The Self-Rated Health of Women in Midlife: A cross-sectional and longitudinal study of a New Zealand sample

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This paper is concerned with the role that current determinants and persisting factors play in shaping the health status of women in midlife. We examined associations with current self-rated health and explored causal pathways using health status, well-being, lifestyle, and psychosocial data from 739 New Zealand women, all mothers of the participants in the Dunedin Multidisciplinary Health and Development Study. Survey data collected in 1994, and longitudinal determinants from as early as 1975-76 were included. Cross-sectionally, poor health was associated with depression, chronic conditions, acute symptoms, role limitations due to chronic illness, unemployment, and being overweight. In addition, physical inactivity distinguished 'good' from 'very good' health - as did use of hormone replacement therapy and a history of hysterectomy. Independently, employment status had the strongest association with present self-rated health and the findings also highlighted the importance of support satisfaction.

In contrast, the longitudinal data showed a linear pattern between poor health and early neuroticism and no post high school education. Furthermore, current depression was exacerbated by prior depression. Past physical symptoms and prior poor lifestyle behaviours were independently associated with current 'good' rather than 'very good' health. Overwhelmingly, however, a prior history of chronic depression was the most predictive factor for those with current reduced health. The findings highlight the complexity of health determinants and the need for future research on the mechanisms through which determinants may persist and compromise health. Implications are discussed in terms of health promotion efforts, particularly for mental health, and how the findings extend our understanding of determinants of health in policy informed ways.

It is well established that individual factors as well as aspects of the ones environment are key elements related to health status. Cross-sectional studies have identified a range of interacting associations with poor health, for example, low income, lack of education, health symptoms, degraded housing, reduced coping ability and lack of social support (e.g., Adams, Cartwright, Ostrove, 1998; Blakely, Lochner, & Kawachi, 2002; Ellaway & Macintyre, 1998; Manderbacka et al., 1999; Malmstrom, Sundquist, & Johansson, 1999; Ministry of Health, 1999a). In addition, longitudinal studies have identified the link between increased age, persisting poor lifestyle behaviours, prior unemployment, chronic health conditions and subsequent poor health (e.g., Cott, Gignac, & Badley, 1999; Blaxter, 1990; Goldberg, Gueguen, Schmaus, Nakache, & Goldberg 2001). It is these literatures and challenges that provide the context for the present study. We focus on the cross-sectional and the longitudinal contributions of individual and contextual factors to self-rated health status in a sample of New Zealand women in midlife.

The research interest in women's health has grown considerably, particularly with regard to influences on health at various stages throughout the life-course (e.g., Kuh, Hardy, Rodgers, & Wadsworth, 2002; Lee & Powers, 2002). Within this research area, midlife is a particular interesting stage of life to examine, as there can be many concurrent changes. Social networks and roles change as children leave home, retirement approaches, and with longer life expectancy for women, there may be the additional burden of caring for a parent or spouse (e.g., Benzeval, 1998; Lee & Porteous, 2002; Lee & Powers, 2002; Shadbolt, 1997). At the same time, midlife is the time at which women may reflect on career goals and achievement, which some studies have suggested affects well-being (e.g., Carr, 1997). In addition, the menopause occurs at midlife and hormonal changes

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have been associated with reduced health status (e.g., Brown, Mishra, & Dobson, 2002; McKinlay, 1996). It is beyond the scope of this paper to comment on all the possible mechanisms through which women's health may be affected at midlife. It is worth pointing out, however, that there are mixed findings. While some say circumstances or lifestyle play the largest part in influencing health and well being (e.g., Blaxter, 1990; Harris, 2003), a few studies show, with longitudinal data, that prior depression and cognitive characteristics are strong predictors of reduced well-being and health ratings for midlife women (e.g., Adams et al., 1998; Kuh et al., 2002). Furthermore, others have indicated that an increase in the number of physical symptoms, or diminished feelings for a partner is associated with reduced self-rated health during midlife years, and that menopause transition is not (e.g., Dennerstein, Dudley, & Guthrie, 2003). Teasing apart the important elements affecting the health of midlife women is therefore complex, as both objective and subjective concepts are involved, shaped by events and influences over a lifetime.

In the present study we examine both current and past variables and their relationships with health status in midlife New Zealand women. We focus on self-rated health, an established and useful indicator of health status (e.g., Eriksson, Unden & Elofsson, 2001; Fayers & Spranger, 2002; Heistaro, Jousilahti, Lahelma, et al., 2001; Idler & Benyamini, 1997; Power, Matthews, & Manor, 1998). We address two issues. First, although self-rated health has been examined using cross-sectional surveys in New Zealand, there is little information about the key factors affecting health specifically for midlife women (e.g., Ministry of Health, 1999b; Statistics New Zealand & Ministry of Health, 1993; Sarfati & Scott, 2001). Based on the literature, the present analysis investigates the relative contribution of well-being, lifestyle, social circumstances, physical illness, menopausal status, and psychosocial measures. Our second broad issue relates to the contribution of past factors to current health. We use longitudinal data to examine change in self-rated health over an 11 year period and also how determinants measured in the preceding 11 years may impact on current health status. The women involved have all previously participated in a longitudinal health study and represent a range of social circumstances. The present study therefore extends the women's health research area, particularly in New Zealand, by isolating the contributing elements to current health and highlighting some of the mechanisms through which prior social, background, health, and lifestyle measures may shape current health status - leading to a more complete understanding of health determinants for women in midlife and a clearer focus for health improvement efforts.

