Physical Activity and Transitioning to Retirement
A Systematic Review

Inka Barnett, MSc, Esther M.F. van Sluijs, PhD, David Ogilvie, PhD

Appendix A

Tool used for the quality appraisal of the primary studies, based on Critical Appraisal Skills Programme (CASP) checklist for cohort studies

12-question checklist	Criteria	Binary thresholds for criteria
1. Did the study address a clearly focused issue? 2. Did the authors use an appropriate method to answer their question?	Initial quality screening questions	
3. Was the cohort recruited in an acceptable way? 4. (a) Was the follow-up of the subjects complete enough? (b) Was the follow-up of the subjects long enough?	Criterion 1: External validity assessment of selection bias	Random sample and nonresponse <30% and loss of follow-up <50%=Yes (1 point) Nonrandom sample and/or nonresponse ≥30% and/or follow-up ≥50%=No (0 points)
5. Was the exposure (retirement) accurately measured to minimize bias?	Criterion 2: Internal validity assessment of measurement bias (exposure: retirement)	Self-reported retirement status or objective (e.g., based on company records, receipt of pension)=Yes (1 point) Merged with participants that might not be retired (homemakers, unemployed, students)=No (0 points)
6. Was the outcome (physical activity) accurately measured to minimize bias?	Criterion 3: Internal validity assessment of measurement bias (outcome: physical activity)	Objective measurement (e.g., accelerometer) or validated questionnaire=Yes (1 point) Custom questionnaire or single question=No (0 points)
7. (a) Have the authors identified all important confounding factors? (b) Have they taken account of the confounding factors in the design and/or analysis?	Criterion 4: Internal validity assessment of confounding	Adjusted for all confounders (age, gender, SES, functional status) (analysis, stratification, or exclusion)=Yes (1 point) Adjusted for some or none of the confounders=No (0 points)
8. What are the results of this study? 9. How precise are the results? 10. Do you believe the results? 11. Can the results be applied to the local population? 12. Do the results of this study fit with other available evidence?	Overall quality assessment of the results and transferability of the study findings (as determined by likelihood of selection bias (Criterion 1); measurement biases (Criteria 2 and 3); and confounding (Criterion 4). No additional quality criterion was used.	

Appendix B

Summary of the 19 studies on retirement and physical activity that were reviewed between July 2010 and August 2010

Study and country	Design (follow-up)	Participants (N, age, gender, retirement status)	Assessment of physical activity	Results	Quality ranking (0–4)
Berger (2005)[1] United Kingdom	Cohort (4.5 years) Population-based	N= 699 ~60 years 45.5% male At baseline: 49.5% employed, 50.5% not employed At follow-up: 21.6% employed, 78.6% not employed	Leisure, home, and occupational physical activity questionnaire	Employed had lower odds of meeting physical activity recommendation with nonwork physical activity compared to non-employed (OR 0.59 [95% CI=0.4, 0.86]) Employed had higher odds of meeting physical activity recommendations with total physical activity compared to non-employed OR (2.72 [95% CI=1.88, 3.97])	Poor (1)
Brown (2009)[2] Australia	Cohort (3 years) Population-based	N= 8762 51–55 years Women only Not reported how many retired	Leisure physical activity Active Australia physical activity survey[3]	Participants who retired were more likely to report an increase in leisure physical activity (compared to 3 years ago) than participants who were still employed (OR 1.54 [95% CI=1.24, 1.91])	Modest (2)
Chung (2009)[4] U.S.	Cohort (6 years) HRS (Wave 3-6) Population-based	N=11,469 Age not reported 47.1% male 30% retired at baseline 43% retired at follow-up 7% reversible retirement	Total vigorous physical activity Single-item question on total vigorous physical activity	No significant change in total vigorous physical activity (three or more times a week) in retirement	Good (3)
Evenson (2002)[5] U.S.	Cohort (6 years) Population-based	N=7782 45–64 years 41.4% male All employed at baseline 29.5% retired at follow-up	Leisure and occupational physical activity Baecke questionnaire[6]	Exercise participation increased for all gender and ethnic groups in retirement No results for occupational physical activity reported	Modest (2)
Fonseca (2004)[7] Portugal	Cross-sectional Population-based	N=100 M 59.4 years (SD 4.6) 50% male 50% retired	Total physical activity Single-item question on total physical activity	No difference in total physical activity between retirees and employees	Poor (1)

