Revista portuguesa de saúde pública

www.elsevier.pt/rpsp

Review article

A public health approach to health and retirement: What do we know about their relationship?

Mafalda Sousa Uva[a,b,*], *António Manuel Fonseca*[c], *Baltazar Nunes*[a], *Carlos Matias Dias*[a,b]

[a] *Department of Epidemiology, National Health Institute Dr. Ricardo Jorge, Portugal*
[b] *National School of Public Health, New University of Lisbon, Portugal*
[c] *Faculty of Education and Psychology, Catholic University of Porto, Portugal*

ARTICLE INFO

Keywords:
Retirement
Chronic diseases
Self-perceived health
Public health
Portugal

ABSTRACT

The exit from active life and the ingress into a life stage in which labour activities and relations do not exist, or could be of a different nature, is a feature of retirement.

Several studies have investigated the effects of changes in health upon retirement. Several others have investigated the effects of retirement on health. If retirement is responsible for affecting health, then the implementation of public health policies, aimed at improving older individual's health, should take this matter into account. Similarly, the implementation of political changes in retirement age such as those that we are witnessing in Portugal should be carefully planned.

The aim of this work is to describe and discuss the international and national studies conducted to improve the understanding of the relationship between health and retirement, especially between chronic diseases (and self-perceived health) and retirement, and also to highlight the importance of studying this subject from a public health point of view in Portugal.

Regarding the effects of health on retirement, self-perceived health seems to have a relevant effect on retirement, as well as chronic diseases, although there is less agreement in the latter case. Findings on the impact of retirement in health are not consensual and it is thought that the nature of the analysis (cross-sectional or longitudinal), the timing and the reason for retirement, the circumstances of an individual before and after retirement and the health measure under research could be primarily responsible for the lack of consistency among studies.

Concerning the Portuguese population, the few studies found about health and retirement are focused in different health status indicators, making it difficult to reach a general

* *Corresponding author.*
E-mail addresses: mafalda.uva@insa.min_saude.pt (M. Sousa Uva), afonseca@porto.ucp.pt (A. Manuel Fonseca), baltazar.nunes@insa.min_saude.pt (B. Nunes), carlos.dias@insa.min_saude.pt (C. Matias Dias).
http://dx.doi.org/10.1016/j.rpsp.2015.07.005
0870-9025/© 2015 The Authors. Published by Elsevier España, S.L.U. on behalf of Escola Nacional de Saúde Pública. This is an open access article under the CC-BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

conclusion. Thus the need remains for the establishment of more methodologically valid research studies in Portugal, mainly epidemiologic studies involving the quantification of association and impact measures.

© 2015 The Authors. Published by Elsevier España, S.L.U. on behalf of Escola Nacional de Saúde Pública. This is an open access article under the CC-BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Saúde e reforma: o que conhecemos da sua relação numa perspectiva de saúde pública?

Palavras-chave:
Reforma
Doenças Crónicas
Saúde Percebida
Saúde Pública
Portugal

RESUMO

A saída da vida ativa e a entrada numa fase da vida em as relações e atividades laborais não existem ou são de natureza diferente constituem uma característica da reforma.

Alguns estudos têm investigado os efeitos das alterações do estado de saúde na reforma. Outros têm investigado os efeitos da reforma no estado de saúde. Se a reforma for responsável por afetar o estado de saúde, então a implementação de políticas públicas saudáveis, para melhoria da saúde dos adultos idosos, deveriam tê-lo em consideração. Da mesma forma, a implementação de alterações na idade da reforma, tais como aquelas que têm vindo a verificar-se em Portugal, também o deverão ponderar.

Constituem objetivos deste trabalho descrever e discutir os estudos que têm sido desenvolvidos para melhoria do conhecimento da relação entre a saúde e a reforma, nomeadamente, entre as doenças crónicas (e saúde percebida) e a reforma, assim como sublinhar a importância da investigação deste tema em Portugal numa perspetiva de Saúde Pública.

No que concerne aos efeitos da saúde na reforma, a saúde percebida e as doenças crónicas parecem ter um importante papel para a reforma, apesar de haver menos concordância relativamente às últimas. Por outro lado, as conclusões sobre os efeitos da reforma na saúde não são consensuais, facto que tem sido atribuído às diferenças na natureza de análise (transversal ou longitudinal), do momento de reforma, dos motivos de reforma, e do indicador de estado de saúde sob investigação em diferentes estudos.