Method

Participants

The sample was mothers of children enrolled in the Dunedin Multi-disciplinary Health and Development Study (DMHDS), a cohort born between April 1st, 1972 and March 31st, 1973. The women were residents of Dunedin at that time. A fuller description of the study is provided elsewhere (Silva & Stanton, 1996). The children were traced at the time of their third birthday and followed up at two yearly intervals until they reached the age of 15 and then again at ages 18, 21, and 26 years. A parent, usually the mother, completed questionnaires about the background characteristics of the family, and the behaviour and health of the child. The mother also completed questions about their own health at each assessment occasion until 1987. In this study we have used data for women who cared for the child since birth, most of whom were the child's natural mother.

In 1994 a questionnaire was sent to 980 mothers, and 742 (76%) responded, including 38 women living abroad. The questionnaire asked about their social circumstances, mental and physical health, attitudes to fitness, quality of life, and a number of other factors. Of the original 1022 women, 21 women had died, and 4 could not be traced. The 17 women whose children had died were also excluded.

Measures

Global measure of health. The women were asked to rate their overall health using a four point scale: Very good, good, fair, or poor (Statistics New Zealand, 1993).

Depression. The women completed the 20-item Center for Epidemiologic Studies Depression Scale (CES-D), a well-validated measure of current depressive symptoms (Knight, Williams, McGee, & Olaman, 1997; Radloff, 1977). The women indicated on a 4-point scale, how frequently they may have felt or behaved a certain way in the past week (e.g., blue or depressed, enjoyed life). The most commonly used CES-D cut-off point for depression in adults is a score of 16 (Radloff, 1977). Therefore, the women who scored 16 or more were classified as meeting the criterion for depression. The CES-D was found to be a reliable measure with an alpha value of 0.88 for the full scale (Knight, et al, 1997).

Anxiety and affective problems. A 10-item checklist, derived from screening items of the Diagnostic Interview Schedule (DIS) was included. The women were asked about experiences of depressive, phobic, panic-related, obsessive-compulsive, and social anxiety symptoms in the past 12 months (Robins, Cottler, & Goldring, 1989). A score of 3 or more defined the presence of anxiety or affective problems to a marked degree.

Chronic conditions experienced in the past 12 months were checked from a list of 19 conditions (e.g., asthma, cancer, arthritis). The list was based on the most common problems reported by the DMHDS mothers in earlier assessments (e.g., 1983). Women reporting more than 3 were regarded as having chronic illness.

Role limitation was based on the degree to which anxiety/affective and chronic physical conditions "impaired with their family life", 'social life", "work", and "recreation" (Cox, Blaxter, Buckle, Fenner et al., 1987). Limitation was rated on a 4-point scale ranging from not at all to most of the time. Any limitation reported was regarded as a positive response.

Acute symptoms experienced in the previous 2 weeks were checked from a

list of 19 psychological or physical symptoms (e.g., backache, upset stomach, trouble sleeping) (McKinlay, 1996; Kaufert, Gilbert & Hassard, 1988). The presence of 5 or more acute symptoms was defined as significant.

Menopause. Pre-, peri-, and post-menopausal groups were identified using a series of specific questions about the women's periods (Brown, Mishra, & Dobson, 2002; McKinlay, 1996). Women that had undergone a hysterectomy and those regulating their cycles with hormone replacement therapy were also identified.

Lifestyle

Activity was dichotomised, based on New Zealand guidelines (Hopkins, Wilson, & Russell, 1991; Ministry of Health, 1999a). Active women took part in at least 3.5 hours per week of moderate intensity exercise, such as walking or gardening; inactive women reported less duration or intensity than recommended.

Body Mass Index (BMI) was derived from measures of height and weight (weight (kg)/height (m^2)). A BMI of 25 or more was regarded as overweight.

Smoking. The women were asked if they were non-smokers, current or ex-smokers, and the number of cigarettes smoked (Department of Health & Department of Statistics, 1992). Latency from cessation was not asked, and therefore ex-smokers were coded as non-smokers.

Nutrition. A total of 11 guidelines were identified, related to daily consumption of fruit, vegetables, cereals, protein, dairy products (5 guidelines), fluid intake (1), food preparation (2) and take-away food (3) (Department of Health 1991). Because the totals were skewed, given many unmet guidelines, women meeting fewer than 6 guidelines were regarded as nutritionally compromised. The remainder formed the reference group.

