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Changes in use of time across retirement: A longitudinal study

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ABSTRACT

Objectives: This study aimed to investigate how daily use of time changes across the retirement transition and how these changes may differ according to socio-demographic characteristics.
Study design: This longitudinal cohort study was based on interviews with 124 people at pre-retirement and at three, six and 12 months after retirement.
Main outcome measures: The Multimedia Activity Recall for Children and Adults (MARCA), a computer-assisted telephone interview, measured use of time. Random effects mixed modelling (REMM) was used to examine time use changes across retirement, and ANCOVA to investigate the extent of the change by sex, education and health.
Results: Apart from the decrease in time spent in work across retirement (−122 min/day, $p < 0.001$), less time was also spent in both active and passive transport (−26 min/day, $p < 0.001$). There were significant increases in time spent on Chores (+55 min/day, $p < 0.001$), Screen time (+32 min/day, $p < 0.001$), Sleep (+32 min/day, $p < 0.001$), Quiet time (+17 min/day, $p = 0.02$), Self-care (+8 min/day, $p = 0.01$) and Physical activity (+7 min/day, $p = 0.01$). There was little variation in change between sex, education and health sub-groups. Most changes occurred at retirement, with time use patterns fairly stable between three and 12 months post-retirement.
Conclusions: The small amount of time spent in physical activity, combined with less time spent in active transport and increased time spent watching television, indicate the need for a more active lifestyle.

1. Introduction

1.1. Background

The transition from a working lifestyle to one of retirement involves a reorganisation of daily activities [1] and the choice of activities has health consequences. For example, being more active will help reduce the risk of chronic illness, some cancers and mental health conditions [2,3], while being more sedentary will increase the risk of all-cause mortality, cardiovascular disease and metabolic syndrome [4,5]. Given that the population is ageing in most developed countries [6], and therefore there are increased numbers of people who are retired, the health impact of choices relating to use of time is of significant concern. Yet little is known about how use of time changes across retirement.

How people use their time over the retirement transition may differ by socio-demographic factors. For example, although men spend less time doing household chores than women at all life stages, they increase the time spent in chores around retirement, compared with women [7,8]. Similarly, previous studies have found an overall increase in recreational physical activity at retirement, but a decrease when considering only retirees from lower socioeconomic backgrounds [9,10].

Some studies have examined the effect of retirement on a limited range of activities such as physical activity [9], or sedentary behaviours [11], but only a few have looked at the full range of daily activities, using time use surveys [12,13]. These time use studies have been of a cross-sectional design, which is subject to bias due to different characteristics of the working and retired groups. To our knowledge, no longitudinal studies have investigated daily use of time, in a number of socio-demographic groups, across retirement.

1.2. Objective

This study aimed to investigate how use of time throughout a 24-h

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day (within the domains of chores, physical activity, quiet time, screen time, self-care, sleep, sociocultural activities, transport and work) changes across the retirement transition in a cohort of people from pre-retirement to 12 months post-retirement. The secondary aim was to explore how changes in use of time differed based on the socio-demographic characteristics of sex, education (as an indicator of socioeconomic status) and health.

2. Methods

2.1. Study design and participants

This study was embedded within the Life After Work Study [14]. Ethics approval was obtained through The University of South Australia Human Research Ethics Committee and The University of Queensland Behavioural and Social Sciences Ethical Review Committee. The committees' ethics frameworks are based on the Australian Code for the Responsible Conduct of Research (2007) [15] with written, informed consent obtained from all participants.

Participants were recruited via recruitment companies and a wide range of advertising, from two cities in Australia, Adelaide and Brisbane, between April 2012 and July 2013. People were eligible for study participation if they were over 50 years of age, worked ≥19 h/week pre-retirement, had plans to retire within the next nine months and were able to speak and write in English. Additional eligibility criteria were to reduce working hours by ≥19 h/week at retirement and work ≤11 h/week once retired. Having a life-threatening health condition or major treatment in the last six months, was the only exclusion criterion.

At the pre-retirement face-to-face assessment, participants completed a survey, undertook physical measures for the Life After Work Study and made appointments for the two use of time phone interviews, which took place in the following week. Use of time interviews and surveys were repeated at three and six months, with most participants completing these surveys online. All assessments were repeated in another face-to-face appointment at 12 months post-retirement. At the completion of each assessment, participants were sent an honorarium of AUD25-50 to acknowledge their time and effort and to assist with travel costs.

