

Health-related behaviour in relation to transition into age retirement: An observational study based on HUNT3

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Summary

Objectives: In western countries, more years are being spent in age retirement. The transition phase into age retirement may be important for physical and mental health in the years following retirement. The aim of the present study was to investigate whether age retirement is associated with changes in the level of physical activity, smoking habits and alcohol habits.

Design: Using data on self-reported health-related behaviour from a population-based study (The Nord-Trøndelag Health Study (HUNT3)) linked to registry data on age retirement, participants who retired within two years prior to and two years after participating in the Nord-Trøndelag Health Study (N = 2,197) were compared.

Participants: A total of 2,197 participants were included.

Setting: Population-based study in Norway.

Main outcome measures: Registry data on age retirement.

Results: No systematic differences in alcohol consumption, smoking or physical activity over the strata defined by time before or after age retirement were identified.

Conclusion: The current and previous findings do not suggest that transition into age retirement changes health-related behaviours. However, there is probably merit in investigating complicating factors related to the retirement process, such as degree of voluntariness, as these factors may influence the impact of age retirement on health behaviours.

Keywords

Old age retirement, health-related behaviour, alcohol, smoking, ageing

many countries – expanding the length of time people spend in age retirement.² For instance, those retiring at the age of 60 may anticipate about 20 years in retirement.³ For many, the workplace is an important social platform that provides meaning and structure to everyday life,⁴ and employment seems generally to be beneficial for health, mental health in particular.⁵ Conversely, worklessness is associated with poorer physical and mental health.⁴ Leaving working life is an abrupt, stochastic event, but psychologically, it will for many be a process of gradual contemplation, planning and adaptation. With increasing focus on healthy ageing, there is a need to know how the transition between work and age retirement impacts on health and wellbeing.

Mein⁶ investigated changes in mental and physical health before and after age retirement and found that mental health improved, while physical health seemed unaffected. Their overall conclusion was that normal retirement is not associated with adverse changes in health. On the other hand, Westerlund et al.⁷ found that perceived health problems were substantially relieved when entering old age retirement. These studies did not, however, look into health-related behavioural changes upon retirement, such as level of physical activity, smoking habits and usual alcohol consumption. Previous studies have suggested that lifestyle changes in terms of smoking, drinking and physical activity can partly account for many age-associated declines in physical and cognitive functioning.⁸ While the literature generally indicates that older people drink less alcohol than the younger, a few studies contradict this, and find stability or increase, and some studies even contend that excessive consumption in old age should be considered an important public health concern.^{9,10} Previous studies

Background

Life-expectancy is increasing in western countries and is presently around age 78 for men and age 83 for women. As a result, the proportion of elderly in the population is increasing.¹ Simultaneously, the mean age for age retirement has decreased in

have also indicated that individuals who exercise regularly and do not smoke, on average live longer and spend fewer years living with disability.^{11,12} Many of the common causes of death and disability in old age can be attributed to physical inactivity, smoking and alcohol use, including cardio-vascular diseases, cancer and chronic obstructive lung disease.^{13,14} Smoking contributes to lung dysfunction, chronic airflow obstruction, and nearly half of cancer-related mortalities, while physical activity enhances physiological functioning, mitigates the development of chronic disease and disease-related morbidities, and lowers the risk of cognitive dysfunction.⁸ Behavioural changes seen in the transition into age retirement are important when understanding physical and mental health in the years following retirement. These changes can also be an indicator of how people cope with important life transitions.

Several previous studies have investigated if people tend to change these health-related behaviours when they retire. For physical activity, retirement does not seem to affect leisure-time physical activity, although it introduces a decline in overall physical activity as work-related physical activity is eliminated.¹⁵ For smoking, there also seems to be few differences before and after retirement.¹⁶ And, finally, the results from previous studies indicate, with few exceptions, that retirement may not have a strong impact on drinking behaviours or drinking problems.¹⁷ In the present study, we will use data from a recent data collection in linkage with a comprehensive national registry to explore the association between self-reported health-related behaviour and old age retirement.

Aim

To investigate whether old age retirement is associated with changes in the level of physical activity, smoking habits and alcohol habits.