Alcohol consumption. Frequency of alcohol consumption was rated on a scale ranging from more than once a day to less than once a year. This question was derived from a New Zealand survey conducted by the Alcohol and Public Health Research Unit (Wyllie, Zhang, & Casswell, 1993). The women were

also asked to estimate the number of standard drinks they consumed in a typical drinking episode (McMenamin, 1994). The Alcohol Liquor Advisory Council state that consumption of 15 to 35 standard drinks per week for women is an increased risk for health, and consumption of over 35 drinks per week is harmful to health (Royal Colleges of Physicians, Psychiatrists, and General Practitioners, 1995). For the present analyses, alcohol consumption was dichotomised: Drinking at a safe level (fewer than 15 drinks per week) formed the reference group, or at an increased risk/harmful level (15 or more drinks per week). The categories were therefore based on New Zealand recommendations and measurement standards, where one drink, such as a glass of wine, equals one unit (7-11g) of alcohol (Royal Colleges of Physicians Psychiatrists & General Practitioners, 1995; O'Hagan, Robinson, & Whiteside, 1993).

Socio-demographics

Education data collected in 1975 made it possible to group the women according to whether or not they had received further education after high school. Age, marital status, educational qualifications, and their family and personal income data from 1994 were used (Department of Statistics, 1991). Personal income was dichotomized: Less than $10,000 or $10,000 or more. We also noted if they were living alone or not and if they were caregivers or not. Women were placed in three groups based on current employment status: More than 15 hours work per week, 1 to 15 hours, or not working.

Social support

Social support, conceptualised as satisfaction and network size within and outside the home was obtained from an 8-item version of the Brief Social Support Questionnaire (Sarason, Levine, Basham, & Sarason, 1983; Siegert, Patten, & Walkey, 1987). For each item, a different aspect of support was described (e.g., "Who can you really count on to support you in major decisions you make?", "With whom you can be totally yourself?").

Network size. The mean number of persons providing social support within

the home was categorised as follows: No-one, one person, and more than one. The mean number of supporters living outside the home was categorised: No-one, one or two persons, more than two.

Support satisfaction. For each of the 8 items, support satisfaction was measured using a 6-point scale that ranged from very satisfied to very dissatisfied. Mean satisfaction across all items was used to place the women in three groups: Dissatisfied (<4), satisfied (4-5) or very satisfied (>5).

Longitudinal data

Global measure of health. The women were asked to rate their overall health in 1983, 1985, and 1987 as part of their children's 11, 13, and 15 years of age assessments, using a four point scale: Very good, good, moderate, or poor.

Depression Scale. Depression was also measured in 1983, 1985, and 1987 with a self-administered questionnaire (The Dunedin Depression Questionnaire) that consisted of 21 questions, requiring a 'yes' or 'no' response. The first 19 were based upon the DSM-III criteria for a major depressive episode (McGee, Williams, Kashani, & Silva, 1983). The others were concerned with past depression and depression treatment in the last two years. Internal consistency of the scale, measured with coefficient alpha was 0.78. For the analyses, the four groups were defined in the following way. The reference group consisted of women who were not currently depressed and had not been depressed at the previous assessment. The three comparison groups comprised of those not currently depressed but had been depressed in the past, those currently depressed and those who were depressed on both occasions.

Neuroticism. In 1975, the women completed 22 extraversion and 24 neuroticism items from the self-report Eysenck Personality Inventory (Eysenck & Eysenck, 1964). The respondents were asked to reflect on how they think, feel, and act (e.g., " I behave properly'; 'I often feel lonely'). Nine lie scale items were also included. The responses were scored 0 or 1 and summed. These were standardised to have a common mean and standard deviation. Scores ranged from 1 to 26 (*Mean* = 11.9, *SD* = 4.9), and the women in the upper

quartile were compared with the remainder.

Family Environment Scale 1979, 1981. The women completed this scale of 90 true false items for nine scales (Holahan & Moos, 1983). Using the active recreation orientation scale, a mean score of less than 5 was used as a proxy measure to identify women with low levels of physical activity.

Physical Symptoms (1979, 1981) experienced in the past month were reported. A mean score of 5 or more defined previous poor physical health.

Lifestyle. Smoking information was collected in 1983 and Body mass index (Previously defined) in 1985.

Statistical Analyses

The analyses were performed using the multinomial logistic regression procedure in STATA. The first analyses examined associations between self-rated health and the other measures, by comparing those with good health and those with very good health, and women with moderate health or poor health with those with good health. If the Odds Ratios were not significantly different,

a linear trend, rather than the odds ratios, was used to describe the data (see Table 1).

