Women, Work and Illness: A Longitudinal Analysis of Workforce Participation Patterns for Women Beyond Mid-age

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Abstract

Background: Labour policies and economic incentives encourage women to work beyond mid-age. However women exhibit complex patterns of workforce participation over this life stage. This study examined transitions in and out of paid work across the life course of mid-age women over a 14 year period and investigated associations between work and chronic diseases.

Methods: Latent Class Analysis (LCA) identified dominant workforce participation patterns among 11,551 mid-age women from the 1946-51 birth cohort of Australian Longitudinal Study on Women's Health (ALSWH). Multinomial logistic regression examined associations between work patterns and chronic diseases (diabetes, asthma, depression and arthritis), while adjusting for health risk factors, socio-demographic factors and competing activities.

Results: Five latent classes were identified:– '*Mostly in paid work*' (48%), '*Early paid work*' (9.4%) '*Increasingly paid work*' (8.9%), '*Gradually not in paid work'* (11.4%) and '*Mostly not in paid work*' (22.3%). Results showed that women with chronic diseases (diabetes, asthma, depression and arthritis) were less likely to be in paid work. These associations remained mostly unchanged after adjustments for other factors.

Conclusion: The findings of this study provide better understanding of workforce participation patterns in women's late working life. This has important implications for policy design, aimed to engage mid-age women in paid employment for longer in spite of chronic diseases and their complications. We suggest that there is a need for work place programs that support people with chronic diseases. Policies are also needed to facilitate better prevention and management of chronic health issues over the life course for women, in order to encourage workforce participation till later years.

Key Words: Workforce participation patterns; Middle aged women; Latent Class Analysis; Diabetes; Asthma; Arthritis; Depression.

Introduction

Women and their participation in the workforce is an important subject for research, policy and planning. Many studies have explored women's workforce participation behaviour over the last few decades, and how their workforce involvement has changed substantially over time.[1-4] In most economically developed countries, women's participation in paid work has increased dramatically over the last 25 years, with mid-age women (aged 45 – 64 years) in particular engaging more in paid employment options.[2, 4, 5] This issue of workforce participation among mid-age women has gained more importance because of the demographic trend of 'population ageing', with a rapid growth in the proportion of people aged 60 years and older.[6] A large proportion of these women will leave the workforce in next few decades without younger workers to replace them, potentially creating skill shortages. [7, 8] This situation presents many challenges for policy makers to address issues associated with an ageing workforce.[6, 7]

Despite continued economic incentives and changed labour policies to encourage mid-age women to continue working until later years, there is increasing heterogeneity of workforce participation at and beyond mid-age. This heterogeneity may depend on current health and social circumstances as well as past life circumstances.[9, 10] For example, women exhibit multiple working patterns over their life course depending on varying family and work roles.[11, 12] A large proportion of women work full time,[9, 13] while many are employed part time during childbearing and middle ages;[8, 12, 14] and some remain out of paid work.[9, 15]

Long standing health issues have been identified as major constraints on women's workforce participation.[16, 17] Chronic diseases such as diabetes, asthma, depression and arthritis have been reported to be associated with limited work capacity, influencing women to make adaptations in employment such as reduced working hours or premature retirement.[17-20]

These four chronic diseases are particularly important as they are common among women, and have different ages of onset with different natural histories. Diabetes (metabolic disorder) increasingly affects mid-age women and has many complications.[21] Asthma (chronic, progressive lung disease) affects women with increasing prevalence as they age.[22] Depression is twice as common in women

and can affect many aspects of women's lives,[23] while arthritis increases in prevalence with age and is a major cause of disability and physical limitation among women.[24, 25]

Studies have reported that health risk factors such as smoking[26] and unhealthy BMI (Body Mass Index)[27, 28] may also directly or indirectly affect workforce participation by affecting health status and increased susceptibility to health problems. The dynamics of workforce participation patterns are complex and influenced by other factors such as competing activities and socio-demographic factors such as marital status, education and caring responsibilities.[2, 4, 29-32] For example, some studies found that educated and partnered women were more likely to continue working in later years, as they were better skilled and, despite domestic responsibilities, preferred to work.[2, 4, 9, 33] In contrast, Pitt & Byles[17] and Berecki-Gisolf , Lucke , Hockey and Dobson[29] reported that informal caring negatively impacts on workforce participation.

Past studies have examined the associations between chronic diseases and employment,[16-20, 34-37] however many studies were cross-sectional. Some studies focussed on diabetes and employment ,[36, 38, 39] or on the impact of arthritis on employment [40, 41] and various studies investigated the impact of overall health status on labour force.[17, 19, 34, 42] To our knowledge no previous research specifically investigated the patterns of workforce participation over time, among mid-age women using longitudinal data.