2.2. Use of time measurement

The Multimedia Activity Recall for Children and Adults (MARCA) [16], a computer-assisted telephone interview, measured use of time. Participants were asked to recall the two previous days' activities (including at least one work day and one non-work day) in time intervals of five minutes or more. Activities were matched with the MARCA's list of around 550 activities and recorded by the interviewer. The software calculated the daily time spent in each activity, averaged over the four days that were recalled at each assessment point. Activities were grouped to form "macrodomains" and "superdomains" (e.g. "gardening" and "hanging out washing" contributed to the macrodomain "Outside chores", and this was combined with "Inside chores" to form the superdomain "Chores") (Table 1 in Supplementary material). Note that it is the nature of the activity rather than the context which determined the domain category. For example, computer use falls into the superdomain "Work" regardless of whether it is carried out in a work context or not. Mean daily values for time spent in each domain were calculated, using a weighting for weekdays:weekend days of 5:2.

Each activity is linked to a value for energy expenditure, based on the Ainsworth Compendium of Physical Activities [17] and expressed in metabolic equivalents (METs). Daily energy expenditure was calculated by the MARCA programme and is expressed as MET-minutes [16]. Energy expenditure was categorised as Sleep (< 1 MET), Very light physical activity (1–1.9 METs), Light physical activity (2–2.9 METs), Moderate physical activity (3–5.9 METs), and Vigorous physical activity (≥6 METs). Energy expenditure bands are independent of superdomains or macrodomains and thus provide additional information about activity intensity levels.

The MARCA has demonstrated good psychometric properties. The test-retest reliability, conducted on adults on the one day, was high for the domains of screen time and sleep (ICC = 0.990–0.997) [16]. Validity for physical activity level is moderate-to-strong compared with doubly labelled water (rho = 0.70) [18] and for sedentary behaviour, moderate to strong compared with ActivPAL (r = 0.77) (r = 0.77) [19].

2.3. Socio-demographic variables

In the survey, participants reported age, sex, living arrangements, occupation, work hours, marital status, education, and income. The last three questions were based on those in the Australian Census [20]. Participants recorded the highest level of education they had completed and for analysis, these were categorised as: low (primary/elementary school, high school, post-secondary diploma or certificate); medium (bachelor degree); or high (post-graduate qualification).

2.4. Health variable

Health status was measured using the "general health" subscale of the Short-Form Health Survey (SF-36), a commonly used self-report health survey [21,22]. Five Likert scale items were summed to create a total score (range: 5–25) and re-categorised into the tertiles: fair health (5–17); good health (18–19); or excellent health (20–25). The SF-36 has demonstrated moderate to good test-retest reliability (0.60–0.81) and satisfactory construct validity compared with four equivalent dimensions of the Nottingham Health Profile [21].

2.5. Data analysis

A priori power calculations, based on four assessment time points, a significance criterion of $\alpha = 0.01$ and a power of 80%, indicated that a sample size of 104 was required to detect a small to medium effect size (Cohen's d = 0.25). However, a larger than normal drop-out rate was expected due to the known flexibility of retirement plans. Therefore, to allow for 25% drop-out, a final sample size of 140 was sought.

Data from the two sites were pooled and analysis was conducted on all participants who completed the baseline and at least one other assessment. Where there were missing values data were imputed using a "before and after data" method [23], with values used from the post-retirement time point closest to the missing time point.

Demographic and retirement data were analysed using descriptive statistics, and where possible, compared with available population-based data to help discern the representativeness of the sample.

Using SPSS version 20, and controlling for sex, general health and education level, random effects mixed modelling (REMM) was used to examine changes across retirement in use of time in the different superdomains. ANCOVA was then used to investigate the extent of the change, contrasting pre-retirement with only the final time point (12 months post-retirement) as time use patterns were relatively stable between three to 12 months post retirement. In addition, the baseline value was used as a covariate since it may influence the amount of change. Where data were not normally distributed they were transformed using log (Self-care and Transport superdomains) and square root (Quiet time, Screen time and Sociocultural superdomains) transformations. Sequential Bonferroni adjustment was used to correct for multiple comparisons.