006).

The majority of older volunteers are women (because women are more likely to volunteer than older men and because there are more women than men at older ages) and it is estimated that over 30% of Australian women aged 55 to 85 years undertake volunteer work (ABS, 2006). In this analysis of ALSWH data from Surveys 1-4 we had two aims:

1. to explore the prevalence of volunteering and identify the sociodemographic and health-related factors associated with volunteering over time; and
2. to analyse the associations between volunteer status (continuing volunteer, intermittent volunteer, new volunteer, never a volunteer) and health-related quality of life and social support over time.

7.6.2. The prevalence of volunteering and the sociodemographic and health-related factors associated with volunteering over time

Around one in four (25%) of the women who completed Survey 4 reported that they engaged in volunteer activities. When women's responses were compared across Surveys 1 to 4, around 16% of women had reported volunteering on at least two surveys, around 8% reported participation in volunteering for the first time at Survey 4, 15% reported volunteering on some surveys but not others, and 35% never reported volunteering. Results were missing for the remainder of the participants who had died or otherwise did not provide data on these items.

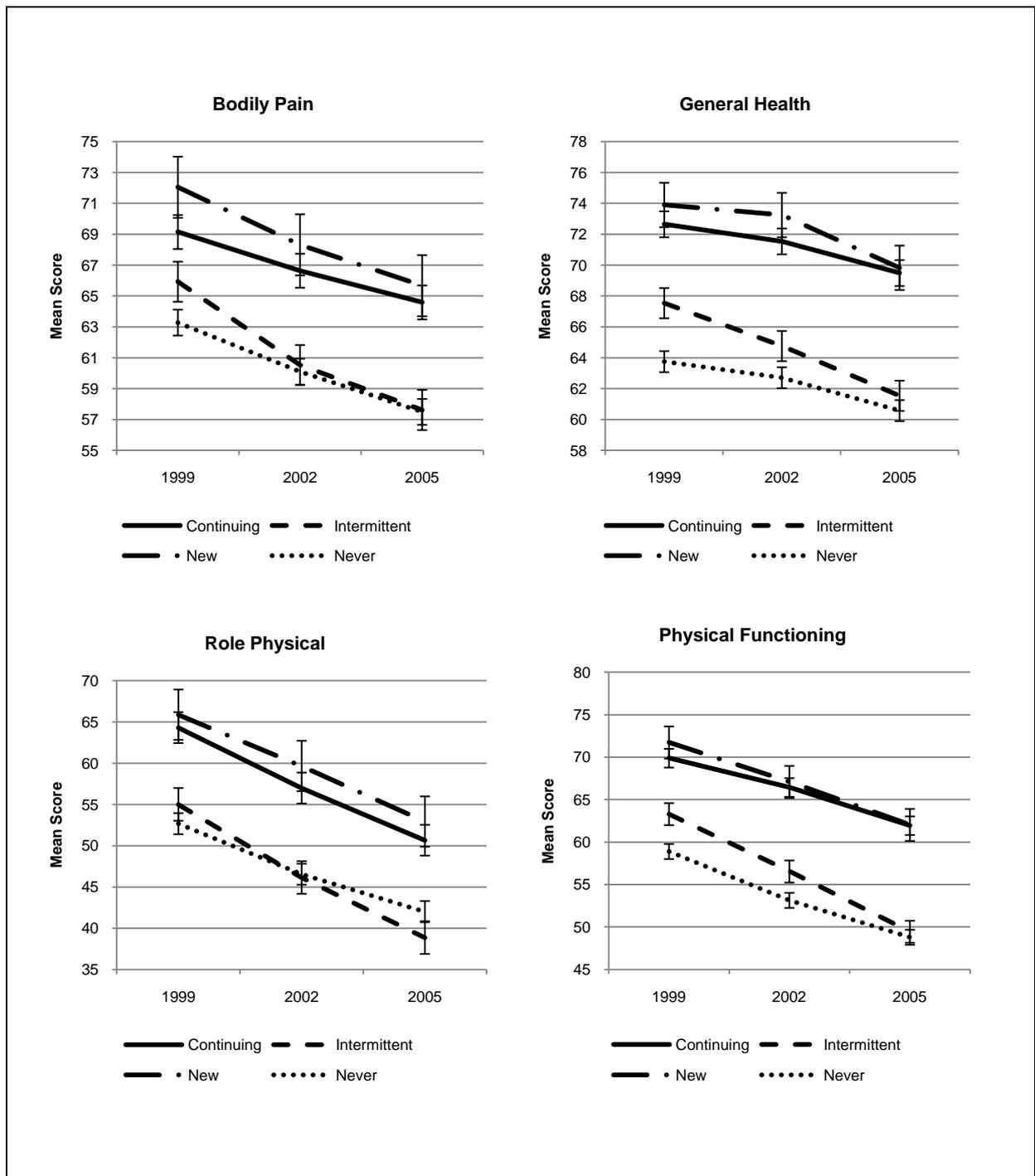
On longitudinal analysis across Surveys 2 to 4 (results not shown here), women who participated in volunteering were more likely to be living in a rural area than in urban areas, have higher education level, and speak English. They were also more likely to have private health insurance, more visits to health care professionals, and better physical and mental health related quality of life. Social factors associated with being a volunteer included living alone, using your own car as the main means of transport, and having better social support (measured by the Duke Social Support Index). The likelihood of a woman participating in volunteer activities decreased over time.

7.6.3. Associations between volunteer status (continuing volunteer, intermittent volunteer, new volunteer, never a volunteer) and health-related quality of life over time

Figure 7-3 and Figure 7-4 describe trends in quality of life scores (mean and 95% Confidence Intervals for the eight SF-36 subscales) according to women's volunteer status across three surveys, Survey 2 to Survey 4 (1999, 2002, 2005). In these Figures, women who reported undertaking volunteer work for any community or social organization 'every day' 'every week' or 'every month' on Survey 2, Survey 3 and Survey 4 were classified as Continuing volunteers; women who reported volunteering for the first time at Survey 3 and again at Survey 4 were classified as New volunteers; and other women who reported volunteering on at least one survey (but not all surveys) were called Intermittent Volunteers. Women who answered 'less than once a month' or 'never' in response to the question about volunteering on Survey 2 and 'less than once a month' or 'never' or 'missing' on Survey 3 and Survey 4 were classified as Never having been a volunteer.