Methods

This study employs data from the population-based Nord-Trøndelag Health Study wave 3 (HUNT3; 2006–2008) in linkage with the Norwegian national insurance database (FD-trygd). The HUNT3 study was a population-based study covering Nord-Trøndelag county in Norway (for more information see Krokstad et al.¹⁸). Self-reported information about physical activity, smoking habits and alcohol habits was included from the HUNT3 database, and information on time of old age retirement was retrieved from the comprehensive national insurance administration (FD-trygd). FD-trygd is an extensive database developed by Statistics

Norway (www.ssb.no), which comprises the whole population of Norway, with the person as statistical unit. Information contained in the database includes social security benefits, average earned pension, sickness benefits, education and demographic change. All participants who became old age retirees within two years prior to and two years after participating in the HUNT3 study were included in the present study.

Demographic information

Information about the age and gender was retrieved from the Norwegian Tax Administration. In addition, HUNT3 also included self-reported marital status: ‘unmarried’, ‘married’, ‘widow(er)’, ‘divorced’, ‘separated’ and ‘registered partner’. For the purposes of this study, a binary variable was constructed in which being married or in registered partnership was coded as 1 and the other responses were coded as 0.

Assessment of health-related behavioural change

Alcohol habits were assessed with three sets of questions, one relating to the usual consumption of alcoholic beverages, one relating to consumption last four weeks, and one relating to frequency of binge drinking. Usual alcohol consumption within a 14-day period was assessed by three questions, one for beer, one for wine and one for spirits with the wording “How many glasses of [X] do you usually drink within a 14-day period?” with open-ended response categories. The usual number of glasses of beer, wine and spirits consumed were recoded to comparable alcohol units (constituting a 35 cl bottle of beer (4.5% alcohol by volume), a glass of 12 cl of wine (12%) or a 4 cl shot of spirits (45%)¹⁹), and then summed for each participant. The new composite variable ranged from 0 to 62.4 units usually consumed within a 14-day period. Recent consumption was assessed by the binary variable ‘Have you consumed alcohol in the last four weeks?’, where yes was coded 1 and no was coded 0. Frequency of binge drinking was assessed by the question ‘How often do you consume 5 or more glasses of beer, wine or spirits during one sitting?’ with the following response categories: ‘never’, ‘monthly’, ‘weekly’ and ‘daily’. This information was used to construct a binary variable assessing monthly binge drinking, where the first category was coded as 0 and the rest coded as 1.

Daily cigarette smoking was assessed with a binary (yes/no) question.

Physical activity was assessed with two questions, one related to frequency of physical exercise and one related to sedentary behaviour. Frequency of physical exercise was measured based on the question ‘How often do you exercise?’ with the following response options: ‘never’, ‘less than once a week’, ‘once a week’, ‘2–3 times a week’ and ‘almost every day’. Based on this information, a binary variable of weekly physical inactivity was constructed. Daily inactivity (sedentary behaviour) was measured by the open-ended question ‘About how many hours do you sit still during a normal weekday?’ with responses ranging from 0 to 17 hours.

Statistical procedure

Based on a previous design employed to study health status at various stages before and after a disability pension process,²⁰ we established a virtual time axis combining information from HUNT3 and FD-trygd: We identified all participants who became old age retirees within two years prior to and two years after participating in the HUNT3 study (N=2197). These participants were grouped into eight groups defined by the distance in time between age retirement and participation in HUNT3; four groups that retired before HUNT3 participation and four groups that retired after HUNT3 participation: Retirement 24–18 months, 17.9–12 months, 11.9–6 months and 5.9 months–30 days before participation, and retirement 30 days–5.9 months, 6–11.9 months, 12–17.9 months and 18–24 months after participation. A group was also constructed for those in the period of retirement at HUNT3-participation (retirement between 30 days before to 30 days after participation). The mean (with standard deviation; SD), median (with interquartile range; IQR) or proportion (with 95% confidence intervals; CI 95%) for each of the demographic and health-related behaviour variables were computed for the individual groups (Tables 1 and 2). In order to retain the maximum level of information, case-wise deletion was used for each health-related variable. In the main analyses, the Kruskal–Wallis test with correction for ties was employed for the ordinal data due non-normality (for usual alcohol consumption per fortnight and hours of daily inactivity),²¹ and logistic regression with ‘deviation from means coding’²² as the reference category for binary data (for any alcohol consumed last four weeks, usual monthly binge drinking, daily smoking, and any weekly physical activity).^{23,24} The reported *p*-values in Table 2 therefore reflect each time-point’s likelihood of deviating from the overall score on the variable of interest. Also, post-estimation analyses were employed to compute the

Table 1. Demographic description of the sample across periods of old age retirement relative to HUNT3-participation (N=2197).