After examining the univariate associations, multivariate analysis was performed for three models. The rationale for the three models, was to assess successively, the contribution of groups of measures to self-rated health The first model examined the association between self-rated health and selected background or social circumstances variables, the second considered the health measures, and the third combined these in the same model

Table 1. Distribution of variables by self-rated health and associations between current self-rated health and the cross-sectional variables

	Very good N=357 N (%)	Good N=316 N (%)	Moderate/Poor N=66 N (%)	OR (95% CI)† Good/ Very good OR (95% CI)	OR (95% CI)† Moderate or Poor/ Good OR (95% CI)
Illness					
CES-D score (≥16)	21 (5.9)	56 (17.7)	26 (39.4)		7.69 (4.91,12.04)
Chronic conditions (≥3)	62 (17.4)	126 (39.9)	45 (68.2)		3.18 (2.45, 4.13)
Acute symptoms (≥5)	42 (21.9)	109 (34.5)	41 (62.1)		3.62 (2.73, 4.78)
Anxiety problems (≥3)	70 (19.6)	106 (33.5)	41 (62.1)		2.41 (1.87, 3.10)
Roles limited by anxiety problems	26 (7.6)	36 (11.8)	26 (41.3)	1.55 (.92, 2.59)	4.98 (2.72, 9.09)
Roles limited by chronic illness	17 (4.8)	61 (19.5)	39 (60.9)		5.53 (3.88, 7.89)
Lifestyle					
Alcohol (≥15 drinks per week)	20/343 (5.8)	24/307 (7.8)	6/63 (9.5)		1.32 (.86, 2.03)
BMI (≥25 kg.m²)	111/324 (34.3)	132/281 (47.0)	29/55 (52.7)		1.56 (1.22, 2.00)
Smoker	67/355 (18.9)	82/314 (26.1)	28/65 (43.1)		1.71 (1.32, 2.22)
Inactive	235/320 (73.4)	239/280 (85.4)	45/57 (82.5)	2.10 (1.39, 3.19)	.81 (.38, 1.72)
Nutrition (<6/11 guidelines)	130/355 (36.6)	134/310 (43.2)	38/65 (58.5)		1.46 (1.16, 1.83)
Social demographic measures					
No post high school education	197 (55.2)	206 (65.2)	46 (69.7)		1.43 (1,13, 1.81)
No husband/ partner	65 (18.2)	54 (17.1)	24 (34.4)	.92 (.62, 1.38)	2.77 (1.55, 4.96)
Living alone	22 (6.2)	16 (5.1)	9 (13.6)	.81 (.42, 1.57)	2.96 (1.25, 7.03)
Personal income (<$10,000)	79 (22.1)	80 (25.3)	32 (48.5)	1.19 (.83, 1.70)	
Working (≥15 hrs)	256 (72.5)	194 (62.6)	22 (37.9)	1.00	
Working (1-15 hrs)	55 (15.6)	53 (17.1)	7 (12.1)	1.27 (.83, 1.94)	
Not working	42 (11.9)	63 (20.3)	29 (50.0)	1.98 (1.28, 3.05)	8.03 (4.22, 15.28)
Caregiver	39 (10.9)	46 (14.6)	9 (13.6)		1.22 (.88, 1.69)
Social support	n=345	n=304	n=61		
In	109 (31.9)	109 (37.1)	57 (50.9)		1.39 (1.09, 1.77)
Out	175 (51.3)	164 (55.6)	36 (63.2)		1.23 (.98, 1.56)
Dissatisfied	79 (22.9)	102 (33.6)	32 (52.5)		1.84 (1.44, 2.36)
Menopausal status					
Pre	188 (53.0)	120 (38.6)	25 (39.1)		
Peri	47 (13.2)	40 (12.9)	8 (12.1)	1.33 (.83, 3.52)	.96 (.40, 2.29)
Post	54 (15.2)	52 (16.7)	4 (6.3)	1.51 (.97, 2.35)	.36 (.12, 1.11)
Hysterectomy	52 (14.6)	77 (24.8)	8 (37.5)	2.31 (1.52, 3.52)	1.50 (.80, 2.81)
HRT	14 (3.9)	22 (7.1)	3 (4.7)	2.46 (1.21, 5.00)	.65 (.18, 2.35)

† Odds ratios (OR) are presented as a trend across all three categories where the odds ratio (Good/Very good) is not significantly different from the OR (Moderate or Poor/ Good).

(Table 2). The remaining part of the analysis examined changes in self-rated health collected on four occasions. To identify possible pathways to reduced self-rated health at midlife, the analysis also examined associations between current self-rated health and current or past depression and additional measures collected in the earlier part of the study (Table 3). Multinomial logistic regression was used. The standard errors were adjusted for the multiple outcome measures. Univariate analysis or unadjusted odds ratios for each variable are presented. A model for all the early variables was also fitted followed by a model that included the depression variable (Table 4).

Missing values for the longitudinal section of the analysis

The women included in the analysis did not differ from those excluded on any of the variables included in the analysis, apart from smoking. Only 43% of the 656 women who provided at least one set of observations for the longitudinal part of the study smoked compared with 77% of those not included. The difference was statistically significant, p<.001.