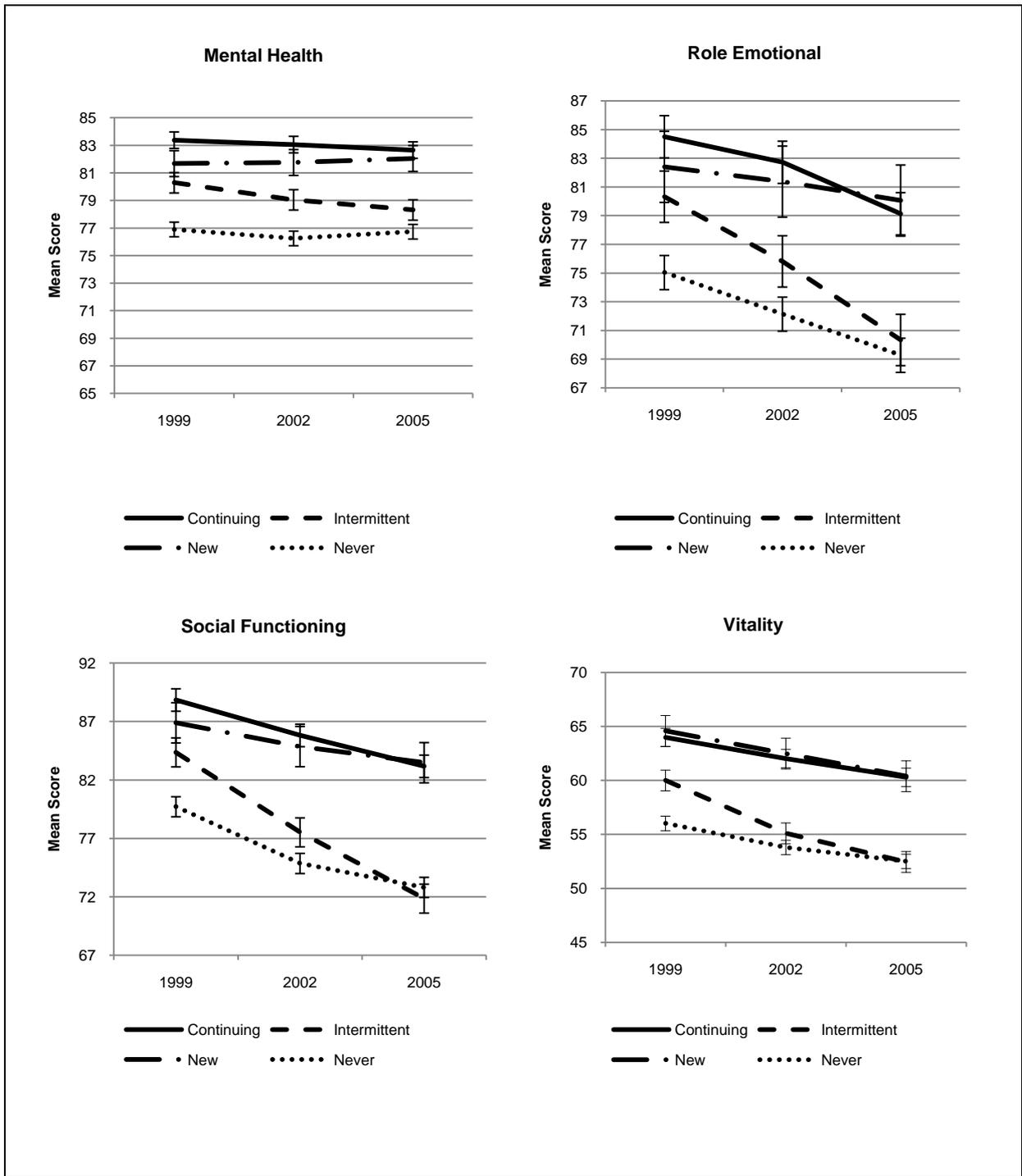
In Figure 7-3 bodily pain, general health, physical functioning and role physical subscales of SF-36 all show a similar pattern, with Continuing and New volunteers having significantly higher scores at all time points, and Intermittent volunteers starting with higher scores at Survey 2 (1999) that declined to become not significantly different to the scores for Never volunteers by Survey 4 (2005).

Figure 7-4 shows scores for mental health, role emotional, social function, and vitality subscales according to volunteer status. Mental health sub-scale scores were relatively stable across time for Continuing, New and Never volunteers, with Never volunteers having significantly poorer mental health than the other three groups (particularly Continuing and New volunteers). Intermittent volunteers started with a similar level of mental health to Continuing and New volunteers, but their scores declined between Survey 3 and Survey 4 to approach the levels of Never volunteers by Survey 4. While role emotional and social functioning scores declined for all women over time, the pattern for these subscales was otherwise similar to that for the mental health subscale, with Continuing and New volunteers having significantly higher scores than other groups at Survey 3 and Survey 4, and scores for Intermittent volunteers decreasing to approximate the scores of Never volunteers over time. The pattern for the vitality subscale was different in that Intermittent volunteers had significantly lower mean scores at Survey 2 compared to Continuing and New volunteers, then decreasing to approximate scores for the Never volunteer category.



Source: Parkinson et al., Volunteering and older people: Psychosocial and health predictors from an analysis of Australian Longitudinal Study on Women's Health data (under editorial review - *Aging and Mental Health*).

Figure 7-3 Mean scores and 95% confidence intervals for SF-36 physical functioning subscales (bodily pain, general health, role physical, physical functioning) according to volunteering status over three surveys.

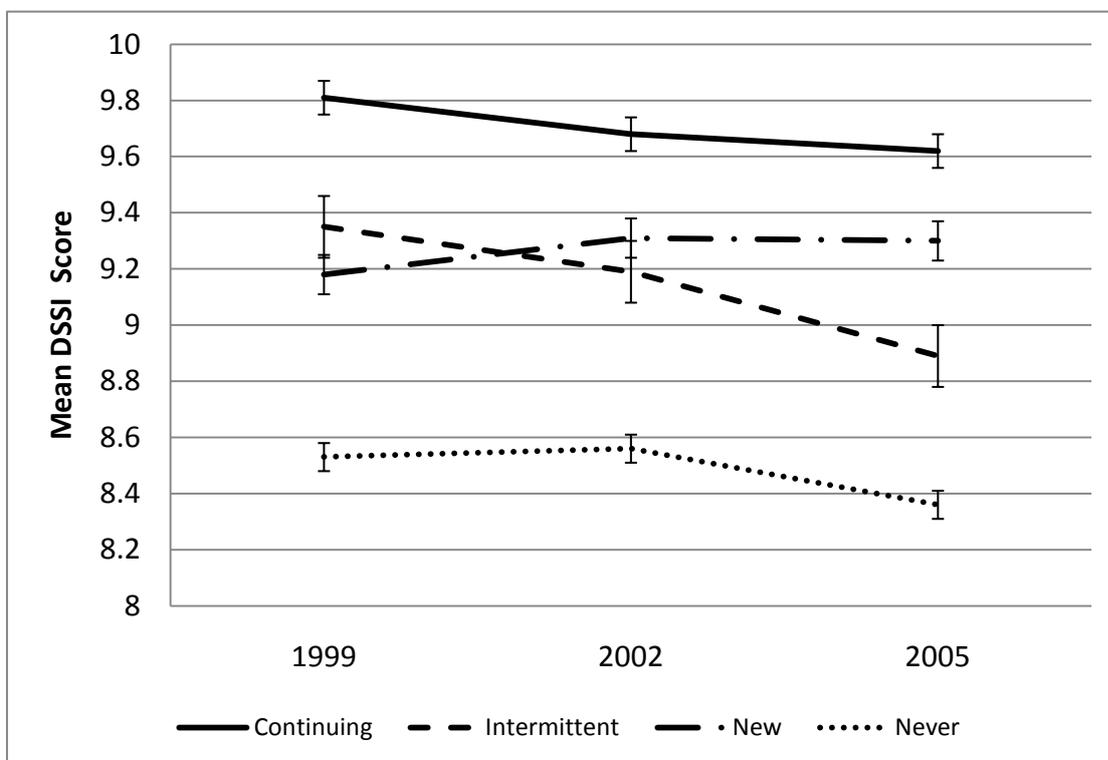


Source: Parkinson et al., Volunteering and older people: Psychosocial and health predictors from an analysis of Australian Longitudinal Study on Women's Health data (under editorial review - *Aging and Mental Health*).

Figure 7-4 Mean scores and 95% confidence intervals for SF-36 mental functioning subscales (mental health, role emotional, social function, vitality) according to volunteer status over three surveys.

7.6.4. Associations between volunteer status (continuing volunteer, intermittent volunteer, new volunteer, never a volunteer) and social support over time.

Figure 7-5 describes the relationship between the women’s level of social support and volunteer status across Surveys 3 to 4. A higher mean score on the Duke Social Support Index (DSSI) reflects higher (better) social support. Continuing volunteers had a significantly better social support (higher score) than any other group at all surveys, although the score did decrease slightly over time. While Intermittent and New volunteers were not significantly different in regards to level of social support until Survey 4, New volunteers were on an upward trajectory while Intermittent volunteers were on a downward trajectory. Women who were Never volunteers had a significantly poorer social support than any other group at all surveys, and had a significantly poorer social support at Survey 4 than at Survey 2.



Source: Parkinson et al., Volunteering and older people: Psychosocial and health predictors from an analysis of Australian Longitudinal Study on Women’s Health data (under editorial review - *Aging and Mental Health*).