We hypothesized that, women who reported having diabetes, asthma, depression or arthritis conditions had less engagement in paid work over their mid-age life stage. Thus we had two main aims for this study: i) identifying patterns of workforce participation through the mid-age life stage and ii) exploring the association between workforce participation patterns of mid-age women and chronic diseases (diabetes, asthma, depression and arthritis). Examining these patterns and associations is important for the current policy climate, where governments are re-designing policies to encouraging mature age workers to continue working longer.

Materials and Methods

Sample and eligibility

This paper presents the results of a quantitative study using self-reported data collected prospectively over a period of 14 years from the Australian Longitudinal Study on Women's Health (ALSWH).[43] This is an ongoing population-based longitudinal study since 1996, designed to track the health of Australian women over their lifetime and funded by the Australian Government Department of Health.[43, 44] Women were randomly selected from Medicare (national health insurance coverage for the whole population), with over-sampling of women from rural and remote areas.[44, 45] For this study, self-reported questionnaire data from up to six survey points (over a period of 14 years) for women born in 1946 – 1951 were used .[43] These women were aged 45 – 50 years in 1996 at the baseline survey and since then they have been surveyed every three years (1998, 2001, 2004, 2007, and 2010). They were aged 59 to 64 years at survey 6.[46] This sample of women is broadly representative of the national population of women in the target age groups.[44] To be eligible for this analysis, women had to provide valid responses to questions concerning work status for at least three out of the six surveys.

Measures of workforce participation – Indicator variable

At each survey women were asked if they were in 'paid employment', 'unpaid employment' or were 'unemployed' and were categorized as in 'Paid work' and 'Not in paid work'. This work status was used to identify robust workforce participation patterns (the latent variable) over a substantial period of time.

Measures of chronic diseases

Women were asked if they had been diagnosed or treated for chronic conditions ('ever' in the first two surveys and 'in the last three years' from survey three onwards). Diabetes, asthma, depression and arthritis were considered as enduring conditions: so if participants reported diagnosis/treatment of diabetes, asthma, depression or arthritis at any time point, they were categorized as having that condition.

Health risk factors

Body Mass Index (BMI) was calculated from reported height and weight, and categorized based on WHO BMI classification of 'Healthy weight BMI'; 'Underweight BMI'; 'Overweight BMI' and 'Obese BMI'.[47]

Smoking: Smoking was coded as 'Current smokers'; 'Ex-smokers' and 'Non-smokers' according to classification methods of the Australian Institute of Health and Welfare (AIHW).[18, 48]

For both BMI and smoking, the last available observation was identified and used in analysis.

Measures of socio-demographic factors

Marital Status: Participants who responded as being married or in a de-facto relationship were categorized as '*partnered'*; otherwise they were coded as '*not partnered*'. A transition variable was created to represent marital status at survey 1 and survey 6 as: '*Not Partnered at S1, S6'*; 'P*artnered S1, S6'; 'Partnered at S1, Not Partnered at S6'* and 'P*artnered at S6, Not Partnered at S1'*.

Education: Participants reported their highest educational qualification at survey 1 and then at survey 6 (school certificate, diploma or higher degree). They were categorized as having *'education'* if they indicated 'yes' to any qualification at either survey 1 or survey 6, and as '*no education'* if they responded as having 'no qualification' at both time points.

Income was found to be highly correlated with workforce participation, and was not included in analysis as a socio-demographic factor.

Measures of competing activities

Women were categorised as "yes" to "grandchild care" if they reported that they provided care for their grandchildren on any survey from baseline to survey 6.

Women were categorized as 'Yes' to "informal care" if they reported that they provided unpaid care to a sick/disabled person on any survey from baseline to survey 6.

Statistical Analysis

Latent class analysis (LCA) was the method of choice to identify the underlying subgroups of workforce participation patterns in a format that was parsimonious and easy to comprehend.[49] LCA is a finite mixture model, used to identify latent subgroups within a population based on individuals' responses to multiple observed variables.[49] Results from the LCA model also provided the prevalence of each latent class and error associated with observed variables in measuring the latent classes.[49] This method enabled us to fit a model that represented the workforce participation in our data, including the most common and least common workforce participation patterns.[49] The latent classes were then treated as an independent variable and its associations with specific chronic diseases (diabetes, asthma, depression and arthritis) were explored. SAS 9.4 was used to carry out the LCA procedure which was developed by the Methodology Centre, Penn State.[50, 51]

Six latent class models were conducted (fitting two to seven latent classes) and results compared. An optimal classification model with the best fit was identified based on the principle of best model fit, parsimony and information criteria Akaike's Information Criteria (AIC), Bayesian Information Criteria (BIC), Entropy. [49] Labels were assigned to each latent class using the 'item response probability' and 'latent class membership probability'.[49]

The characteristics of each latent class were graphically summarized using a type of Lasagne plot[52] to provide a simple and comprehensible way to visualize the class membership and validate the labels.