Results

Self-rated health

The first part of the analysis is based on the reports of 739 women who completed the questions about illness. Of these 357 (48.3%) described their health as very good, 316 (42.7%) as good and 60 (8.1%) as fair or moderate and 6 (.8%) as poor. Those describing their health as moderate or poor health were combined into one group.

Summarising the 1994 cross-sectional data, the proportion of women in each group that met the definition of depressed, chronic conditions, acute symptoms and anxiety/affective problems and those who believed that their role was limited by chronic illness or anxiety problems are shown (Table 1). Each of these problems were reported more often by women who described their health as good rather than very good and even more often by women who described their health as moderate or poor. Table 1 also shows the odds ratios associated with a lower rating of self-rated health for each variable. In terms of health measures, the strongest association was with depression, represented by a linear trend (the odds describing the

association between the very good and good, and that for good and moderate or poor were not significantly different). A single odds ratio estimate is therefore presented to demonstrate the relationship between depression and poorer health, 7.69 (95% confidence interval 4.91, 12.04). A significant linear trend also described the association between reduced self-rated health and the presence of chronic conditions, acute symptoms, as well as reports of their role being limited by chronic illness. Limitations associated with anxiety problems were not significantly different between those describing their health as very good and good, 1.55 (.92, 2.59) but strong effects due to anxiety were seen between those with moderate or poor health compared with good health, 4.98 (2.72, 9.09).

Table 1 also demonstrates that self-rated health is linked to reports of poor lifestyle behaviours. More particularly, reduced self-rated health was linearly related to an overweight or obese BMI 1.56 (1.22, 2.00), smoking 1.71 (1.32, 2.22), and meeting few nutrition guidelines 1.46 (1.16, 1.83). With regard to physical activity, those who were inactive were twice as likely to rate

Table 2. Odds ratio (95% confidence interval) for moving from very good to good health, or good to poor or moderate health for background measures or health measures or both (n=572)

	OR (95% CI)† good/very good	OR (95% CI)† moderate or poor/good	OR (95% CI)† good/very good	OR (95% CI)† moderate or poor/good
	Background measures		*Background and health measures*	
Age (5yr)	.92 (.79, 1.07)		1.02 (.86, 1.22)	
No post school education	1.19 (.89, 1.58)		.96 (.68, 1.34)	
Dissatisfied with social support	2.00 (1.48, 2.71)		1.45 (1.01, 2.09)	
Working (≥15 hours)	1.00	1.00	1.00	1.00
Working (1-15 hours)	1.67 (.87, 3.21)	4.56 (1.56, 13.36)	1.18 (.58, 2.42)	3.97 (1.20, 13.16)
Not working	2.27 (1.34, 3.87)	4.85 (2.32, 10.12)	1.72 (.95, 3.09)	4.54 (2.01, 10.28)
	Health measures			
Depression	2.21 (1.37, 3.56)		2.11 (1.28, 3.47)	
Chronic conditions	2.36 (1.66, 3.67)		2.44 (1.69, 3.50)	
Acute symptoms	2.57 (1.75, 3.77)		2.40 (1.62, 3.55)	
Roles limited by chronic illness	3.98 (2.52, 6.28)		3.93 (2.45, 6.31)	
BMI (≥25 kg.m²)	1.55 (1.11, 2.14)		1.46 (1.04, 2.04)	
Smoker	1.48 (1.02, 2.15)		1.40 (.95, 2.06)	
Inactive	2.81 (1.72, 4.59)	.50 (.21, 1.21)	2.60 (1.57, 4.27)	.45 (.18, 1.14)

† Odds ratios (OR) are presented as a trend across all three categories where the odds ratio (Good/Very good) is not significantly different from the OR (Moderate or Poor/ Good).

their health as good rather than very good 2.10 (1.39, 3.19), but activity did not distinguish between moderate / poor and good health.

With regard to socio-demographic variables, not working had the strongest association for this section, distinguishing between all self-rated health categories. The women reporting moderate or poor health were 8 times more likely to not have a job compared to those with good/very good health 8.03 (4.22, 15.28). Having no husband or partner, living alone, and a low personal income did not differentiate between women who described their health as very good rather than good. The women who described their health as moderate or poor, however, were nearly three times more likely to report having no husband or partner 2.77 (1.55, 4.96), that they lived alone 2.96 (1.25, 7.03), and received a low income 2.77 (1.61, 4.79) versus those with good or very good health.

Women reporting a low level of support in the home 1.39 (1.09, 1.77) and those dissatisfied with their social support 1.84 (1.44, 2.36), were more likely to rate their health as moderate/ poor than good. The role of care giving was not significant, with the odds ratios shown in Table 1. The final section of Table 1 presents the associations between self-rated health and menopausal status. There was no evidence that pre-, peri-, or post-menopause was associated with self-rated health. Having undergone a hysterectomy or using hormone replacement therapy to regulate cycles, however, were both associated with good rather than very good health, 2.31 (1.52, 3.52) and 2.46 (1.21, 5.00) respectively.