Relativamente à população Portuguesa, os poucos estudos preconizados focam diferentes indicadores de saúde, tornando difícil atingir uma conclusão comum. Permanece, na verdade, a necessidade de desenvolvimento de estudos sobre esta matéria em Portugal metodologicamente mais válidos, principalmente com a quantificação de medidas de associação e de impacte.

© 2015 The Authors. Publicado por Elsevier España, S.L.U. em nome da Escola Nacional de Saúde Pública. Este é um artigo Open Access sob a licença de CC-BY-NC-ND (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

The demographic changes observed during the last decades and the projections for the future point to an unprecedented transition in the demographic structure in the history of humanity.[1] Population ageing has been made possible by advances in medicine and health care in the last centuries, and this reality has important implications for which countries will have to adjust, particularly in which policies and legislation to be adopted. The extent of the challenge linked with population ageing has been greatly debatable and more positive outlooks have been proposed.[2–4]

It is estimated that the proportion of people over 65 years of age will triple between 1950 and 2050 in Europe.[5] According to Statistics Portugal, the number of ageist in Portugal (people over 65 years old) in 2050 will be 2.95 millions, one million more than in 2006 (1.82 millions).[6] In this scenario, the Portuguese population ageing process will be aggravated, as expressed by the ageing index that today is of 129.4 elders for every 100 children under 14 years[7] and is expected to be 238 for every 100 children under 14 years by 2046.[6]

In the last century we have also witnessed an epidemiological transition, in which chronic diseases became the leading cause of death and disability worldwide, with a higher prevalence in old age.[8] Its prevalence has increased globally across almost all regions and socio-economic backgrounds. In 2008 the morbidity, mortality and disability attributable to major chronic diseases accounted for 68% of all deaths and 43% of the global burden of disease, while by 2020 estimates point to 73% of all deaths and 60% of the global burden of disease.[9] In Portugal, data from the National Health Survey 2005/2006, show a prevalence of these diseases in 49.9% of men and 58.5% of women.[10] The mortality attributed to them in 2008 was approximately 45.4% in men and 43.4% in women.[8] Globally, current evidence has shown that the major chronic diseases

are cerebro-cardiovascular diseases, cancer, chronic respiratory diseases and diabetes.[9]

The exit from active life and the ingress into a new life stage in which labour activities and relations are reduced or become inexistent, is a feature of retirement.[11] Retirement might be one of the most important events in people's lives.[12] It could embody a simple exit from working life; a change through which a different role is assigned to the person, with different rules and rights; or, and, a transition from middle age to old age. In fact, while for some people retirement could mean the long awaited end from a demanding job performed throughout a lifetime, for others it may represent the opposite, a loss of the meaning of life, especially when it revolves around the professional dimension.[13]

Although in recent years, in Portugal, there has been an increase in life expectancy, the average retirement age seems not have been undergoing considerable changes. In Social Security pensioners (private sector workers) retirement age decreased from 63.7 to 62.5 years between 2002 and 2012,[14] whereas in Caixa Geral de Aposentações (CGA) pensioners (public sector workers) retirement age increased from 58.2 years to 60.1 years.[15]

In Portugal, the legal retirement age for workers, in the public and private sectors, is 66 years old with at least 15 years of contributions to Social Security or to CGA.[16,17] Early retirement, can be provided to workers over 55 years old and with at least 30 years of contributions to CGA (except for the new public sector workers after the 1st of January 2006, which thereafter began to be registered in the general Social Security scheme). Regarding Social Security workers, the government decreed a freeze of early retirement until 2014.[18]

Retirement is an event involving changes in many different aspects of life, in which each person is looking for the best adaptation, requiring an effort of re-organization of the individual living standards.[19] The availability of time, the social networking, the social position, the monthly income and the physical and mental activity may be different after retirement and any changes in these life aspects are likely to affect retiree's health.[20]

Several studies have investigated the effects of changes in health upon retirement.[20–23] Several others have investigated the effects of retirement on health status indicators.[24–27] If retirement could actually be responsible for affecting health, then the implementation of public health policies, aimed at improving older individual's health, should certainly take this matter into consideration. Similarly, the implementation of political changes in retirement age such as that we are currently witnessing in Portugal, as well as in other European countries, should reflect this aspect.

The aim of this work is to briefly describe and discuss the international and national studies developed to improve the understanding of the relationship between health and retirement, especially between chronic diseases (as well as self-perceived health) and retirement, and to highlight the importance of studying the subject from a public health perspective in Portugal. A greater focus is given to the effects of retirement on health, due to the increasing relevance of this issue in our country with the recent changes in retirement age.