	Mean (SD, n)/proportion (CI 95%, n)									
	24/18 months pre	18/12 months pre	12/6 months pre	6 months/30 days pre	Period of retirement	30 days/6 months post	6/12 months post	12/18 months post	18/24 months post	Total
Age, years (SD, n)	66.2 (2.3, n = 299)	65.9 (2.2, n = 292)	65.7 (2.1, n = 267)	65.0 (2.1, n = 234)	65.0 (2.2, n = 105)	64.6 (2.2, n = 234)	64.2 (2.2, n = 236)	63.8 (2.5, n = 277)	63.6 (2.1, n = 253)	64.9 (2.4, n = 2197)
Gender, % female (CI 95%, n)	47.5 (41.8–53.2, n = 299)	50.7 (44.9–56.4, n = 292)	46.1 (40.1–52.1, n = 267)	45.7 (39.3–52.1, n = 234)	50.5 (40.9–60.1, n = 105)	50.0 (43.6–56.4, n = 234)	43.6 (37.3–50.0, n = 236)	46.2 (40.3–52.1, n = 277)	39.9 (33.9–46.0, n = 253)	46.5 (44.4–48.6, n = 2197)
Marital status, % married (CI 95%, n)	80.6 (76.1–85.1, n = 299)	82.5 (78.2–86.9, n = 292)	83.5 (79.1–88.0, n = 267)	81.2 (76.2–86.2, n = 234)	77.1 (69.1–85.2, n = 105)	81.1 (83.9–92.3, n = 234)	85.1 (80.5–89.7, n = 235)	81.2 (76.6–85.8, n = 277)	83.7 (79.2–88.3, n = 253)	82.1 (80.5–83.7, n = 2196)

HUNT3: The Nord-Trøndelag Health Study, wave 3.

Table 2. Self-reported health-related behaviour of the sample across periods of old age retirement in relation to HUNT3-participation (n ranging from 1861 to 2197^a).