Figure 7-5 Mean scores and 95% confidence intervals for social support (DSSI) according to volunteer status over three surveys.

7.7. Elder Abuse

7.7.1. Introduction

Elder abuse has been recognised as a significant problem for older people. Elder abuse can include physical abuse, psychological abuse, and exploitation or financial abuse (Aged and Community Services Australia (ACSA), 2006; Australian and New Zealand Society for Geriatric Medicine, 2003; Kurrle & Naughtin, 2008; United States National Academy of Sciences, 2003; World Health Organisation (WHO), 2002) and some definitions also include sexual abuse (ACSA, 2006; Kurrle & Naughtin, 2008; WHO, 2002).

In this research we aimed to investigate the prevalence and nature of elder abuse in the 1921-26 ALSWH cohort, determine the sociodemographic and health factors associated with elder abuse and determine the association between elder abuse and survival.

The analyses involved data from Survey 1 and mortality data up to the end of October, 2006.

7.7.2. Prevalence and nature of elder abuse

In the ALSWH, elder abuse has been measured using a 12 item self-report scale which has been developed in the US as a screening tool (Hwalek, 1996; Schofield et al., 2002; Schofield & Mishra, 2003).

Analysis of the women's responses on this self-report scale showed that the items represented four conceptual 'factors' that measured vulnerability, coercion, dependence and dejection (see Table 7-8). Vulnerability to abuse includes aspects of verbal and emotional abuse as well as fear of family members. As shown in Table 7-9, 8% of the women noted at least one aspect of vulnerability to abuse, with name calling and put downs being the most common (6%). Just over 6% indicated some form of coercion, with the most common experience of coercion involving the taking of belongings without consent (4%).

Around 18% of the women participating in Survey 1 reported at least one aspect of dependence. Of these, 9% indicated that they did not trust most of the people in their families and a similar percentage indicated that they had trouble taking their own medication or getting around by themselves. Aspects of the dejection factor were indicted by one in five of the women who participated in Survey 1. Of these women, the majority indicated that they felt sad and lonely often (15%), while 9% reported feeling uncomfortable with someone in their family.

Table 7-8 Components and prevalence of elder abuse scales for 12,066 women aged 70-75 years at Survey 1.

Elder abuse scales and items	Prevalence* (%)
Vulnerable	7.5
Has anyone close to you tried to hurt you or harm you recently?	2.2
Has anyone close to you called you names or put you down or made you feel bad recently?	5.9
Are you afraid of anyone in your family?	1.4
Coerced	6.4
Does someone in your family make you stay in bed or tell you you're sick when you know you're not?	0.7
Has anyone forced you to do things you didn't want to do?	2.6
Has anyone taken things that belong to you without your OK?	4.3
Dependent	17.5
Can you take your own medication and get around by yourself?	8.9
Do you trust most of the people in your family?	8.7
Do you have enough privacy at home?	5.8
Dejected	21.6
Are you sad or lonely often?	14.8
Do you feel uncomfortable with anyone in your family?	8.9
Do you feel that nobody wants you around?	3.6

* Weighted for area of residence

7.7.3. The sociodemographic and health factors associated with elder abuse

In this section we examined the sociodemographic correlates of elder abuse among the 12,066 women who responded to questions about elder abuse at Survey 1. There were significant associations between sociodemographic factors and abuse. As shown in Figure 7-6, women who had not experienced elder abuse tended to be more educated than those who experienced elder abuse. Women who had not experienced elder abuse were also more likely to indicate that they found managing on their available income to be not too bad or easy when compared with women who had experienced elder abuse (Figure 7-7).

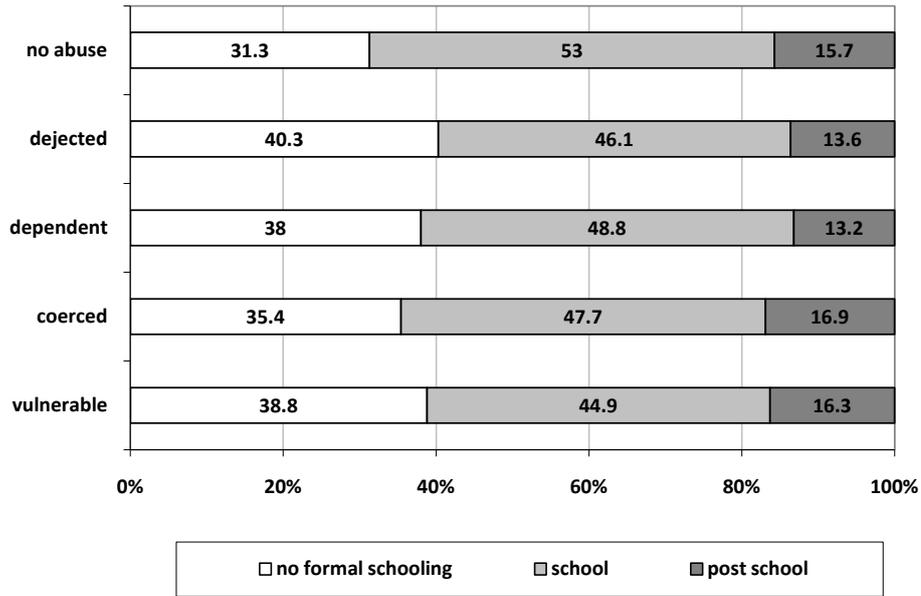


Figure 7-6 Level of education by elder abuse at Survey 1 of the 1921-26 cohort.

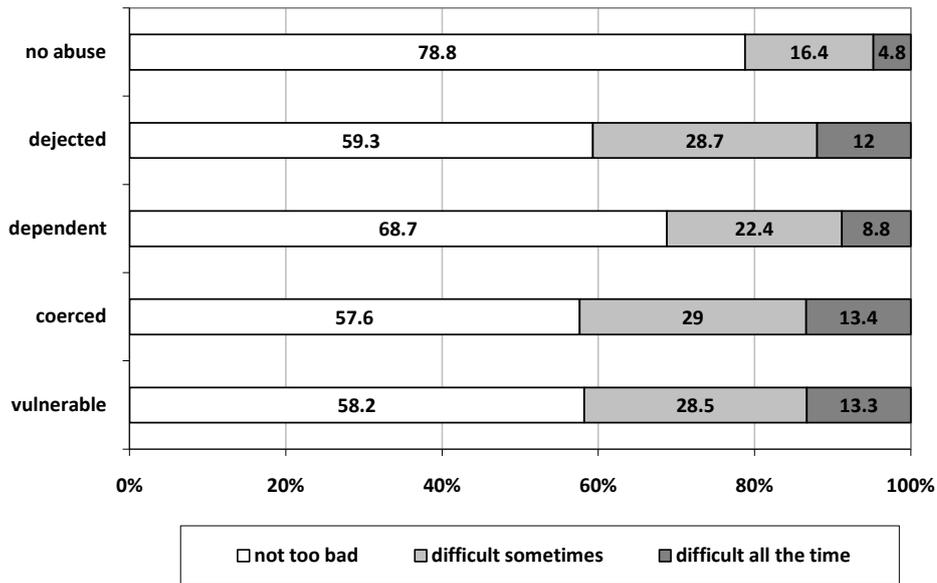


Figure 7-7 Ability to manage on income by elder abuse at Survey 1 of the 1921-26 cohort.

In terms of social support measures, women who had experienced elder abuse were less likely to be partnered (Figure 7-8) and had lower levels of social interaction (Figure 7-9) than women who had not experienced elder abuse.