For that purpose, the first part of the work describes the methodology explaining how the literature review was performed. The second part of the work describes the main international studies on the effects of health status indicators (chronic diseases and self-perceived health) on retirement, followed by a description of the main international studies on the effects of retirement on these health status indicators. The fourth part of the work describes the few studies about this issue published in Portugal. The lack of agreement on the relationship between health and retirement, and the relevance of increasing this knowledge in Portugal, is then discussed.

Methodology

The literature review to find international studies on the effects of retirement on self-perceived health and/or chronic diseases was conducted during September 2013. The framework of it was divided into the following stages: (1) identifying the research question; (2) identifying relevant studies; (3) selection of studies based on pre-established inclusion criteria; (4) data collection; and (5) summarizing and reporting the results.

We included international studies published between 1992 and 2013 on the effects of retirement on self-perceived health and/or chronic diseases. The review covered publications not included in the report "Europeans of Retirement age: chronic diseases and economic activity" from the RIVM,[32] in order to update and widen the scope of knowledge, although some studies may appear in both reviews. Additionally, we confirmed and supplemented extra information (study design, sample size, study population and data source).

The information source used was PubMed, maintained by the US National Library of Medicine. We searched for studies in English only, combining search terms with the Boolean operator AND. The terms used were 'retirement' AND 'health' AND each one of the chronic diseases (cardiovascular diseases, diabetes, chronic respiratory diseases, cancer, and depression).

Concerning the studies on the relationship between health and retirement in Portugal, we conducted a literature search also in September 2013, using the online databases Pubmed, B-on and Google, to find studies carried out between 1992 and 2013. The key words used to identify relevant studies were: 'retirement' AND 'health' AND 'Portugal' (key words were used in both Portuguese and English languages).

In both the two literature reviews performed, no inclusion criteria were established in terms of study design, type of publication, or age of the study population. The quality of the studies was not used as an inclusion criterion, since we wanted to describe the scope (quantity, focus, and nature) of the research.

Data on the following variables were collected and entered into a standard table: author(s), publication year, study design, sample size, study population, data source and the main results. The information was entered into the table as the studies were selected and the data were subsequently analyzed.

Effects of health on retirement

Generally, the majority of studies on the effect of changes in health status on retirement have shown that the health status may influence retirement.[19]

Some findings about health effects on retirement are the following: (i) workers with poor health, suffering from chronic health conditions, retire earlier than healthy workers[28]; (ii) men with health problems retire one or two years earlier than men without health problems[20]; (iii) it is less likely that individuals with worse health continue to work compared to those with good health, and changes in life expectations during retirement are much more influenced by changes in health than by economic factors[21]; (iv) psychiatric disorders increase significantly the occurrence of (early) retirement in both men and women[29]; (v) retirees who reported to have suffered from thrombosis, depression, osteoarthritis or cancer, were twice as likely to retire earlier due to ill-health than those without these health problems; this association was even stronger for the self perceived health.[30]

A review of Oortwijn and colleagues, including the analysis of six European longitudinal studies reporting the relationship between poor perceived health and early retirement, concluded that a worker with poor perceived health was more likely to retire early than a worker with good perceived health.[31]

Nevertheless, a systematic review of Van Rijn et al., including 29 longitudinal studies on the relationship between health and retirement, concluded that self-perceived poor health is a risk factor for early retirement (RR 1.33; CI 95% 1.14–1.54), but chronic diseases are not.[23]

In Table 1 we present a summary of the studies published between 1992 and 2012 that found an effect of different chronic health states and self-perceived health on retirement. Table 1 was adapted from the report "Europeans of Retirement age: chronic diseases and economic activity" of the Dutch National Institute for Public Health and the Environment (RIVM),[32] requested by the European Commission, which highlights the current importance of this issue. It describes a literature search developed by the RIVM using the online databases Medline, PsycoINFO, Social SciSearch and SciSearch, between 1992 and 2012.

Effects of retirement on health

The study of the potential effects of retirement on health has been gaining importance in recent years due to the increase in population ageing and the associated increase in health care spending.