	Median interquartile range (IQR), n/proportion (CI 95%, n)									
	24/18 months pre	18/12 months pre	12/6 months pre	6 months/30 days pre	Period of retirement	30 days/6 months post	6/12 months post	12/18 months post	18/24 months post	Total
Usual alcohol consumption per fortnight, units (IQR) ^b	2.1 (0.6–4.8, n = 277)	2.3 (0.8–4.3, n = 270)	2.4 (0.4–4.1, n = 239)	2.2 (0.9–4.1, n = 215)	2.8 (0.9–4.7, n = 100)	2.4 (0.9–4.3, n = 214)	2.3 (0.7–4.2, n = 224)	2.4 (0.5–4.8, n = 252)	2.4 (0.9–4.8, n = 243)	2.4 (0.8–4.5, n = 2034)
Consumed alcohol last four weeks, % yes (CI 95%, n)	75.3 (70.3–80.3, n = 287)	77.1 (72.2–82.1, n = 280)	76.7 (71.5–81.9, n = 253)	77.4 (72.0–82.9, n = 226)	76.7 (68.5–84.9, n = 103)	78.4 (73.0–83.8, n = 227)	77.1 (71.6–82.5, n = 231)	80.5 (75.7–85.2, n = 266)	76.3 (71.0–81.7, n = 245)	77.3 (75.5–79.1, n = 2118)
Usual monthly binge drinking, % yes (CI 95%, n)	13.2 (9.2–17.2, n = 280)	14.4 (10.3–18.6, n = 277)	13.5 (9.3–17.7, n = 252)	11.7 (7.4–15.9, n = 223)	19.8 (12.0–27.6, n = 101)	17.3 (12.3–22.3, n = 220)	14.6 (10.0–19.2, n = 226)	16.7 (12.2–21.3, n = 257)	17.6 (12.8–22.3, n = 245)	15.1 (13.5–16.6, n = 2081)