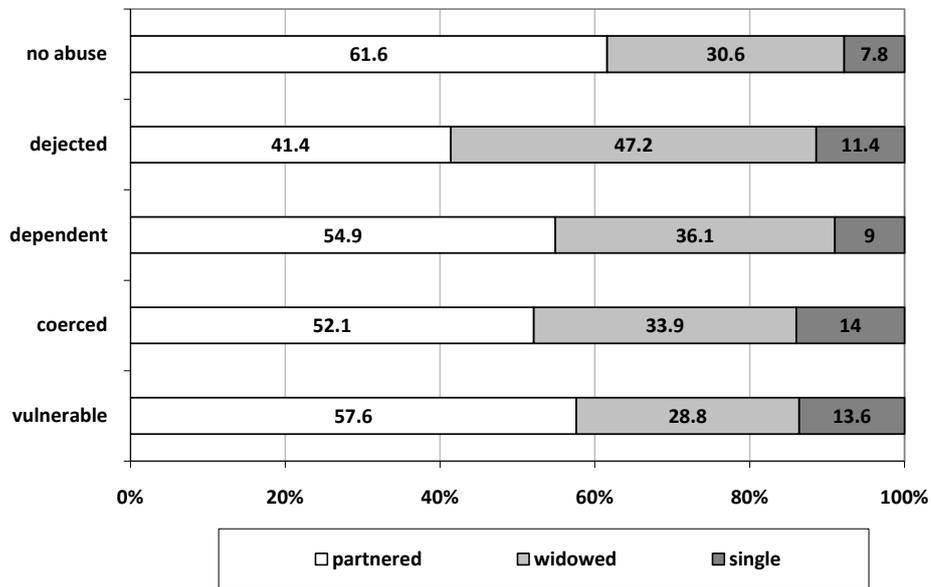


Figure 7-8 Marital status by elder abuse at Survey 1 of the 1921-26 cohort.

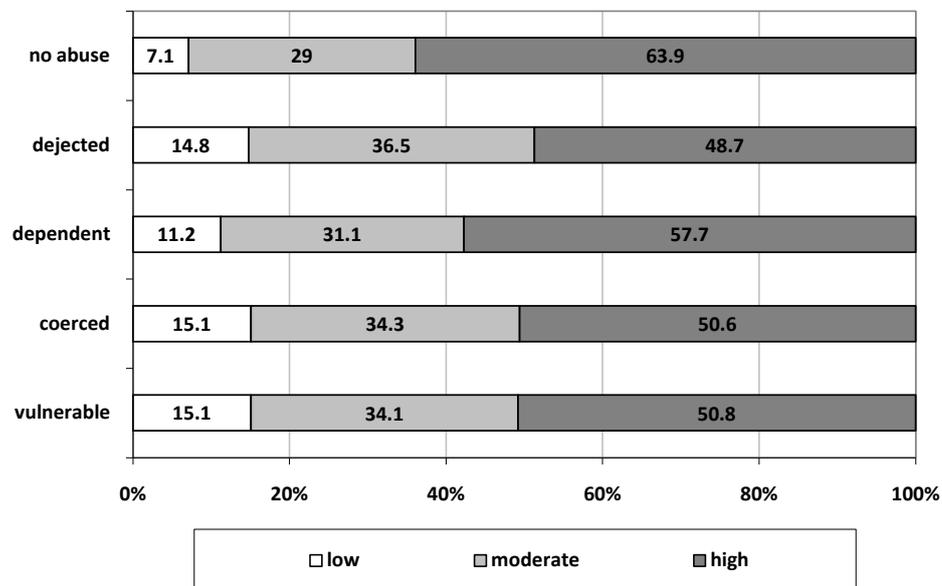


Figure 7-9 Level of social interaction by elder abuse at Survey 1 of the 1921-26 cohort.

Generally, women who had experienced elder abuse were more likely to be smokers or ex-smokers than women who had not experienced elder abuse, although smoking status was similar for women who indicated they were dependent and those who had not experienced abuse (Figure 7-10).

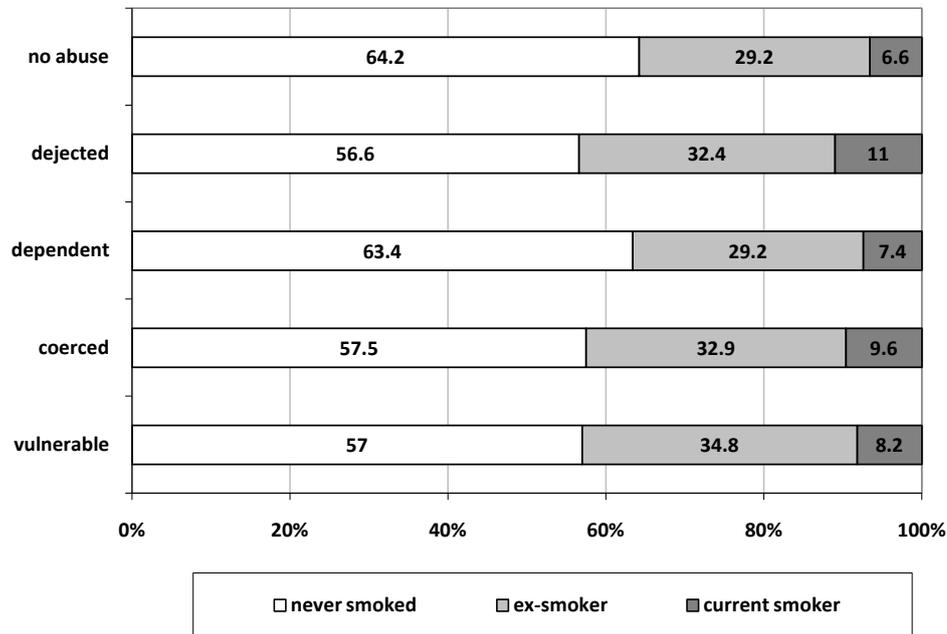


Figure 7-10 Smoking by elder abuse at Survey 1 of the 1921-26 cohort.

A limited body of evidence has suggested that older women who experience abuse also have increased likelihoods of presenting to medical practitioners with physical injuries, gynaecological complaints, gastrointestinal disorders, and general symptoms of fatigue, headache, myalgias, depression, and anxiety (Mouton & Espino, 1999). Results from Survey 1 show that women who have experienced elder abuse had poorer mental health and more chronic conditions (diabetes, heart disease, stroke, osteoporosis, and cancer other than skin cancer) than women who had not experienced abuse. Figure 7-11 shows the number of chronic conditions that women who had and had not experienced elder abuse reported at Survey 1.

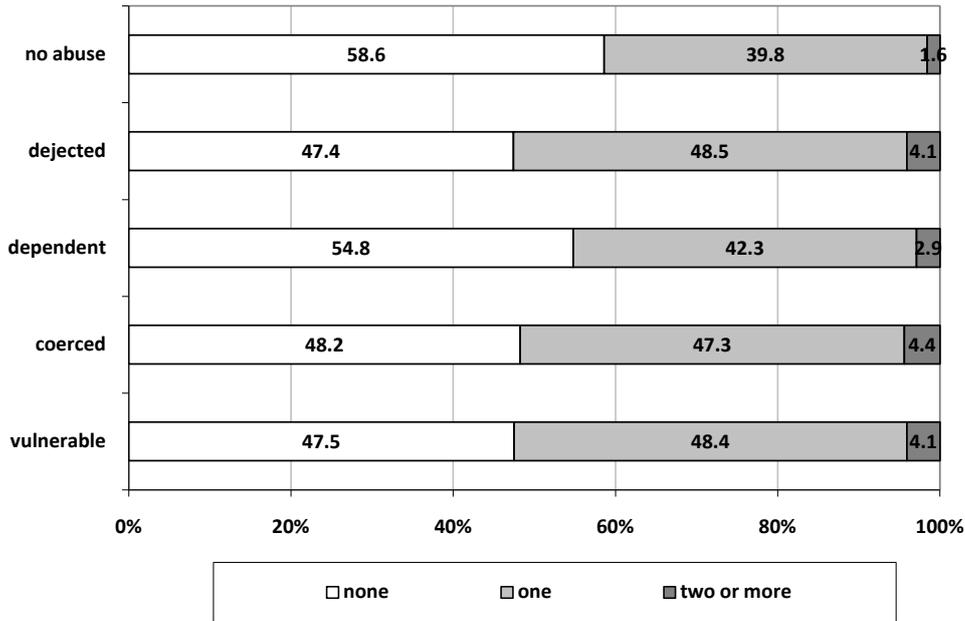


Figure 7-11 Number of chronic conditions by elder abuse at Survey 1 of the 1921-26 cohort.