The trends in population ageing and the financial difficulties faced by Social Security system, have led to policy changes, such as the increase of the retirement age. However, the effects of retirement on health is something that has not been taken into account when such policies were implemented.[25]

A longitudinal study of Mein et al. compared 392 retirees with 618 employees to determine if retirement at age 60 years was associated with changes in mental and physical health. They showed that mental health deteriorated in individuals who continue to work beyond 60 years of age, whereas physical health deteriorated in both workers and retirees.[33]

Solokangas and Joukamaa observed some improvement in mental health after retirement, but no clear effect of retirement on physical health.[34]

Szinovacz and Davey found that symptoms of depression in women increase after retirement, especially if retirement was felt as abrupt or forced.[24] This effect was greater in women married to men who had functional limitations.[24]

A longitudinal study of 6257 municipal employees in Finland showed an increase of musculoskeletal diseases and cardiovascular diseases in male pensioners.[35]

Ostberg and Samuelsson, on the other hand, described the positive effects of retirement on health, using blood pressure measurement, presence of musculoskeletal disease, psychiatric symptoms and number of visits to the doctor.[36]

Overall, some studies have also found positive effects of retirement on health,[25,37] while others found a lack of association,[38] and still others have found negative effects.[26,39]

In Table 2 we present a summary of the international studies, published between 1992 and 2013, which aimed to investigate the effects of retirement on different health states (chronic diseases and self-perceived health). The search provided us with 16 different studies. One study found no effects of retirement on cancer, while another study found no effects of retirement on chronic respiratory diseases. In what concerns cerebro-cardiovascular diseases, three studies were found, two of which described retirement as a risk factor, and the third found an absence of association. Nine studies focused on the impact of retirement on mental health and two on antidepressant use (Table 2). From those nine studies, four described a negative effect of retirement on mental health; three described a positive effect; and one described an absence of association (Table 2). One study found a positive effect of retirement on the antidepressant use and other found a lack of association (Table 2). Regarding diabetes, both two studies about the impact of retirement on diabetes reported the absence of a significant association (Table 2). Finally, concerning the self-perceived health, in the seven studies present in Table 2, five described positive effects of retirement, one found negative effects, and another one found no effects of retirement on self-perceived health.

Studies on health and retirement in Portugal

Concerning the studies on the relationship between health and retirement in Portugal, the search provided us with 5 studies, developed between 1992 and 2013, on the relationship between health and retirement in the Portuguese population, which will be briefly described below to complement the reviews mentioned earlier.

Fonseca and Paúl conducted a comparative cross-sectional study between 50 retired persons and 50 non-retired persons (25 men and 25 women), living at home in the north and centre of Portugal, to study the retirement transition impact on perceived health. The retired participants were individuals recently retired (less than one year) and the non-retired participants were full-time employed individuals. The instrument used for evaluation was a version of the "Self-Reported Health

Table 1 – Summary of studies that found effects of chronic diseases and self-perceived health on retirement.

Studies	Health state affecting retirement
Rodgers LM. A five year study comparing early retirements on medical grounds in ambulance personnel with those in other groups of health service staff. Part II: Causes of retirements. Occup Med (Lond). 1998;48:119–32. Weber A, Weltle D, Lederer P. Ill health and early retirement among school principals in Bavaria. Int Arch Occup Environ Health. 2005;78:325–31. Karpansalo M, Kauhanen J, Lakka TA, Manninen P, Kaplan GA, Salonen JT. Depression and early retirement: Prospective population based study in middle aged men. J Epidemiol Community Health. 2005;59:70–4. Maguire M, O'Connell T. Ill-health retirement of schoolteachers in the Republic of Ireland. Occup Med (Lond). 2007;57:191–3.	Mental disorder (including depression)
Karpansalo M, Manninen P, Kauhanen J, Lakka TA, Salonen JT. Perceived health as a predictor of early retirement. Scand J Work Environ Health. 2004;30:287–92. Van den Berg T, Schuring M, Avendano M, Mackenbach J, Burdorf A. The impact of ill health on exit from paid employment in Europe among older workers. Occup Environ Med. 2010;67:845–52.	Poor perceived health
Van den Berg T, Schuring M, Avendano M, Mackenbach J, Burdorf A. The impact of ill health on exit from paid employment in Europe among older workers. Occup Environ Med. 2010;67:845–52.	Having at least one chronic condition (heart disease, stroke, diabetes, lung disease, asthma, arthritis or rheumatism and osteoporosis)
Maguire M, O'Connell T. Ill-health retirement of schoolteachers in the Republic of Ireland. Occup Med (Lond). 2007;57:191–3.	Circulatory diseases
Burke FJ, Main JR, Freeman R. The practice of dentistry: An assessment of reasons for premature retirement. Br Dent J. 1997;182:250–4.	Cardiovascular diseases
Maguire M, O'Connell T. Ill-health retirement of schoolteachers in the Republic of Ireland. Occup Med (Lond). 2007;57:191–3. Carlsen K, Oksbjerg Dalton S, Frederiksen K, Diderichsen F, Johansen C. Cancer and the risk for taking early retirement pension: A Danish cohort study. Scand J Public Health. 2008;36:117–25.	Cancer