Daily smoking, % yes (CI 95%, n)	14.4 (10.4–18.4, n = 299)	12.7 (8.8–16.5, n = 292)	14.6 (10.4–18.9, n = 267)	13.7 (9.3–18.1, n = 234)	14.3 (7.6–21.0, n = 105)	10.7 (6.7–14.7, n = 234)	14.4 (9.9–18.9, n = 236)	10.5 (6.9–14.1, n = 277)	12.6 (8.5–16.8, n = 253)	13.0 (11.6–14.4, n = 2197)
Weekly physical activity, % yes (CI 95%, n)	80.3 (75.8–84.9, n = 295)	87.2 (83.3–91.1, n = 289) ^c	80.1 (75.3–84.9, n = 266)	82.1 (77.1–87.1, n = 229)	85.7 (79–92.4, n = 105)	77.9 (72.6–83.3, n = 231)	77.2 (71.7–82.7, n = 228)	81.7 (77.1–86.3, n = 273)	81.1 (76.3–86.0, n = 249)	81.3 (79.7–83.0, n = 2165)
Median of inactivity daily, hours (IQR) ^d	5.0 (4.0–7.0, n = 251)	5.0 (4.0–6.0, n = 240)	5.0 (4.0–6.0, n = 218)	5.0 (4.0–6.0, n = 199)	5.0 (4.0–6.0, n = 85)	5.0 (4.0–7.0, n = 199)	5.0 (4.0–8.0, n = 201)	5.0 (4.0–8.0, n = 240)	5.0 (4.0–7.0, n = 228)	5.0 (4.0–7.0, n = 1861)

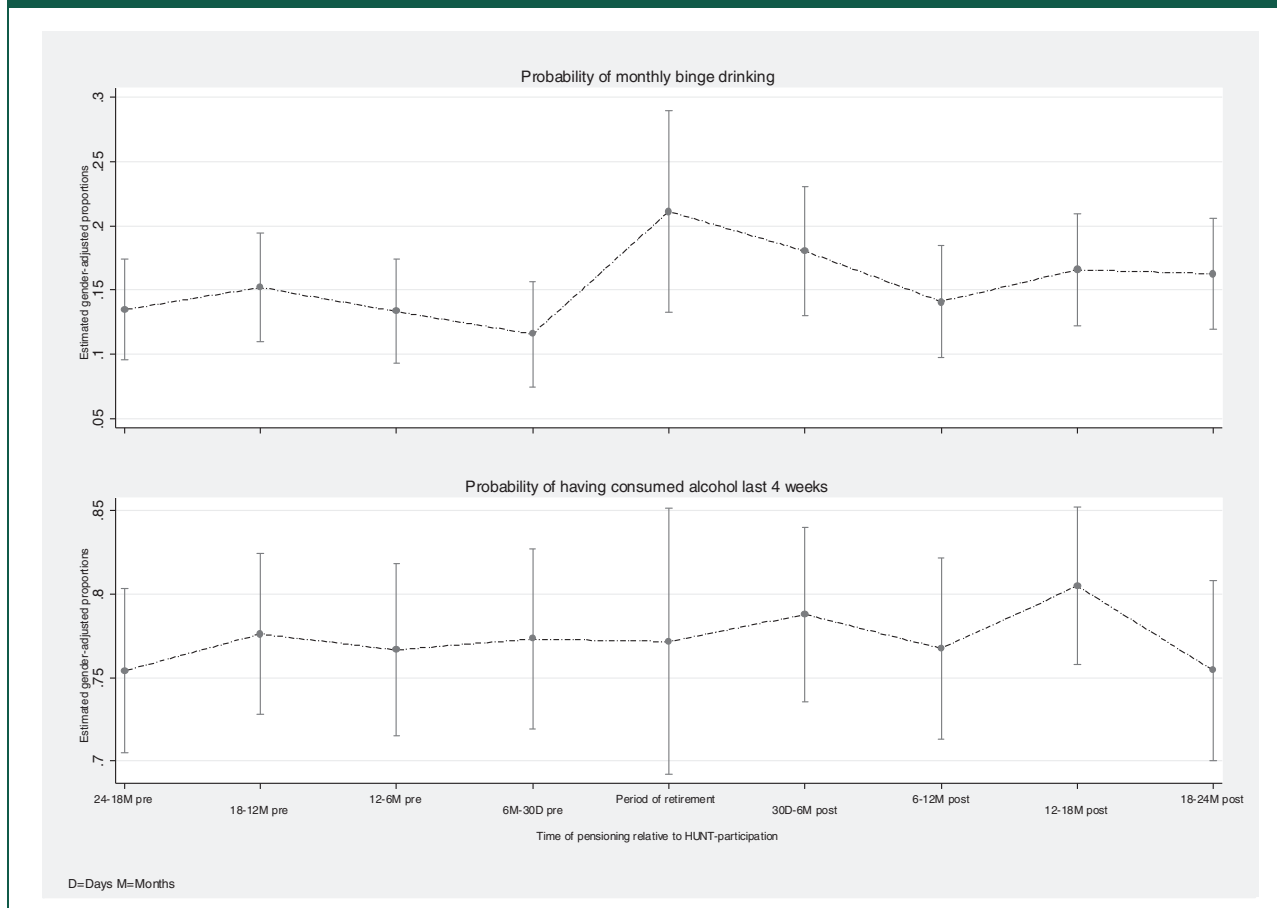
^aIn order to retain maximum level of information, all cases with valid responses were retained.