7.7.4. The association between elder abuse at Survey 1 and survival

Figure 7-12 shows the impact of the four aspects of elder abuse (vulnerability, coercion, dependence, dejection) as measured at Survey 1 on subsequent mortality. Women who had experienced coercion, dependence or dejection as indicated by the ALSWH elder abuse subscales at Survey 1 (Table 7-8) were more likely to die during the study period than women who did not have these experiences. Vulnerability was not associated with increased mortality. After adjusting for demographic and social support measures, dependence was no longer significantly associated with mortality. The effects of coercion and dejection were still significant after controlling for demographic factors, social support measures and health-related factors, but not significant when poor mental health and chronic conditions were included in the models.

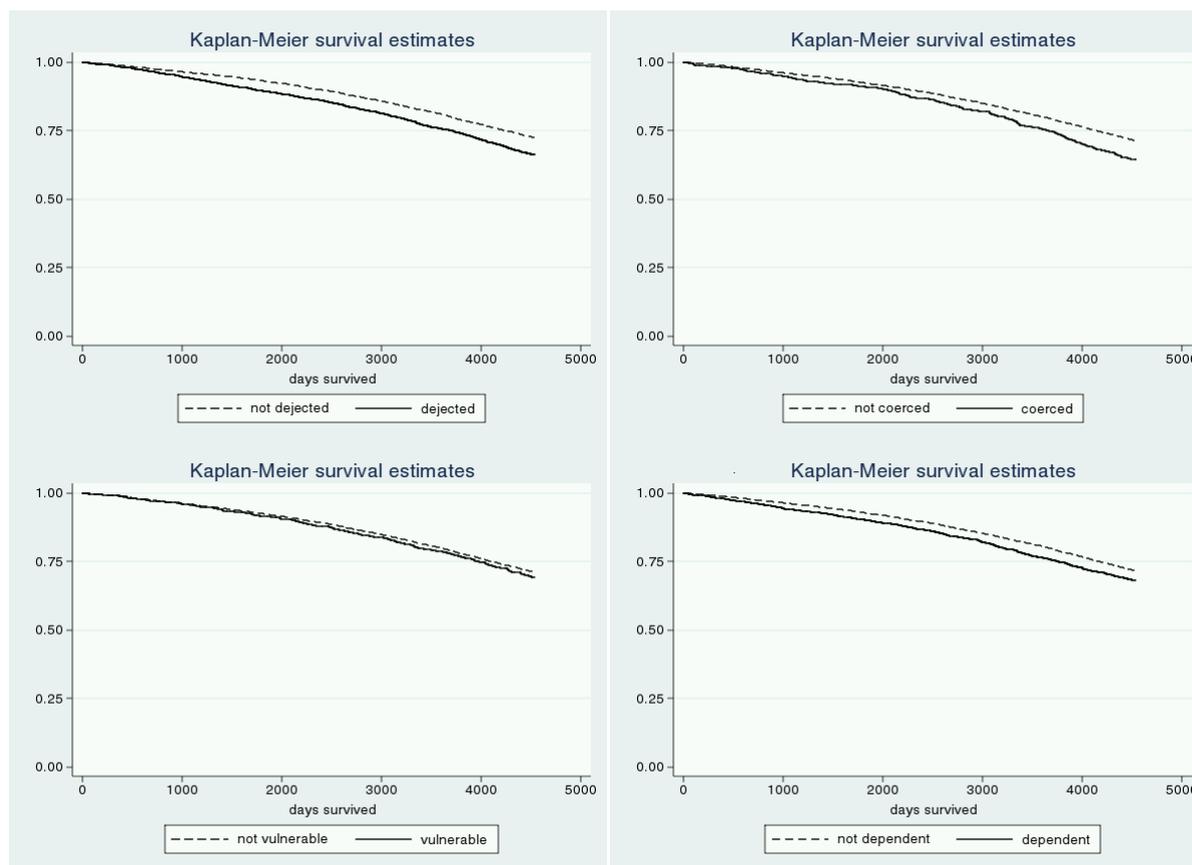


Figure 7-12 Estimated survival of women by coercion, vulnerability, dependence and dejection.

7.7.5. Discussion

These data show clear associations between indicators of potential elder abuse and poorer health but the analyses are not adequate to distinguish between direct causation and other factors, such as lower socio-economic status, that are associated with both elder abuse and poorer health.

7.8. Summary

While much of this report has focussed on the physical health of older women we also examined social inclusion, social support, social participation and networks. Evidence for association between older women's health and social factors is weak and inconsistent. By using longitudinal data we showed that poorer health lead to social isolation (e.g., through loss of mobility, having to stop driving, or sensory loss). In contrast, our analyses have not, at this stage, shown that low levels of social connectedness and support lead to ill health. The implication of these findings is that policies or services aimed at increasing older women's social inclusion as a strategy to improve health are not supported by evidence.

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8. Trends in health across three generations of Australian women

8.1. Key Findings

- Trends in social and demographic factors and health differed across generations (cohorts), as women in any generation became older, and at different historical times. These differences mean that extrapolation from the experiences of one generation to another is often inappropriate.
- Some conditions such as hypertension and diabetes increased with age regardless of cohort.
- Other conditions such as asthma showed different patterns across different generations.
- Overweight and obesity increased among younger and mid-aged women. These trends are likely to cause increases in chronic conditions and greater need for health services well into the future.
- While physical health scores decreased with age, mental health scores tended to improve except at the oldest ages.
- These age-specific differences emphasise the growing needs for health care providers with special expertise in the care of different age groups, in particular the care of older adults as this group becomes a higher percentage of users of health services.

8.2. Introduction

The objective of this section is to explore differences between the three generations of women in the ALSWH in terms of demographic characteristics, health risk behaviour and health status, over a period of 12 years from 1996 to 2008. There are numerous challenges in studies that follow individuals over the lifespan. One of the most important tasks is disentangling age, period and cohort effects when interpreting findings (Yang, 2008). (See Box 1 for definitions.)

In the ALSWH we have attempted to overcome some of the limitations of other longitudinal studies, by simultaneously studying three cohorts of adult women as they age. The purpose of this section is to illustrate differences between these groups of women in trends in selected demographic factors (i.e., marital status and education), health risk factors (i.e. smoking, alcohol consumption, physical activity, and weight), health status indicators (i.e., the common conditions of asthma, hypertension, diabetes and depression), and measures of general health over more than a decade. These indicators were selected because they are important for health across the lifespan and were measured by the ALSWH across all cohorts at three or more times.

Box 8-1 Definition of age, period and cohort effects.

Age effects: Patterns of morbidity and mortality that are due to the biological process of ageing. These effects are reasonably consistent across nations and historical time.

Period effects: Patterns related to the time at which events occur that influence all age groups at about the same time. They may include the impact of historical events and environmental factors such as world wars, economic conditions, pandemics of infectious diseases or new health interventions that influence the health of all members of society at a particular time.

Cohort or generation effects: Represent patterns of morbidity and mortality across groups of individuals born in the same year or years. Cohort effects usually suggest environmental causes possibly occurring early in life and producing later health effects.

Sources: Merrill, 2007; Taylor, Comino & Bauman, 1997; Yang, 2008.