Adapted from the RIVM report "Europeans of Retirement age: chronic diseases and economic activity".[32]

Questionnaire" from "The European Survey on Aging Protocol" (ESAP). Results showed no significant differences between retired and non-retired concerning self-reported health.[40]

Sequeira reported the decisions made by CGA medical panels with respect to cardiovascular diseases (excluding those that may have caused stroke) in the period 2002–2008. Cardiovascular diseases were considered the justification for the early retirement of 4.5–7.5% of employees during the period under investigation. There was a considerable difference between genders, with men accounting for 7–12% of the total and women 2.8–.9%.[41]

Verbisck studied the relationship between the transition to retirement and subjective self-reported health, perceived social support and spiritual well-being. The sample consisted of 150 subjects, divided into three groups of equal size (workers, recent retirees, and retirees for longer than five years). The selected instruments were a scale measuring subjective health, the Social Support Questionnaire, short version (SSQ6 – Portuguese version), and the Spiritual Well-being Questionnaire (SWBQ – Portuguese version). The results showed no significant differences between the two groups of retirees. However, there were differences in terms of self-reported health, social support, and spiritual well-being between workers and retirees, always in favour of the first group.[42]

Clímaco, Pita-Barros and Lourenço, using data from the national health survey 2005/2006, estimated a continuous health index through an ordered probit model for retirees and workers aged 50 to 80 years old to compare their health. They concluded that retirement appears not to be a health status determinant.[43]

Loureiro, Fonseca and Veríssimo developed a study to describe the evolution of individual's behaviour and health status during retirement. This was a quantitative study, in which a questionnaire was administered to 432 individuals who had been retired for less than five years. The sample was selected using the network method. After retirement respondents improved their health behaviours, but their health status did not improve (Body Mass Index increased in 94.8% of cases and the prevalence of chronic disease increased in 3.7%, particularly psychiatric illnesses).[44]

Discussion

All of the studies mentioned here on the effects of health status on retirement address important aspects of the relationship between health and retirement. As a matter of fact, it seems clear that a poor self-perceived health state leads to early retirement.[31,45,46] The majority of studies described here also indicate that chronic diseases could be responsible for affecting retirement, although the systematic review of Van Rijn et al. concluded that chronic diseases are not risk factors for early retirement.[23]

It should be pointed out, regarding the effects of health on retirement, that there is generally a lack of agreement, particularly concerning the effects of health status on the retirement decision.[47] The decision to retire may be influenced by a

Table 2 – Summary of studies which aimed to investigate the effects of retirement on health.