Study and country	Design (follow-up)	Participants (N, age, gender, retirement status)	Assessment of physical activity	Results	Quality ranking (0–4)
Glamser (1985)[8] U.S.	Cohort (6 years) Employee-based	N=51 ~62 years Male only All employed at baseline All retired at follow-up	Leisure physical activity Based on list of leisure activities	No change in leisure-time physical activity in retirement	Poor (1)
Henkens (2008)[9] Netherlands	Cohort (6 years) Employee-based	N=1604 M 54.8 years (SD 2.8) 75% male All employed at baseline 55.1% retired at follow-up	Exercise physical activity Single-item question on change in exercise	Participants who retired were more likely to report an increase in exercise (compared to 5 years ago) than participants who were still employed (RR 2.90 [95% CI=2.19, 3.84] in voluntary retired; RR 2.14 [95% CI=1.47, 3.13] in involuntarily retired)	Poor (1)
Mein (2005)[10] United Kingdom	Cross-sectional Employee-based	N= 6224 45–69 years 26.0% male 36.4% retired	Leisure and home physical activity Questionnaire	Retirees were more likely to meet physical activity recommendations than participants who were still employed (OR 2.5 [95% CI= 1.9, 3.5] in women; OR 3.5 [95% CI=2.8, 4.3] in men)	Good (3)
Midanik (1995)[11] U.S.	Cohort (2 years) HMO insurance holders	N=595 M 61.8 years (retired at follow-up) M 62.3 years (employed at follow-up) 57.5% male All employed at baseline 53.8% retired at follow-up	Exercise physical activity Single-item question on exercise	Participants who retired were more likely to report participation in regular exercise than participants who were still employed (men: RR 3.5 [95% CI =2.0, 6.2]; women: RR 2.2 [95% CI=1.2, 4.0])	Modest (2)
Parnes (1985)[12] U.S.	Cross-sectional Population-based	N= 2899 57–71 years Male only 60.6% retired	Exercise physical activity Questionnaire	More retirees participated in exercise (in last 12 months) than employees (44% retired vs 35% employees, $p<0.01$)	Modest (2)
Patrick (1986)[13] United Kingdom	Cohort (2 years) Employee-based	N=74 M 65.1 years (SD 0.2) 71.6% male All employed at baseline All retired at follow-up	Total physical activity Objectively measured total physical activity plus physical activity diary	Total physical activity (time and intensity) increased in men after retirement and decreased in women	Poor (1)

Study and country	Design (follow-up)	Participants (N, age, gender, retirement status)	Assessment of physical activity	Results	Quality ranking (0–4)
Slingerland (2007)[14] U.S.	Cohort (13 years) Population-based	N=971 M 50.5 years (SD 5.3) 75.0% male All employed at baseline 70.4% retired at follow-up	Exercise, leisure-time, and work-related transport physical activity Questionnaire	Participants who retired had lower odds of a decline in leisure-time physical activity compared to participants who were still employed (OR 0.36 [95% CI =0.19, 0.68]) No significant differences in changes in exercise physical activity in retired and employed Participants who retired had higher odds of a decline in work-related transport physical activity compared to those who were still employed (OR 3.03 [95% CI =1.97, 4.65])	Modest (2)
Touvier (2010)[15] France	Cohort (3 years) Population-based	N=1389 45–64 years 50.3% male All employed at baseline 20.4% retired at follow-up	Leisure and occupational physical activity Modifiable Activity Questionnaire (MAQ)[16]	Leisure physical activity increased in retirement (M 2.1 (SD 0.4) hours/week in men; M 1.8 (SD 0.4) hours/week in women) No results for occupational physical activity reported	Modest (2)
Wells (1999)[17] Australia	Cross-sectional Population-based	N=363 M 69.9 years (SD 4.0) Female only 7.7% working 20.0% partly retired 27.0% recently retired 36.7 % long-term retired	Total physical activity Single-item question on change in total physical activity	Retirees were more likely to report a decrease in total physical activity (compared to 5 years ago) than participants who were still employed (OR 3.89, $p<0.05$)	Modest (2)
Wister (1996)[18] Canada	Cross-sectional Population-based	N=5333 >45 years 44.5% male 18.0% retired	Exercise physical activity Single-item question on exercise physical activity	Retirees were more likely to participate in exercise (once a week or more) than participants who were still employed (OR 1.73, $p<0.001$)	Modest (2)
Chung (2005)[19] U.S.	Cohort (2 years) HRS (subsample 2001–2003) Population-based	N=2762 M 63.5 years (SD 4.6) 40.7% male All employed at baseline 55.7% retired at follow-up	Total vigorous physical activity Single-item question on total vigorous physical activity	Total vigorous physical activity decreased in retirement (–3.5 [SD 1.05] MET hours/day, $p<0.01$)	Good (3)

Study and country	Design (follow-up)	Participants (N, age, gender, retirement status)	Assessment of physical activity	Results	Quality ranking (0–4)
Nekuda (2009)[20] U.S.	Cohort (2 years) HRS (subsample 1998–2000) Population-based	N= 5351 M 58.9 years (SD 6.7) remained employed M 63.4 years (SD 6.9) retired 51.7% male All employed at baseline 16.9% retired at follow-up	Total vigorous physical activity Single-item question on total vigorous physical activity	No significant change in total vigorous physical activity (three or more times a week) in retirement (OR 1.06 [95% CI=0.89, 1.24])	Poor (1)
Parise (2004)[21] U.S.	Cohort (6 years) Population-based	N=2091 54–99 years 40.5% male 76.2% retired at baseline 78.3% retired at follow-up	Leisure physical activity Based on list of leisure activities	No significant change in leisure-time physical activity in retirement	Poor (0)
Zheng (2008)[22] U.S.	Cohort (6 years) HRS (Wave 3–6) Population-based	N=3936 M 54.3 years (SD 2.0) Male only All employed at baseline 52.1% retired at follow-up	Total vigorous physical activity Single-item question on total vigorous physical activity	Total vigorous physical activity (three or more times a week) decreased in retirement (OLS –0.049, $p<0.05$)	Modest (2)

Note: Studies are ordered by type (published articles followed by PhD theses) and then alphabetically by first author.

HRS, Health and Retirement Study; OLS, ordinary least-squares regression; RR, risk ratio

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