^bKruskal–Wallis: $p = 0.982$ (χ^2 with correction for ties: 1.976 (8 degrees of freedom)).

^cOdds ratio 1.53, $p = 0.011$ for weekly physical activity at '18/12 months pre' compared to overall odds (average logit for all time-periods).

^dKruskal–Wallis: $p = 0.504$ (χ^2 with correction for ties: 7.306 (8 degrees of freedom)).

Figure 1. Predicted gender-adjusted proportion of monthly binge drinking and having consumed alcohol last 4 weeks across periods of old age retirement in relation to HUNT3-participation. Bars denote 95% confidence intervals.



estimated gender-adjusted proportions for the binary health-related behaviour measures included. Assuming no substantial systematic differences between these retirees as a function of imposing this time-defined design, we can compare health-related behaviours across the groups, and study if there are clear patterns of differences across the process of old age retirement.

Ethics

The HUNT3 survey was approved by the Regional Committee for Ethics in Medical Research and the Norwegian Data Inspectorate. Written informed consent was obtained from all subjects. The present study was approved by the Regional Committee for Ethics in Medical Research.

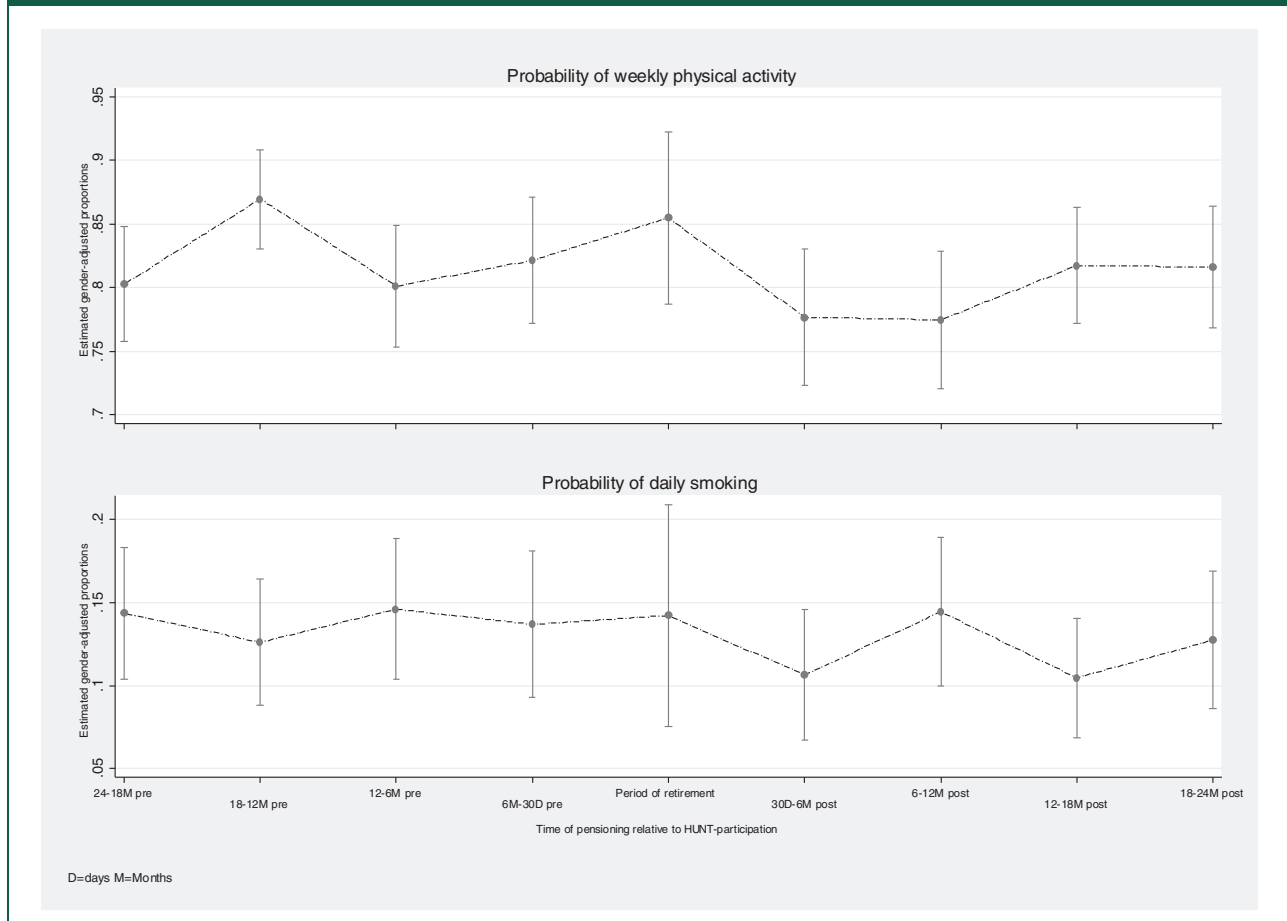
Results

The mean age of the participants was 64.9 (SD 2.4) years, 46.5% were female and 82.1% reported being

married (Table 1). As to be expected per the design, there was a linear trend of decreasing age when going from 24–18 months before to 18–24 months after HUNT3-participation ($p < 0.001$). There was, however, no consistent trend in relation to gender ($p = 0.063$) and marital status ($p = 0.513$), although some of the groups were different in relation to gender composition (proportion of female point estimates ranging from 39.9% to 50.7%). In the main analyses, there was no consistent change in patterns for the health-related behaviours across the virtual time-line, with p -values ranging from 0.067–0.982 (Table 2). The exception was for reporting weekly physical activity 18 to 12 months before retirement compared to the overall odds (odds ratio: 1.53, $p = 0.011$).

Overall, the alcohol habits, smoking habits and levels of physical activity were stable before, during and after old age retirement. This was also evident in the post-estimation analyses of estimated gender-adjusted proportions (see Figures 1 and 2).

Figure 2. Predicted gender-adjusted proportion of daily smoking and weekly physical activity across periods of old age retirement in relation to HUNT-participation. Bars denote 95% confidence intervals.