Participants were then assigned to maximum probability based workforce participation classes using the first maximum probability rule.[53] Class membership based on maximum posterior probability was retained, creating a five category variable 'workforce participation' for subsequent multivariate regression analysis and model interpretation.

Unadjusted associations between workforce participation patterns and chronic diseases were initially assessed.

Multinomial logistic regression

Regression analysis was performed to assess the effect of each chronic disease (diabetes, asthma, depression and arthritis) on workforce participation patterns while adjusting for health risk factors, socio-demographic factors and competing activities. A model building approach was taken where groups of variables were added in to the initial unadjusted models.

The analyses for multinomial logistic models defined below were carried out in separate models for diabetes, asthma, depression and arthritis.

Model 1: Workforce participation patterns + each chronic disease in separate unadjusted models.

Model 2: Workforce participation patterns + each chronic disease separately + adjusted for health risk factors

Model 3: Workforce participation patterns + each chronic disease separately + adjusted for health risk factors and socio-demographic factors

Model 4: Workforce participation patterns + each chronic disease separately + adjusted for health risk factors, socio-demographic factors and competing activities

Results

To reliably identify workforce participation patterns across time, the analysis was restricted to participants who had at least three valid survey observations for paid work status. Using this eligibility criteria, 1670 (12.2%) women with four or more missing survey observations were excluded from analysis. To maintain the same sample across various regression models, a further 494 (4.1%) women were excluded from analysis due to missing covariate observations, resulting in a total of 11,551 women included for analysis.

Participants' engagement in paid work was graphed over the six survey points to demonstrate changes in workforce participation at each survey point. The majority of women were partnered at surveys 1 and 6 and had some educational qualification. Most were providing informal care and caring for grandchildren on at least one survey (1 to 6) and had a healthy BMI and were non-smokers. Figure 1

presents the transitions from ‘paid work’ to ‘not in paid work’ and vice versa over all the survey points. The majority of participants (70%) were ‘in paid work’ at survey 1, but transitioned in and out of paid work, with 49% of participants in paid work by survey 6. The frequency of transitions greatly increased towards survey 4, 5 and 6, with more and more women transitioning in and out of paid work.

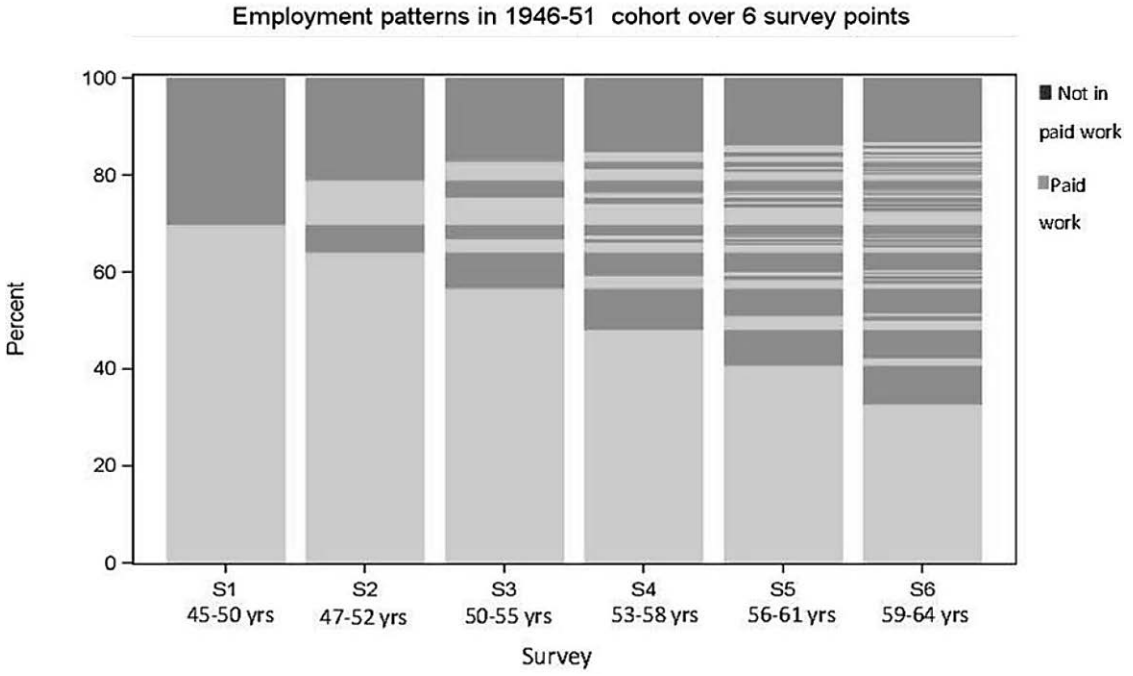

Figure1: Transition patterns of 11,551 middle aged women in and out of paid work over six survey points