8.3. Changing demography and risk factors

Demographic characteristics and health risk factors of women who responded at each survey are shown in Table 8-1. During the study period the percentage of women in the 1973-78 cohort who were partnered increased, while the percentage of women who were partnered in the 1946-51 cohort decreased slightly. The dramatic decrease in partnered status among the 1921-26 cohort reflects the number of women who had been widowed. The percentage of post-high school qualifications among the 1973-78 cohort increased over time, with 79% having a post-high school qualification by the time they were aged 28-33 years. In comparison, only 39% of the 1946-51 cohort had post-high school qualifications and this figure was lower still (19%) for the 1921-26 cohort.

Table 8-1 Demographic characteristics and health risk factors of women in each cohort who responded at each Survey.

Characteristic	Cohort	S1	S2	S3	S4	S5
Married/partnered (%)	1973-78	19.2	44.1	60.8	72.8	x
	1946-51	83.0	82.3	81.1	79.6	78.0
	1921-26	58.8	52.6	45.6	38.1	30.3
Post-high school education (%)	1973-78	31.9	70.8	76.2	79.2	x
	1946-51	39.2	-	-	-	-
	1921-26	18.9	-	-	-	-
Current smoker (%)	1973-78	27.2	25.5	21.5	17.1	x
	1946-51	14.4	14.6	12.9	12.5	10.2
	1921-26	5.2	3.7	-	-	-
Risky level of alcohol consumption (%)	1973-78	4.9	3.2	3.3	3.4	x
	1946-51	5.0	5.5	-	6.7	6.5
	1921-26	3.6	4.0	3.0	-	-
Inadequate physical activity (%)	1973-78	-	44.2	44.7	49.9	x
	1946-51	-	-	53.9	44.2	40.6
	1921-26	-	57.8	61.4	66.0	74.8
Overweight or obese (%)	1973-78	20.1	28.3	33.8	39.0	x
	1946-51	44.2	48.9	53.6	58.0	58.8
	1921-26	46.1	47.3	49.4	47.2	46.1

Row percentages are weighted by area of residence

X: Data not yet complete for Survey 5 of 1973-78 cohort

- : Not asked at that survey

Across all three cohorts the percentage of women who smoked decreased over time. The 1973-78 cohort had the highest proportion of smokers, followed by the 1946-51 cohort, with a very low rate of smoking in the 1921-26 cohort. Risky drinking was low for all three cohorts, with percentages remaining fairly stable over time. Of the three cohorts, only those born in 1946-51 showed an improvement in the amount of physical activity being undertaken. The proportion of women who did inadequate physical activity increased among both the 1973-78 and 1921-26 cohorts.

The proportion of women who were overweight or obese increased by 19% over 10 years for the 1973-78 cohort, and by more than 14% over 11 years for the 1946-51 cohort. However, while there was a consistent increase in overweight and obesity in the 1973-78 cohort, for the 1946-51 cohort the increase appeared to plateau, with 58% of women overweight or obese in 2004 and 59% overweight or obese in 2007. In contrast, the 1921-26 cohort showed only small fluctuations in overweight and obesity over time. Trajectories in BMI that further illustrate these findings can be seen in Figure 8-1. Despite changes in overweight and obesity over time, it is important to note that 39% of the 1973-78 cohort, 59% of the 1946-51 cohort and 46% of the 1921-26 cohort were overweight or obese at the most recent survey.

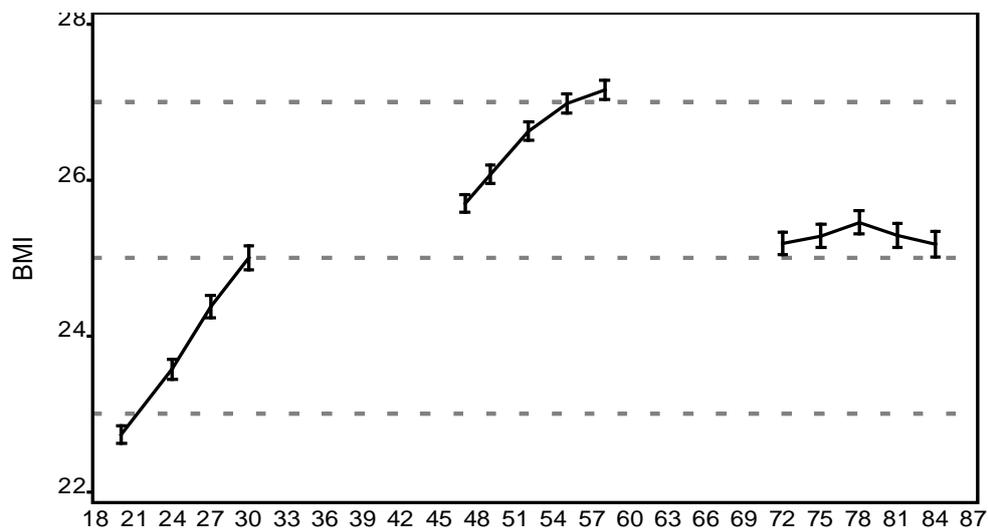


Figure 8-1 Mean BMI by age in the three cohorts.

8.4. Differences in chronic conditions

Prevalence of asthma, hypertension, diabetes and depression by age in the three cohorts is shown in Figure 8-2 and Figure 8-3. In 1996 lifetime prevalence of asthma was highest among women born 1973-78 and lowest among women born 1921-26 (i.e., an example of a cohort effect). Since then the prevalence of asthma increased over time, and remained highest in the younger cohort. Results for hypertension and diabetes show age effects rather than cohort effects, that is, increasing lifetime prevalence with age is readily apparent, especially in the 1946-51 and 1921-26 cohorts for hypertension. Prevalence of depression at each survey increased marginally over time in all cohorts with the 1973-78 and 1946-51 cohorts showing higher levels of depression than the 1921-26 cohort.

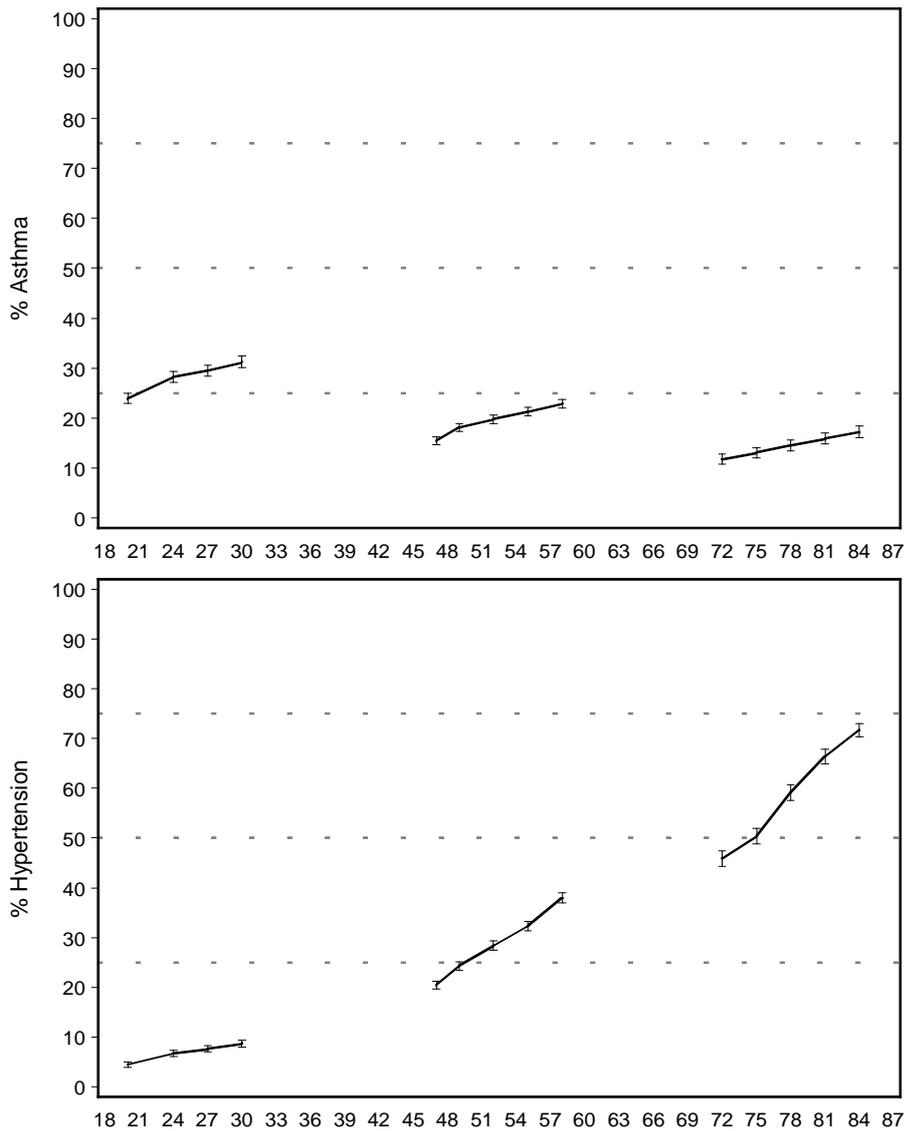


Figure 8-2 Prevalence of asthma and hypertension by age in the three cohorts.