Multivariate Cross-sectional Analyses

The multivariate analyses for the cross-sectional data are shown in Table 2. The first model for the background measures shows that after adjusting for the other variables in the model, the strongest association with poorer self-rated health was being out of the workforce. This distinguished those with poor or moderate health from those with good health 4.85 (2.32, 10.12), as well as those with good health from those with very good health 2.27 (1.34, 3.87).

There was also a significant linear trend between reduced self-rated health and dissatisfaction with social support 2.00 (1.48, 2.71). The association between self-rated health and increasing age (a change in age of 5 years) was not significant. The second model explored the influence of the health measures and showed that there was a significant linear trend between reduced self-rated health and depression, presence of chronic conditions and number of acute symptoms. Reduced health status was also associated with; women feeling that their life was limited by chronic illness 3.98 (2.52, 6.28), being a smoker 1.48 (1.02, 2.15), being overweight 1.55 (1.11, 2.14), and those inactive were nearly three times more likely to report good rather than very good health 2.81 (1.72, 4.59).

As expected, the magnitude of these odds ratios was reduced when both the background and the health measures were included in the model. Of note, however, was the persistent relationship between reduced health and not working. Even after controlling for all variables, those out of work were more than four times more likely to rate their health as poor or moderate compared to good or very good 4.54 (2.01, 10.28).

In a similar direction, those working part-time rather than full-time were nearly four times more likely to report moderate or poor health 3.97 (1.20, 13.16). In addition, taking all cross-sectional measures into account, reduced self-rated health continued to be associated with increased reports of depression, chronic conditions, acute symptoms and an overweight or obese BMI 1.46 (1.04, 2.04). Furthermore, those physically inactive, were again, nearly three times more likely to rate their health as good rather than very good 2.60 (1.57, 4.27). Physical activity levels did not differentiate between those with poor or moderate health and those with good health .45 (.18, 1.14).

Longitudinal data

We now turn to the second focus of our analysis; the longitudinal data. The women had described some aspects of their own health as part of their children's assessment in 1983, 1985 and 1987. Table 3 shows the distribution of health ratings and the proportion depressed across these three early assessments - for the women who completed a survey in 1994. It is worth pointing out that both moderate or poor health and depression are more common as the women age.

Table 4 shows the results of the longitudinal analyses, presenting the associations between self-rated health and earlier background measures, after adjusting for the year in which the self-rated health measure was reported. As the interactions between the different reports of self-rated health and the earlier risk factors were not significant, either two odds ratios, or the odds ratios for a linear trend are presented. The strongest independent associations between current reduced health and past data were for physical symptoms and neuroticism (Model 1).

Table 3. Number of women (%) reporting very good, good or moderate to poor self-rated health, and the proportion depressed for 4 assessments between 1983 and 1994

	Very good N (%)	Good N (%)	Moderate/ poor N (%)	Proportion depressed N (%)	Age Mean (SD)
Assessment 1 1983-4	367 (56.6)	258 (39.4)	26 (4.0)	69 (10.7)	36.1 (4.93)
Assessment 2 1985-6	387 (61.0)	209 (32.9)	38 (6.0)	97 (15.3)	38.1 (4.93)
Assessment 3 1987-8	424 (61.2)	225 (32.5)	44 (6.4)	80 (11.5)	40.1 (4.89)
Assessment 4 1994	357 (48.6)	312 (42.5)	66 (9.0)	102 (13.9)	47.2 (4.98)

The odds ratio describing the association between self-rated and current and/or earlier depression was provided, with an absence of depression as the reference (Table 4). It can be seen that those reporting current depression were nearly five times more likely to rate their current health as moderate/poor, than good/very good, 4.91 (2.90, 8.31). In addition, current depression distinguished between women with good versus very good health, 4.18 (2.76, 6.32). Prior depression exacerbated the situation. Without adjustment for the background characteristics, the women reporting depression on two consecutive assessments were around nine times more likely to indicate current moderate/poor health 8.62 (5.16, 14.39).

Table 4 also presents the odds ratios for the earlier measures adjusted for each other (Model 2). As expected, in most cases the odds ratio is smaller than for Model 1. Apart from the woman's education, however, all measures were statistically significant. The strongest association with current self-rated health was a history of relatively numerous physical symptoms, 1.71 (1.33, 4.68). Being a smoker or overweight was also important, with linear trends similar in magnitude to those in the cross-sectional analyses. Well being measures also showed significant links with current self-rated health. Women in the upper quarter of the neuroticism scale collected in 1975-76 when their children joined the study at age 3 years, were more likely to rate their current health more poorly, 1.72 (1.36, 2.18). When all longitudinal measures (including depression) were taken into account (Model 3), all odds ratios were reduced further. Age, early neuroticism, physical symptoms, smoking, inactivity, and an overweight BMI, however, remained significant and demonstrated a linear trend with reduced self-rated health. Depression also remained significant - the women reporting current and past depression were over five times more likely to rate their health as moderate or poor compared to good or very good. As in the final cross-sectional model, the effect for social support was no longer significant, suggesting that depression could be in the causal pathway. Although the odds ratios for past and current depression were also reduced, they remained significant and relatively high, indicating that depression, whether past or present is a strong predictor of self reported health.