The model with five latent classes was selected on the basis of information criterion AIC, BIC and Entropy[49] as shown in Table 1.This model provided adequate representation of data, distinct labels and easy interpretation of classes. [49, 54]

Table 1: Model fit statistics for baseline latent models for evaluation of workforce participation patterns in 11,551 middle age women (2 – 7 classes)

Model fit Statistics	2 class model	3 class model	4 class model	5 class model	6 class model	7 class model
AIC[1]	213.5	1375.0	376.0	213.5	245.3	268.9
BIC[2]	355.5	1458.5	488.7	316.5	335.3	355.1
Entropy	0.79	0.83	0.80	0.79	0.78	0.77

Figure 2 and Table 2 present item response probabilities (for responding 'yes' to paid work) for each latent class at each survey time point. Many women (48%) were classed as 'mostly in paid work'; with the majority responding 'yes' to being in paid employment at most time points. In contrast, women categorized as 'mostly not in paid work' had item response probabilities closer to 0. Item response probabilities of women classed as 'increasingly in paid work' were closer to 0 in surveys one and two, and closer to 1 in later surveys. Participants classed as 'gradually not in paid work' were clearly distinguishable from 'early paid work' by higher item response probabilities at survey three and four.

Table 2: Probability of being in paid work over a 15 year period, according to five latent classes for 11,551 middle aged women

Item	Latent classes				
	Mostly in paid work (48.0 %)	Early paid work (9.4%)	Increasingly paid work (8.9%)	Gradually not in paid work (11.4%)	Mostly not in paid work (22.3%)
Survey 1	0.93	0.81	0.25	0.87	0.13
Survey 2	0.98	0.99	0.32	0.91	0.09
Survey 3	0.95	0.36	0.53	0.94	0.08
Survey 4	0.94	0.12	0.73	0.64	0.05
Survey 5	0.97	0.10	0.87	0.05	0.04
Survey 6	0.81	0.08	0.73	0.05	0.04

[1] AIC = Akaike's Information Criterion
[2] BIC = Bayesian Information Criterion