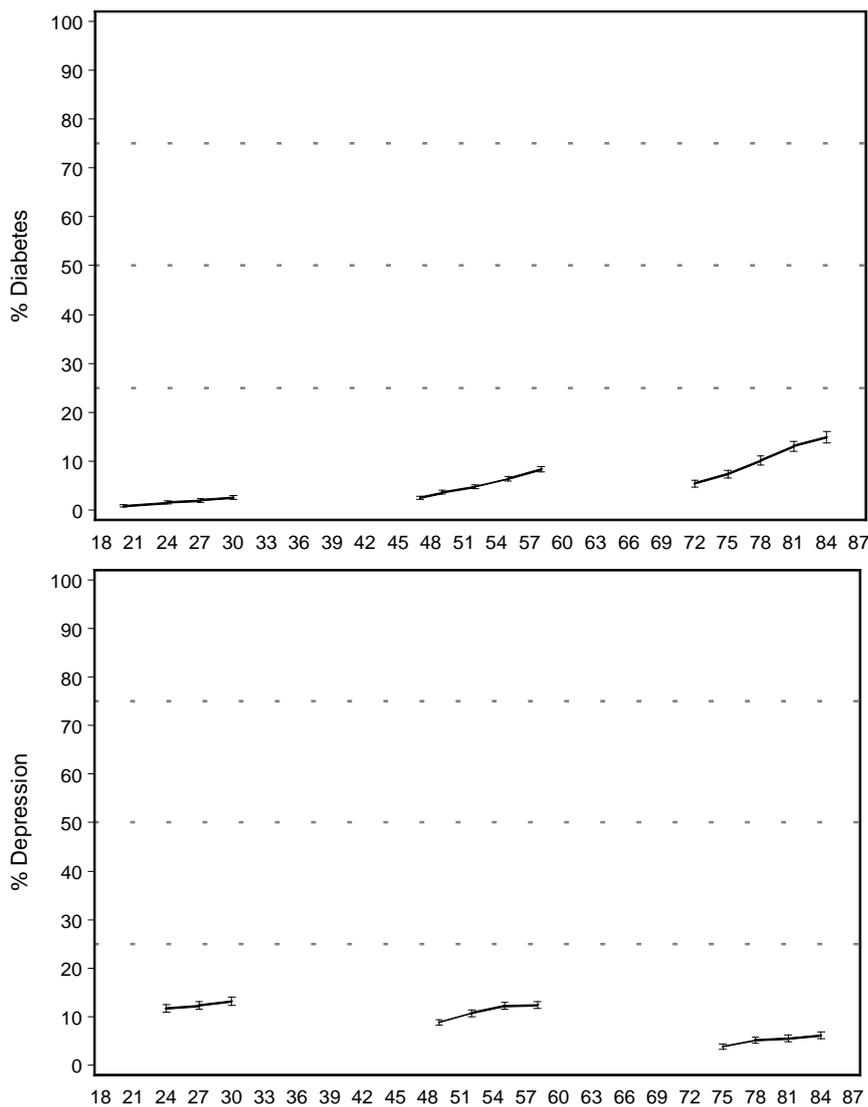


Figure 8-3 Prevalence of diabetes and depression by age in the three cohorts.

8.5. Trends in physical and mental health scores

Mean scores (with 95% confidence limits) for the PF and MH subscales are shown in Figure 8-4, where higher scores reflect better health. As might be expected, women in the 1973-78 cohort had the best physical functioning which remained steady over time. While women in the 1946-51 cohort showed a steady decrease in physical function as they aged from 45-50 to 56-61 years, the older women experienced a sharp decline in physical function as they aged from 70-75 to 82-87 years. In contrast women in the 1973-78 cohort reported the poorest mental health, followed by those in the 1946-51 cohort, while women in the oldest cohort had the best mental health. For the two younger cohorts mental health improved over time (and with age), but for the 1921-26 cohort mental health declined as women aged from 79-84 to 82-87 years.

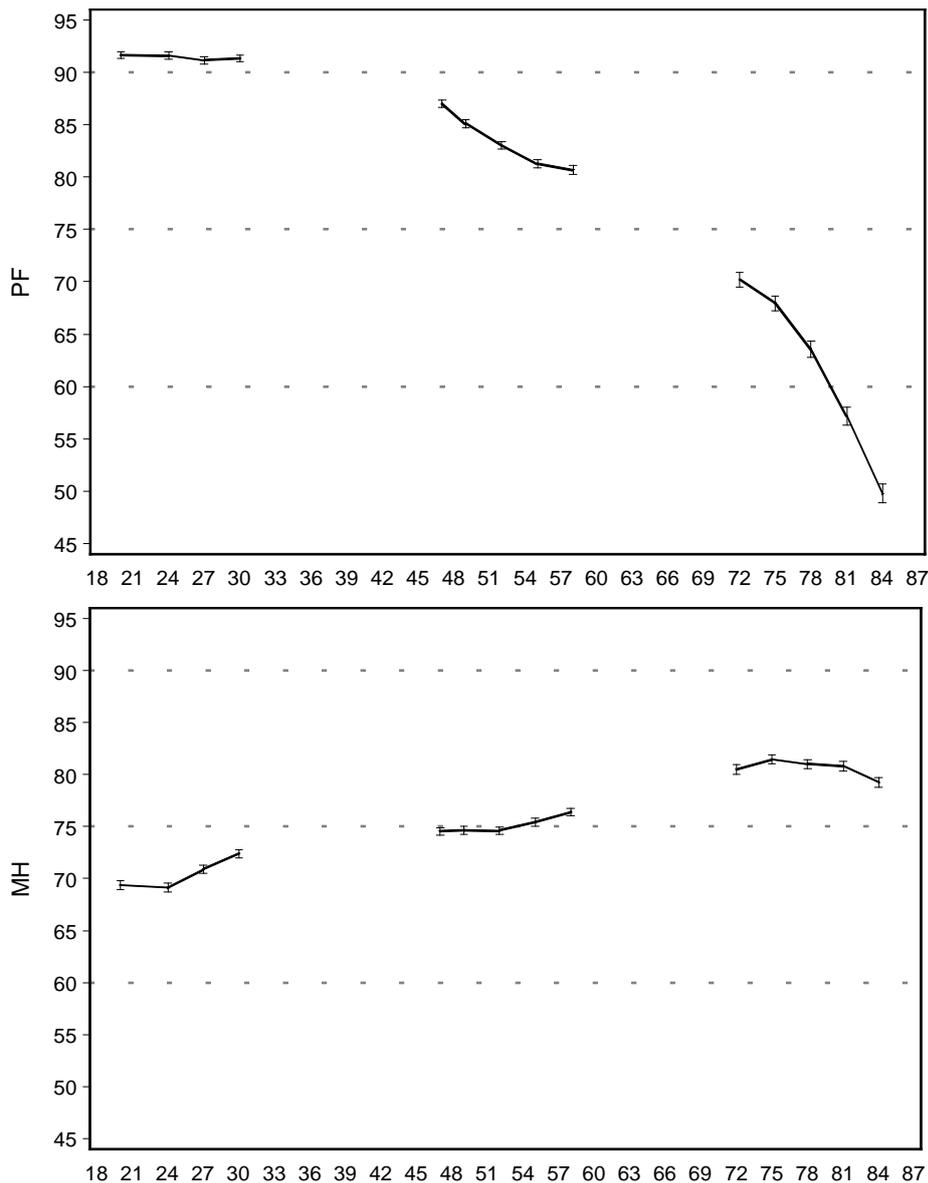


Figure 8-4 Mean physical function and mental health index scores from the SF36 by age in the three cohorts.