Discussion

The first broad issue addressed in the study concerned contributions to current self-rated health for New Zealand women in midlife, and the second issue examined the importance of past factors on current self-rated health. In terms of current measures,

Table 4. Odds ratio (OR), (95% confidence interval) for moving from very good to good health, or good to poor or moderate health for longitudinal health measures (N=656)

		Model 1 – Odds ratio‡		Model 2 - Early measures	Model 3 – Early measures and depression data	
		OR (95% CI)† good/very good	OR (95% CI)† moderate or poor/good	OR (95% CI) linear trend	OR (95% CI)† good/very good	OR (95% CI)† moderate or poor/good
Current age (change of 5 years)		1.05 (.96, 1.17)		1.14 (1.03, 1.26)	1.15 (1.03, 1.28)	
No post school education		1.35 (1.09, 1.68)		1.21 (.97, 1.52)	1.12 (.89, 1.42)	
Neuroticism score (1975)		2.10 (1.68, 2.62)		1.72 (1.36, 2.18)	1.40 (1.10, 1.78)	
Poor family support (1979, 1981)		1.71 (1.34, 2.19)		1.43 (1.10, 1.84)	1.20 (.92, 1.58)	
Low Active recreational (1979, 1981)		1.64 (1.30, 2.07)		1.34 (1.06, 1.71)	1.29 (1.00, 1.65)	
Physical symptoms (1979, 1981)		2.31 (1.76, 2.77)		2.00 (1.57, 2.54)	1.71 (1.33, 4.68)	
Smoker (1983)		1.33 (1.08, 1.64)		1.32 (1.07, 1.63)	1.27 (1.03, 1.58)	
BMI (=25 kg/m²) (1985)		1.51 (1.21, 1.87)		1.41 (1.14, 1.76)	1.38 (1.10, 1.72)	
Current depression	Depression at previous assessment					
No	No	1.00	1.00		1.00	1.00
No	Yes	2.80 (1.88, 4.16)	3.38 (1.84, 6.21)		2.14 (1.40, 3.24)	2.49 (1.35, 4.63)
Yes	No	4.18 (2.76, 6.32)	4.91 (2.90, 8.31)		3.48 (2.29, 5.30)	4.05 (2.34, 6.99)
Yes	Yes	5.45 (3.23, 9.20)	8.62 (5.16, 14.39)		3.52 (2.02, 6.11)	5.54 (3.26, 9.42)

‡Odds ratios for individual variables adjusted for the time at which self-rated health was assessed.
† Odds ratio are presented as a trend across all three categories where the odds ratio (Good/Very good) is not significantly different from OR (Moderate or Poor/ Good). Confidence intervals adjusted for multiple observations.

the data confirms findings from previous research, suggesting that poorer self-rated health is related to depression, chronic conditions, acute symptoms, reports of role limitations due to chronic illness, being out of work, dissatisfaction with social support, inactivity, and being overweight (e.g., Blaxter, 1990; Ministry of Health, 1999; Cott et al., 1999). These make sense, and highlight the contributions of both individual and contextual factors. Poor lifestyle behaviours do not promote health ratings, nor does living in an unsupportive environment. The most pronounced cross-sectional factors, however, were employment status, followed by role limitations due to chronic illness. The women out of work or those working part-time were far more likely to report reduced health status, than those working. This is after controlling for all factors, including income, education, and age. This indicates that being part of the work force is vital to improved health status for New Zealand midlife women. Because of the cross-sectional nature of this data, however, we cannot discern the causal direction of these associations. For example, we know that poor health may make it difficult to work, but not working could precede depression and subsequent poorer ratings of health. Alternatively, there may be a selection effect, where the healthy women take on full-time work. These cross-sectional findings demonstrate the complexity of the relationships that may underlie the observed associations, and suggests that the links between work status, physical health and depression need further investigation.

A strength of the present study was the inclusion of longitudinal data. The analyses confirm past studies, showing that physical symptoms, persistent poor lifestyle behaviours, and prior psychological problems are linked to subsequent reduced health status (e.g., Dennerstein, et al., 2003; Goldberg et al., 2001). There were also real differences in self-rated health with age - the prevalence of lower health ratings increased as the women got older and the association remained significant after adjusting for other factors. Age is often viewed as a variable to control for,

but we do not consider the social implications. Carr (1997), for example, highlighted the link between reflecting on ones career aspirations and achievements in middle age, linking disappointment to reduced well-being. In addition, identity also changes with age, and perceptions that working is valued relatively more in society than retirement and aging, for example, may affect health. Understanding age within the circumstances of our society, and the meaning of age and aging in general is very important.