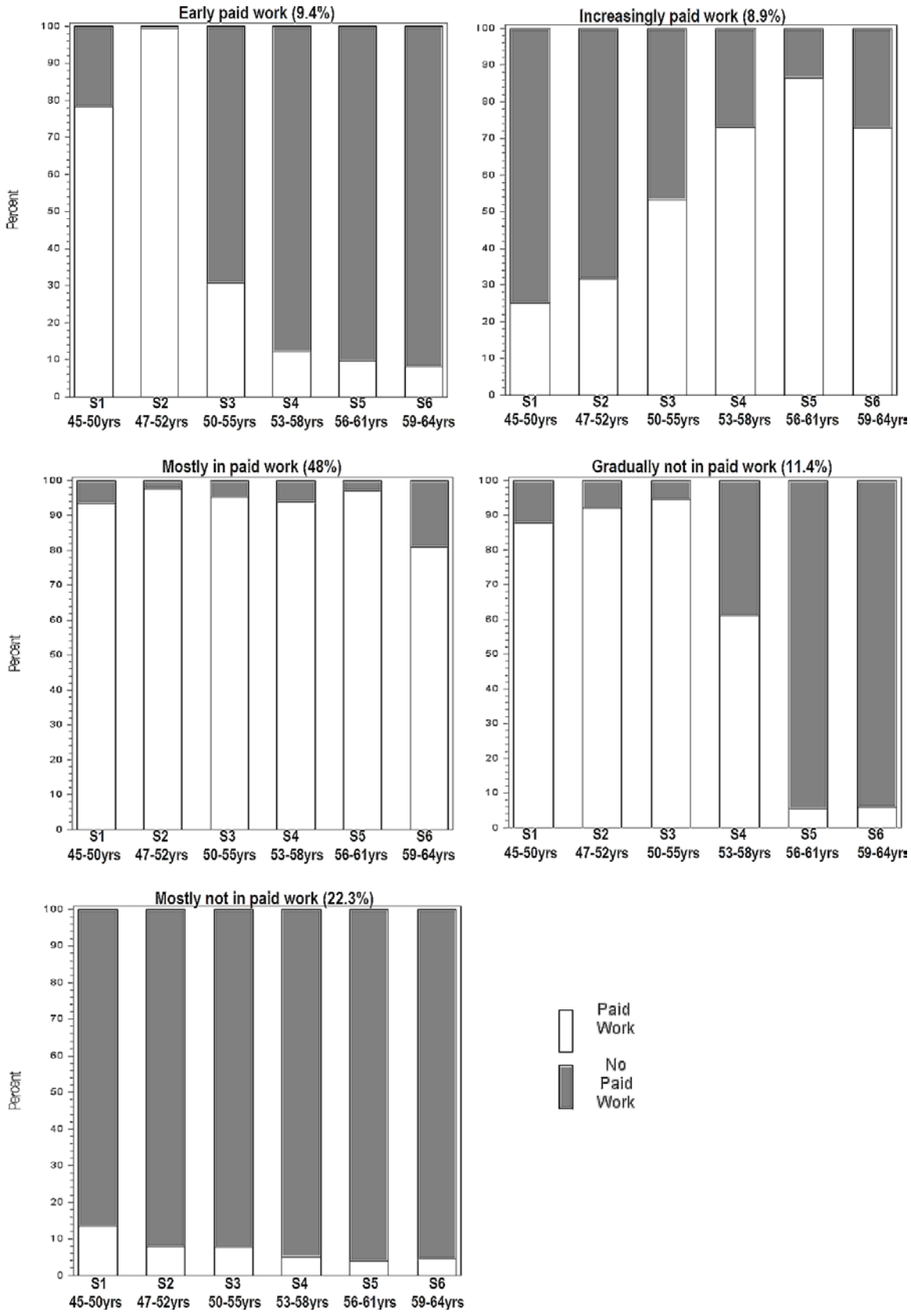

Figure 2: Workforce participation patterns among 11,551 middle age women, using five latent classes

202 Chronic diseases (diabetes, asthma, depression and arthritis) were less prevalent in women classed as
203 'mostly in paid work' compared to other classes (see Table 3).

204 **Table 3: Prevalence of chronic diseases according to the workforce participation**
205 **patterns for 11,551 women born in 1946 – 51**

	Workforce Participation Patterns				
	Mostly in paid work	Early paid work	Increasingly paid work	Gradually not in paid work	Mostly not in paid work
Chronic Diseases					
Diabetes					
Yes	472 (8.0%)	105 (12.1%)	111 (14.0%)	149 (10.9%)	407 (15.4%)
No	5406 (92.0%)	763 (87.9%)	680 (86.0%)	1220 (89.1%)	2238 (84.6%)
Asthma					
Yes	1336 (22.7%)	233 (26.8%)	205 (25.9%)	336 (24.5%)	706 (26.7%)
No	4542 (77.3%)	635 (73.2%)	586 (74.1%)	1033 (75.5%)	1939 (73.3%)
Depression					
Yes	1596 (27.2%)	310 (35.7%)	257 (32.5%)	427 (31.2%)	953 (36.0%)
No	4282 (72.8%)	558 (64.3 %)	534 (67.5%)	942 (68.8%)	1692 (64.0%)
Arthritis					
Yes	2073 (35.3%)	389 (44.8%)	302 (38.2%)	595 (43.5%)	1191 (45.0%)
No	3805 (64.7%)	479 (55.2%)	489 (61.8%)	774 (56.5%)	1454 (55.0%)

206

207 Figure 3 presents the strength of association between each chronic condition and workforce
208 participation patterns in the final adjusted models.