Discussion

Main findings

In the present study, we did not identify any systematic changes in alcohol consumption, smoking and physical activity in relation to the transition to age retirement. Indeed, the health-related behaviours investigated seemed to be fairly stable across all groups (ranging from 24 months before retirement to 24 after retirement). Through a relatively novel approach to the relationship between retirement and health-related behaviours, we add weight to previous findings of minor or no changes.^{15–17} Although our results are in line with previous findings, a single conclusion regarding health-related behaviours in relation to the transition into retirement cannot be drawn. The results of the current study do not draw up retirement as an abrupt ‘crisis’ for the retiree, but would be more consistent with retirement occurring as a planned and voluntary event, that does not

introduce any major change to long established health-related behaviours. There are, however, other studies which have found that the burden of ill-health is relieved by entering old age retirement,^{7,25} a finding which is most consistent for mental health.²⁵ Some previous studies have further suggested that the degree of voluntariness is important for the impact of retirement.^{17,26} By also assessing the voluntariness, findings support a differential association for those who perceive their retirement as voluntary versus those who do not, with a change towards more harmful health-related behaviours among the latter.^{17,26} The aim of the current study was, however, to assess the transition into retirement per se, and not to discriminate between factors that might moderate retirement responses. Also, even though there is a minor group that would experience the transition into retirement as involuntary, there is reason to believe that for the vast majority of those entering retirement in Norway, it will be perceived as voluntary.

Particularly, since Norway has a strong protection against age discrimination, a comprehensive social insurance scheme and a strong employment protection in general.²⁷ In a public health perspective, the impact of changes in health-related behaviour as it occurs in general is perhaps the most important concern.

In terms of generalisability, there are differences between pension schemes, such as age of normative retirement, but most countries in Europe share many similarities.²⁸ Although the present findings are likely to be generalisable to Norway and similar countries, it is not necessarily transferable to other countries with very different pension schemes, or to other cultures.

Strengths and limitations

The strengths of the present study are the high number of participants included in the analyses (N=2197), the long time-period of investigation (four years), and the use of registry-based information about old age retirement instead of self-report. The use of registry-based information ensures that the timing of old age pension is correct and not influenced by for instance recall bias. Despite these strengths, some limitations are pertinent. First, all of the measures of health-related behaviours were self-reported and are therefore liable to be biased. The data collection was, however, carried out blind to our aim, as it was in the context of a general population-based study, precluding bias in relation to old age retirement. Second, we employed a novel approach to analysis by establishing a virtual timeline with different participants in each group defined by their distance to time of retirement. This may have imposed a selection bias for each group, as we have assumed that the groups were comparable except for the timing of retirement. It is, however, unlikely that the choice of design has imparted a substantial bias to our results, as this would require a selection of HUNT-participation dependent on their temporal relation to individual old age retirement. Third, we only assessed the short-time effects of retirement, and the findings may not be similar for longer periods of follow-up after retirement. By only investigating a two-year period after retirement, we argue that the impact of other changes not related to retirement, such as effects of ageing, is limited, and therefore we did not expand the follow-up period. Fourth, as the information about retirement was registry-based, no additional information regarding the retirement process was available, such as degree of voluntariness. Fifth, it could be that important unmeasured health-confounders may impact both time of retirement and health-related behaviours. Sixth, as the study is based in a region of Norway, the findings are not necessarily

generalisable to other regions. As such, a comparative study including data from other regions and countries would have been preferable and strengthen the generalisability of the study.

Conclusion and future research

In conclusion, the results from this study indicate that alcohol consumption, smoking and physical activity remain relatively stable before, during and after the transition into age retirement in general. Based on our findings and previous studies, there is little reason to believe that the transition per se is associated with negative changes in relation to health-related behaviours. On the other hand, there is probably merit in investigating complicating factors related to the retirement process, such as degree of voluntariness, as these factors may influence the impact of age retirement on health. Based on the present findings and existing literature, it seems more likely that there might be subgroups among old age retirees who get an involuntary and unpleasant retirement process which might act as a negative life event and trigger negative health-related behaviours.

Declarations

Competing interests: None declared

Funding: None declared

Ethical approval: The HUNT3 survey was approved by the Regional Committee for Ethics in Medical Research and the Norwegian Data Inspectorate. Written informed consent was obtained from all subjects. The present study was approved by the Regional Committee for Ethics in Medical Research.

Guarantor: JCS.

Contributorship: JCS was responsible for the conception of this study, and the study design was further developed by JCS, AKK and SØ. Analyses were carried out by JCS, and manuscript preparation was led by JCS in cooperation with AKK and SØ. JCS, AKK and SØ were all involved in the interpretation of the data, drafting of the article and approval of the final manuscript.

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