8.6. Discussion

In summary, age, cohort and period effects were all illustrated by the data. The pattern of gaining and then losing partners over time is predominantly an example of an age effect, but there was also a cohort effect, as the younger women moved into stable partnerships at a later age than the older women would have done. The social and economic resource implications, as well as health service utilisation considerations, of young women remaining single for longer, and having children later in life will be considerable. Furthermore, the need for health services to provide additional support for unpartnered older women is also likely to gain increased urgency in the foreseeable future, as the numbers of widowed older women in the population continues to increase. There is evidence that innovative models of care, such as multidisciplinary team targeted home visits for elderly people, particularly those living alone, can improve access and quality of care (Beck et al., 2009).

Differences between the cohorts in education were also apparent, reflecting a period effect with older women having low levels of education compared to the high levels evident among the younger cohort. The impact on the health system is reflected in the different expectations and information requirements of people of different ages, and consequently the wider range of services demanded (Andreassen et al., 2007).

The differences in smoking prevalence suggest strong cohort effects. It is important however, to consider the impact of smoking on morbidity and mortality among the oldest women, and the observation that smokers were more likely to drop out of the study than non-smokers in all three cohorts (Young et al., 2006). This means that population prevalence of smoking may have been underestimated. The health effects of smoking are long-term, not just for risk of lung cancer but also for damage to the respiratory and vascular systems (Erhardt, 2009). Thus the impact of smoking is likely to affect the need for health care of chronic conditions for decades to come.

Patterns in the prevalence of inadequate physical activity and overweight and obesity showed different trajectories for women in the three cohorts. Women in the oldest and youngest cohorts did less physical activity over time, while those in the 1946-51 cohort did more. At the same time, there was a sharp increase in the prevalence of overweight and obesity in both the 1973-78 and the 1946-51 cohorts from 1996 to 2005/2006. In the last survey period this increase may have slowed in the 1946-51 cohort, possibly related to increasing levels of physical activity. These findings mirror the general pattern in Australia, where the prevalence of overweight and obesity has been increasing over at least the past 20-30 years. The implications for health services of the growing levels of overweight and obesity and decreasing physical activity, particularly in younger women are considerable. The age-specific prevalence of chronic conditions is likely to be higher than for older generations (Li, et al., 2006) resulting in greater burden for the health system. It is essential that health services encourage the maintenance of healthy weight for all women, but especially young women who are vulnerable to increased weight at transition times such as moving in with a partner or getting married, starting work, or having children (Bell & Lee, 2005).

The lowest prevalence of asthma was reported by women in the oldest cohort and the highest among the youngest cohort (i.e., cohort effects), but prevalence increased in all cohorts during the study period (i.e., period effects). There is evidence that asthma may be under-diagnosed in older people (Braman & Hanania, 2007). Nevertheless, age-period-cohort modelling has shown that some of the increase in asthma deaths in the mid 1960s, and all of the rise in the late 1980s, was the result of birth cohort effects (Taylor et al., 1997). An estimated 10.3% of the Australian population had asthma in 2004-5, down from 11.6% in 2001 and overall females had a higher prevalence than males (AIHW, 2008). There is evidence that improvement in recognition and treatment of asthma has promoted a decrease in mortality (Comino & Henry, 2001). The implication of this complex pattern is that control of asthma may be improving due to both improvements in health care and changes in the environmental conditions that influence the aetiology of the condition.

Hypertension showed increasing prevalence with age, with the trajectory for women in the 1921-26 cohort following on from the trajectory for women in the 1946-51 cohort. However, the trajectory of the youngest cohort did not indicate an increase in prevalence, consistent with the finding that both prevalence of hypertension and average blood pressure have decreased appreciably since 1980 among urban populations in Australia aged 25-64 years (AIHW, 2008). In contrast, the prevalence of diabetes suggests a steady increase in prevalence with age. In light of the trends for BMI and overweight and obesity, it is likely that there could also be a cohort effect with higher prevalence of diabetes in the younger cohort when they are in their forties, than in women from the 1946-51 cohort at the start of the study. With increasing prevalence of many weight-related chronic diseases there will be a need to plan for managing larger numbers of patients cost effectively across the life span.

The trends for depression show that mental illnesses including depression account for a large proportion of overall disease burden for all age groups up to middle age (AIHW, 2008). The 'healthy survivor' effect may account for the lower depression among older women as women with poor mental health are more likely to drop out of the study as they get older due to increasing disability or earlier death. However, there is other evidence that women's psychological well-being is well maintained into old age (Lee, 1999). Other age-related illnesses may complicate the recognition and treatment of depression, which is more commonly experienced by women than men (Krishnan, 2002). The short-term implications of our findings are that younger women may exhibit co-morbid physical and mental health problems earlier in life than previous generations and these will likely require more management by health service providers with skills in more complex care.

The overall results for physical functioning showed a clear effect of decline with age from the initially high level of physical health in the youngest women, as expected. However, this was balanced to some extent by better mental health with increasing age; which may reflect women's changing expectations of their own health as they age. These age-specific differences emphasise the growing needs for health care providers with special expertise in the mental health of young people, and in the care of older adults as this group becomes a higher percentage of users of health services.

8.7. Summary

Extrapolation from the health of older women to the likely future health of younger women is often inappropriate because social conditions, health-related behaviour and health services differ substantially between generations. However, through careful analysis of major health risk factors across age groups and over time some predictions are possible.

Cigarette smoking was uncommon among women born in 1921-26 yet it has shortened the life expectancy of smokers as well as increasing their risk of respiratory and other chronic conditions. Smoking at some time in their lives has been more common among the middle-aged and younger women and the adverse effects are likely to impact on their health for the rest of their lives. There is good evidence that quitting smoking reduces risk of some conditions (e.g., cardiovascular conditions) quite quickly, but other risks (e.g., lung cancer) more slowly. For adult women who smoke, medical and behavioural help to stop smoking would increase their chances of making this change and reducing the subsequent health risks and costs. For children and young adults the emphasis should be on never smoking.

Among ALSWH participants (and the wider community) younger women (those born in 1973-78) are gaining weight on average faster than mid-aged women (born in 1946-51) who are gaining weight and have higher prevalence of overweight and obesity than older women (born in 1921-26). Based on current understanding of metabolic effects of excess weight, it is very likely that hypertension, diabetes and cardiovascular disease will increase as consequences of this population wide weight gain. This will substantially increase health care costs. Evidence for effective methods to avoid weight gain, increase weight loss and the time lags between weight change and risk change are all weak (in part due to changes in modern diet and levels of energy expenditure). The implications are that weight related health problems will increase for decades and that while prevention of overweight and obesity among children is important, there is an urgent need for better understanding of how to manage the burden of disease and costs due to excess weight in adults.

Current preventive activities in Australia to reduce overweight and obesity, reduce the prevalence of tobacco smoking, and increase levels of physical activity are all strongly supported by the data presented in this report.

Our data also identify growing needs for the primary care sector to help older women with chronic conditions. This requires understanding of their circumstances, and multiple symptoms and diagnoses.

8.8. References

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