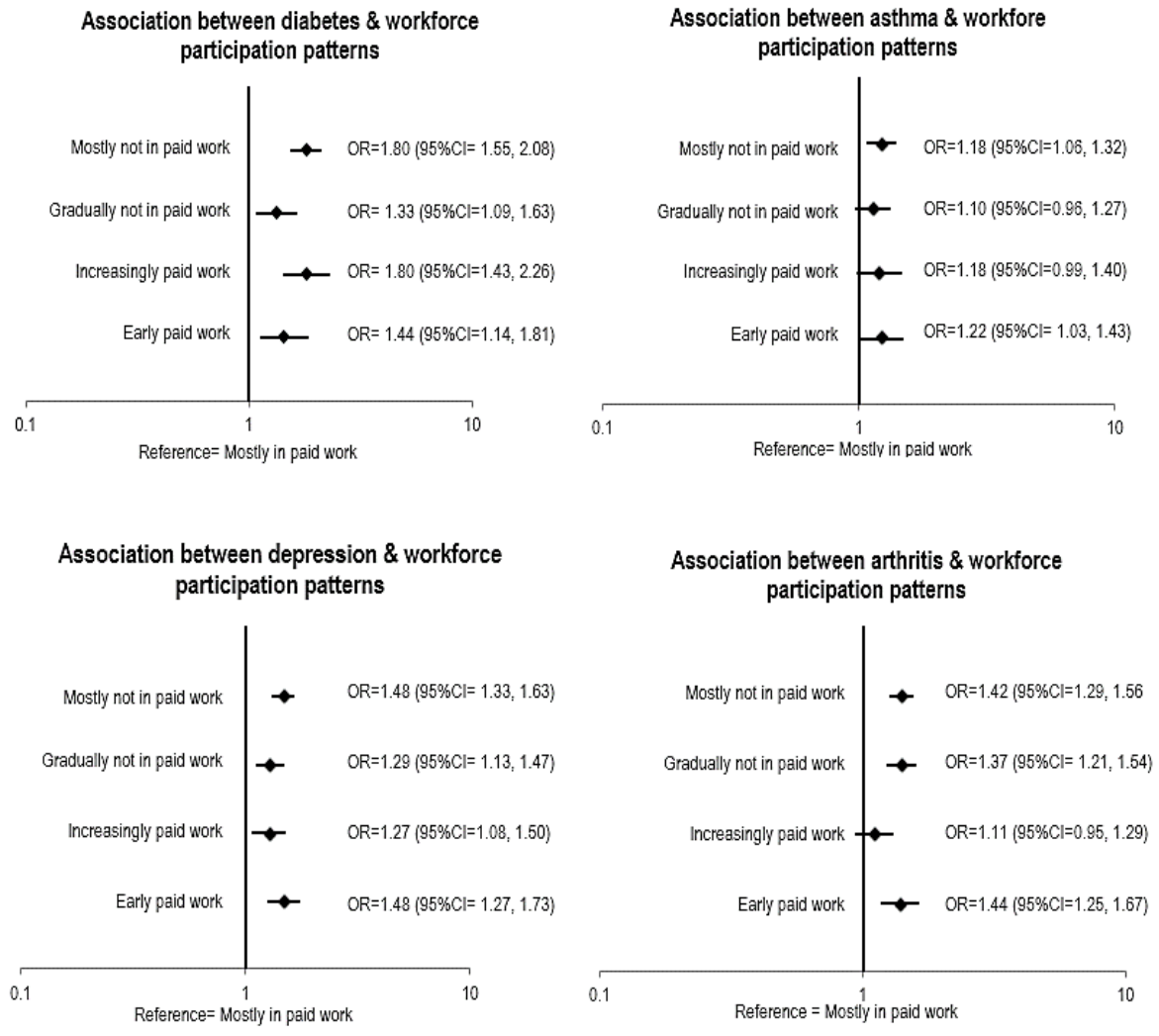

Figure 3: Final adjusted model for association between chronic diseases (diabetes, asthma, depression and arthritis) and workforce participation patterns among 11,551 middle age women

For all the conditions, the odds of being in category other than 'mostly in paid work' were higher for those reporting diabetes, asthma, depression or arthritis (see Figure 3). There were no substantive differences between unadjusted and final adjusted models (results not shown here).

Table 4 presents the fully adjusted model for diabetes. Workforce participation patterns were also found to be associated with:

i) BMI – women with underweight or obese BMI were more likely to be 'mostly not in paid work' and 'early paid work'.

ii) Marital status – partnered women were more likely to be in workforce pattern other than 'mostly paid work'.

iii) Education – less educated women were more likely not in 'mostly paid work'.

iv) Grandchild care and informal caring – Women with either of caring responsibility were more likely to be 'mostly not in paid work' and 'gradually not in paid work'.

Table 4: Association between diabetes and workforce participation patterns of 11,551 mid-age women in the final adjusted model.

	Workforce participation patterns Mostly paid work – Reference							
	Early paid work		Increasingly paid work		Gradually not in paid work		Mostly not in paid work	
	Odds ratio (95% CI)	p-value	Odds ratio (95% CI)	p-value	Odds ratio (95% CI)	p-value	Odds ratio (95% CI)	p-value
Model 4 – Diabetes + Health risk factors + Socio-demographic factors + Competing activities								
Diabetes								
No (reference)	1		1		1		1	
Yes	1.44 (1.14, 1.81)	0.0020	1.80 (1.43, 2.26)	<0.0001	1.33 (1.09, 1.63)	0.0048	1.80 (1.55, 2.08)	<0.0001
BMI								
Healthy weight (reference)	1		1		1		1	
Underweight	1.64 (0.92, 2.92)	0.09	1.13 (0.57, 2.22)	0.72	1.11 (0.64, 1.96)	0.73	2.07 (1.43, 3.00)	0.0001
Overweight	0.95 (0.79, 1.13)	0.53	0.98 (0.82, 1.17)	0.83	1.05 (0.91, 1.20)	0.55	1.02 (0.91, 1.15)	0.72
Obese	1.23 (1.03, 1.48)	0.0234	1.05 (0.86, 1.28)	0.59	1.17 (1.00, 1.36)	0.05	1.36 (1.20, 1.53)	<0.0001
Smoking								
Non-smoker (reference)	1		1		1			
Current smoker	1.34 (1.06, 1.68)	0.0134	1.24 (0.97, 1.57)	0.08	0.85 (0.68, 1.06	0.14	1.10 (0.94, 1.28)	0.25
Ex-smoker	1.08 (0.92, 1.27)	0.35	1.00 (0.93, 1.30)	0.27	0.97 (0.85, 1.09)	0.67	0.96 (0.85, 1.09)	0.59
Marital status								
Not partnered S1 – S6 (reference)	1		1		1		1	
Partnered S1 – S6	1.92 (1.49, 2.48)	<0.0001	1.36 (1.06, 1.72)	0.0130	1.95 (1.59, 2.38)	<0.0001	1.46 (1.26, 1.70)	<0.0001
Partnered S1	2.29 (1.74, 3.02)	<0.0001	1.79 (1.39, 2.32)	<0.0001	1.37 (1.06, 1.69)	0.0151	1.99 (1.69, 2.34)	<0.0001
Partnered S6	1.74 (1.14, 2.64)	0.0100	0.88 (0.55, 1.43)	0.61	0.81 (0.53, 1.26)	0.38	0.62 (0.44, 0.87)	0.0050
Education								
No (reference)	1		1		1		1	
Yes	0.42 (0.34, 0.53)	<0.0001	0.57 (0.45, 0.73)	0.0007	0.69 (0.56, 0.85)	<0.0001	0.33 (0.28, 0.38)	<0.0001
Grandchild care								
No (reference)	1		1		1		1	
Yes	1.14 (0.93, 1.40)	0.29	1.15 (0.94, 1.40)	0.07	1.22 (1.04, 1.43)	0.0031	1.23 (1.08, 1.41)	0.0001
Informal caring								
No (reference)	1		1		1		1	
Yes	1.25 (1.08, 1.45)	0.0030	1.11 (0.97, 1.29)	0.19	1.21 (1.07, 1.36)	0.0026	1.20 (1.09, 1.32)	0.0002