The longitudinal data also showed that earlier measures of physical health, family support and activity were related to subsequent poorer health. There were also strong associations with early neuroticism and both current and earlier depression. Consistent with past findings, this suggests that the relationship between psychological well-being and health is reciprocal (Kuh et al., 2002). Poor health is associated with current psychological problems, while psychological problems may lead to poorer ratings of health. Response bias could explain the latter, as depression or a neurotic personality could lead to increased reports of symptoms and illness. The relationship between self-rated health and lifestyle, however, argues against this. Poor health in both the cross-sectional and longitudinal sections of the study was related to poor lifestyle behaviours as well as to smoking, inactivity and being overweight in the early 1980s. Although women with poor health may not be able to exercise and may gain weight, we know that inactivity and overweight are risk factors for poor health in the future. The findings therefore seem to support other studies, that past depression and poor lifestyle behaviours lead to reduced health status (Blaxter, 1990; Manderbacka et al., 1999).

Interestingly, personal income did not feature in the cross-sectional model at all and lack of further education did not play a significant part in any models. Other unanticipated findings were that neither care giving nor peri-menopause was associated with reduced health status. Only 90 women reported care giving, however, and the age of the women (mean age 47 years) undoubtedly influenced the number

(n=90) that were peri-menopausal. The usual age of menopause in Western countries is around 51 years (McKinlay, 1996). Of note was the apparent low rate (5%) of current HRT users, acknowledging that this estimate excluded just four women who were taking HRT but coded 'hysterectomy'. This low rate may also be due to the age range of the women (36 to 67 years) or the fact that the data were collected in 1994. HRT use has increased substantially over the past two decades in New Zealand (Breheny & Stephens, 2000) and elsewhere (Kmietowicz, 2000), though serious questions about its use have been raised in a recent randomised control trial.

The women in this study, because they are mothers of children in an ongoing longitudinal study, may not be a representative sample of New Zealand women in midlife; the sample is predominantly European (95%) and less culturally diverse than the total population. They are also more educated and have higher incomes than women of similar ages in the general population (Statistics New Zealand, 1996). Nonetheless, the sample was representative of women having babies in the early 1970s and the study does encompass women from a range of backgrounds and social circumstances. There is no reason to believe that the associations reported are limited to the women in this study.

The relative influence of psychological well-being is stronger than observed in other self-rated health studies (e.g., Blaxter, 1990). This may be due to the reliable and valid measures taken during early DMHDS assessments, when there was an emphasis placed on family relations and the well-being of the mother. With no reliance on retrospective recall, measurement error is likely to be reduced, and the validity of the correlations enhanced. The finding that support satisfaction was more influential than network size also highlighted the importance of well-being. Although being out of work was important, the lack of association with income and education level contrasted with other studies (e.g., Malstrom et al., 1999; Blakely, Lochner, & Kawachi, 2002). This may have been a consequence of

relative homogeneity of the sample. The cohort is still relatively young and future assessments will enable us to determine if these associations strengthen as the cohort ages into retirement. The association between reduced health and poor lifestyle, particularly inactivity and being overweight, unfortunately highlights an increasing problem, both within New Zealand and other Western countries.

In conclusion, the present findings reflect the multidimensional nature of health, valuing the importance of both individual and contextual measures. Given the reciprocal relationship between health and well-being, however, we recommend that future health improvement efforts for women strive to enhance psychological well-being. Mental health issues are already high up on the political agenda in New Zealand. The National Mental Health Strategy fosters research and improved service delivery to all those in need, although there is a focus on Maori, child, and youth mental health. Preliminary work is also underway to develop outcome measures for adults, but there is no specific policy on women's mental health (Ministry of Health, 2001). How then can women's mental health issues also receive a higher priority? The World Health Organization (WHO, 2000) has placed increased emphasis upon aspects of women's mental health, primarily due to their increased risk for depression and the psychological effects of violence against women. In New Zealand, increased resources for research in mental health is one important component. Recognition of the evidence and the construction of mental health policies that suit the changing situations for women at different stages of life is a second important component in all countries.

In addition, in order to create initiatives, methodologies and programs to enhance health and well-being, the full spectrum of the determinants must be considered. We also recommend the continued promotion of positive lifestyle behaviours and further research to assess the impacts of work status. The strong association between poor health and being out of work persisted after controlling for all variables. The

findings call for more study on the pathways that connect work and the risk of depression. We also do not know very much about the part that age plays. Age is linked to experiences, education opportunities, and income, for example. Combining these two areas of research and investigating how the duration and quality of work may improve health status at different life stages may hold promise. Further research is also needed to better understand the contexts and relationships between health status and role limitations. For example, how do chronic illnesses interfere with recreation compared to social life or vice versa and where does well-being play a part? This may suit qualitative techniques. The 1994 survey was comprehensive, and there is the opportunity to continue longitudinal investigations of the relative contribution of prior factors on subsequent health status. For example, social support was displaced from the model by depression. Longitudinal research is essential to understand the causal direction of this relationship.

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