Discussion

The main emphasis of this study was on establishing patterns of workforce participation of mid-age women as they age from their 40's through to the age of 60 years, and on assessing the associations between these patterns and chronic diseases (diabetes, asthma, depression and arthritis). The findings indicated that mid-age women exhibit distinct patterns of workforce participation when analysed over a long period of time. The frequency of transitions into and out of paid work increased as the women entered into their 50's, and these transitions and employment patterns were identified by a five class latent structure. Workforce participation patterns were significantly associated with diabetes, asthma, depression and arthritis on their own, and also after adjusting for health risk factors, socio-demographic factors and competing activities.

In this cohort, many women were classed as 'mostly in paid work', meaning that they had a high probability of being in paid work at all time periods. These women tend to be more educated than women in the other classes, and perhaps represent the new generation of women in the baby boomer cohort with high education and career-oriented attitudes. The post-war (World War II) period was marked by increased attainment of education by women and this was a key factor contributing to career-oriented attitudes in this cohort of women.[33, 55] We also found an association between marital status and workforce participation patterns, with unpartnered women having highest odds of being 'mostly in paid work'. This association between work and not partnered marital status may work two ways: women who are in longer-term paid work may be more empowered to either remain single or (more commonly) seek divorce if the marriage is unsatisfactory, or alternatively, single women may be more dependent on their own paid work for economic security. Previous research suggests that both of these economic influences may operate. A cultural explanation has also been proposed whereby career-orientation and single status are influenced by emancipatory norms.[56] However, it should also be noted that, as for the other workforce patterns, the majority of women in the 'mostly in paid work' class were partnered.

Women classed as 'mostly not in paid work' and 'early paid work' may represent women who undertook more traditional female gender roles such as caring for grandchildren after their own

children left home, informal caring, or as stay at home wives. Even though there has been greater social acceptance of working women; many women may prefer to (or have to) opt out of paid work after being married and due to family responsibilities.[9, 30, 31] Women who are informal carers, are also more likely to give up work, or reduce their workforce participation, to allow them to take on this role.[29] However, it should be noted that in this study many women who were mostly in paid work also took on a carer role, underscoring the need for many women to juggle these different roles of paid work and informal care. Likewise, while there was an association between workforce participation patterns and grandchild care, the many women mostly in paid work also cared for grandchildren.

Women classed as 'increasingly paid work' represented the proportion of the cohort who joined (or re-joined) the workforce in their late 40's and 50's and continued working till later years.[15] The experience of freedom due to children leaving home, divorce or separation, change in partner's work (e.g. retrenchment), or financial conditions may be factors driving these women towards increased employment.[15]

The 'gradually not in paid work' class is comprised of women who were previously in paid work but who increasingly moved out of paid work, potentially due to caring responsibilities, financial security, partner's retirement [33] and other life course, ageing and health related factors. As women age, they are more likely to decrease their working hours or stop working.

The second part of this study was focused on understanding the association between workforce participation patterns and chronic health conditions (diabetes, asthma, depression and arthritis). This issue has important policy implications in terms of population ageing, health and government incentives to promote working in older women, by means of creating a better understanding of the interplay between chronic health issues and workforce participation.

Health status plays an important role in women's workforce participation, as demonstrated by our findings and by other studies. [8, 10, 16, 37, 42] However, in contrast to previous studies [16, 17, 19, 34, 35, 37], this study presents a different analytic approach by exploring the association between women's underlying workforce patterns and particular chronic conditions and over a period of 14 years. The identification

of five distinct latent classes shows the variations in mid-age women's workforce participation patterns over this period.

Women with diabetes were around twice as likely to be 'mostly not in paid work', compared to those classed as 'mostly in paid work'. They were also more likely to have 'early paid work' and 'increasingly in part time work', although there was no significant relationship between diabetes and gradually not in paid work once all factors were added to the models. One potential explanation for this relationship between diabetes and work is that the health effects of diabetes may significantly affect women's ability to participate in the workforce.[57] It has also been reported that individuals with diabetes may suffer from discriminatory hiring practices by employers, and this may have played a role in defining these associations.[58] Another potential explanation for the association between diabetes and lesser workforce participation at this life stage, is that diabetes is associated with lower socio-economic position and employment in lower employment grades which may be harder for mature workers to sustain.[59]

Asthma was most strongly associated with being 'mostly not in paid work', and being in 'early paid work'. These results support previous findings that women with asthma are less likely to be in some kind of paid work.[42] Other studies suggest that people with asthma may have difficulty maintaining employment due to frequent acute episodes requiring time off work.[60] Other health factors (particularly BMI) may also explain some of the association between the reporting of asthma and workforce patterns[61, 62] although the association between asthma and work patterns mostly remained even once these had been included in our models.

Women who reported depression had much lower odds of being 'mostly in paid work', both in unadjusted and adjusted models. Again, this association could work in more than one direction. One likely explanation may be that women with depression are less likely to seek employment, find it harder to get paid employment,[63-66] and are less likely to be able to remain employed.[64, 67, 68] Alternatively, being out of the workforce may predispose to depression.[69] Studies have also found that movement from unemployment to employment is associated with improved mental health.[69]

Arthritis was the most commonly reported condition, and was associated with being 'mostly not in paid work', 'early paid work', and 'gradually not in paid work'. The latter two patterns are consistent with the progressive nature of this degenerative condition and its increasing prevalence in later life. [70] Other studies have reported that people with arthritis reduce their workforce participation due to pain and disability. Given the high prevalence of this condition, the impact of arthritis on an ageing workforce is substantial.[71, 72] In a large cross-sectional study undertaken in Canada, more than 50% of working age people with arthritis were not in the labour force. This effect was stronger for women than for men, and those who were working reported that they needed more flexibility in the workplace to allow them to cope with their condition.[73] In our study, arthritis was also common among the majority of women who remained 'mostly in paid work' across the study period indicating that many women continue working with arthritis. However, the extent to which they struggle to continue working despite pain and disability and/or the extent to which their workplaces support them to continue working is not available from our data. The strong association between work patterns and arthritis even after other factors were added to the models suggests that the association between continuing to work and having arthritis is not wholly explained by disability.

Implications for Policy

The ability of an ageing population to contribute to work will be limited by chronic disease and many women will decrease their workforce participation as they age. Policies are needed to accommodate the needs of older women and to recognize that many women will continue to work with chronic diseases and juggling other competing productive activities. These policy approaches require action on multiple fronts, including greater workplace flexibility[73] to respond to fluctuations in symptoms and other needs such as caring, supportive work environments that reduce stress on older workers, addressing age discrimination, and encouraging intergenerational approaches to workforce development.[74]

Strengths and Limitations

A major strength of this study was the use of a large cohort of women surveyed over many time points from the Australian Longitudinal Study on Women's Health (ALSWH) which is the largest, long-term and nationally representative study targeting women's health and life issues in Australia.

However, this study was limited by the fact that chronic conditions were self-reported; and even though they are a valid measure,[75] the possibility of reporting bias cannot be excluded. We also have limited information about the duration, severity and complications of diseases and were not able to establish any causality. Also, not all social and contextual factors could be measured. It should also be noted that latent classes and resultant patterns of workforce participation are hypothetical and information regarding women seeking employment was not included. Other factors associated with life course ageing and social demands may explain some of the differences in workforce participation patterns over time. Some women were excluded from analysis because of missing observations, however this was considered to have a negligible impact on the interpretation of the observed results.

Conclusion

Our results indicate that workforce participation patterns are associated with chronic conditions which may affect women's ability to work beyond middle age. Australia's working age population is projected to decrease in coming years and many sectors with an older workforce profile will be greatly affected. Similarly, other governments around the world are responding to population ageing with policies to extend working life and governments worldwide are increasing the retirement age. The success of these policies is dependent on a better understanding of the interplay between chronic conditions and employment patterns. This study has important implications for the design of policies aiming to engage mature age women in paid employment for longer in spite of chronic diseases and their complications. We suggest that there is a need for work place programs that support people with chronic diseases. Policies are also needed to facilitate better prevention and management of chronic health issues over the life course for women, in order to encourage workforce participation till later years.

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