Health outcome and references	Relationship	Study design	Sample size	Study Population	Data
Cancer					
Behncke S. Does retirement trigger ill health? Health Econ. 2012;21:282–300.	–	Cohort	1439	People born before 1952 who live in England	English Longitudinal Study of Ageing (ELSA)
Chronic bronchitis or asthma					
Westerlund H, Vahtera J, Ferrie JE, Singh-Manoux A, Pentti J, Melchior M, et al. Effect of retirement on major chronic conditions and fatigue: French GAZEL occupational cohort study. BMJ. 2010;341:c6149.	0	Cohort	14104	Employees in 1989 of the French national gas and electricity company: Electricité de France-Gaz de France (EDF-GDF)	Large French occupational cohort (the GAZEL study)
Cerebro-Cardiovascular disease:					
Westerlund H, Vahtera J, Ferrie JE, Singh-Manoux A, Pentti J, Melchior M, et al. Effect of retirement on major chronic conditions and fatigue: French GAZEL occupational cohort study. BMJ. 2010;341:c6149.	0	Cohort	14104	Employees in 1989 of the French national gas and electricity company: Electricité de France-Gaz de France (EDF-GDF)	Large French occupational cohort (the GAZEL study),
Behncke S. Does retirement trigger ill health? Health Econ. 2012;21:282–300.	–	Cohort	1439	People born before 1952 who live in England	English Longitudinal Study of Ageing (ELSA)
Moon JR, Glymour MM, Subramanian SV, Avendaño M, Kawachi I. Transition to retirement and risk of cardiovascular disease: Prospective analysis of the US health and retirement study. Soc Sci Med. 2012;75:526–30.	–	Cohort	5422	Americans with 50 or more years, working full time in 1998	US Health and Retirement Study (HSR)
Mental health/depression:					
Mein G, P Martikainen, H Hemingway, S Stansfeld, M Marmot. Is retirement good or bad for mental and physical health functioning? Whitehall II longitudinal study of civil servants. J Epidemiol Commun H. 2003;57:46–49.	+[a]	Cross-sectional study	1010	Civil servants working in 20 London based civil service departments	Whitehall II longitudinal study of civil servants
Buxton JW, Singleton N, Melzer D. The mental health of early retirees National interview survey in Britain. Soc Psychiatry Psychiatr Epidemiol. 2005;40:99–105.	–[b]	Cross-sectional study	1875	Adults economically active aged 50- to 64-year-olds living in private households in Great Britain	2000 Psychiatric Morbidity Survey
Butterworth P, Gilla S C, Rodgers B, Anstey K J,Villamil E, Melzer D. Retirement and mental health: Analysis of the Australian national survey of mental health and well-being. Soc Sci Med. 2006;62:1179–1191.	–[b]	Cross-sectional study	4189	Adult Australian residents aged 45–74 years and who lived in private dwellings	National Survey of Mental Health and Well-being from Australian Bureau of Statistics (ABS)
Mojon-Azzi S, Sousa-Poza A, Widmer R. The effect of retirement on health: A panel analysis using data from the Swiss Household Panel. Swiss Med Wkly. 2007;137:581–5.	+	Cohort	696	Individuals aged 55 to 75 years residents in Switzerland, working in 1999	Living in Switzerland Survey of the Swiss Household Panel (SHP)

Table 2 – (*Continued*)

Health outcome and references	Relationship	Study design	Sample size	Study Population	Data
Falba T A, Gallo W T, Sindelar J L. Work expectations, realizations, and depression in older workers J Ment Health Policy Econ. 2009; 12:175–186.	–[c]	Cohort	4241	American workers who were less than 62 years of age in 1992	Health and Retirement Study (HRS)
Jokela M, Ferrie JE, Gimeno D, Chandola T, Shipley MJ, Head J, et al. From midlife to early old age: Health trajectories associated with retirement. Epidemiology. 2010;21:284–90.	+[c]	Cohort	7584	Civil servants working in 20 London based civil service departments aged 39–64 years at baseline	Whitehall II longitudinal study of civil servants
Westerlund H, Vahtera J, Ferrie JE, Singh-Manoux A, Pentti J, Melchior M, et al. Effect of retirement on major chronic conditions and fatigue: French GAZEL occupational cohort study. BMJ. 2010;341:c6149.	+	Cohort	14104	Employees in 1989 of the French national gas and electricity company: Electricité de France-Gaz de France (EDF-GDF)	Large French occupational cohort (the GAZEL study)
Behncke S. Does retirement trigger ill health? Health Econ. 2012;21:282–300.	0	Cohort	1439	People born before 1952 who live in England	English Longitudinal Study of Ageing (ELSA)
Calvo E, Sarkisian N, Tamborini, CR. Causal effects of retirement timing on subjective physical and emotional health. J Gerontol B Psychol Sci Soc Sci. 2013;68:73–84.	–[d]	Cohort	6624	Older Americans and their spouses born between 1931 and 1941	Panel data from the Health and Retirement Study
Antidepressant use:					
Oksanen T, Vahtera J, Westerlund H, Pentti J, Sjosten N, Virtanen M, et al. Is retirement beneficial for mental health?: Antidepressant use before and after retirement. Epidemiology. 2011;22:553–9.	+	Cohort	13559	Finnish public-sector employees who have been employed in 10 municipalities or 6 hospital referral districts for at least six months in any year from 1991 to 2005.	Finnish Public Sector Study cohort
Leinonen T, Lahelma E, Martikainen P. Trajectories of antidepressant medication before and after retirement: The contribution of socio-demographic factors. Eur J Epidemiol. 2013. Published Online First: DOI 10.1007/s10654-013-9792–0.	0	Cohort	19877	Employees registered in administrative register data from Filand - national register data from the Finnish Centre for Pensions (earnings-related pensions) and the Social Insurance Institution of Finland (national pensions)	Administrative register data from various sources linked together by Statistics Finland
Perceived health:					
Van Solinge H. Health change in retirement a longitudinal study among older workers in the Netherlands. Res Aging. 2007;29:225–56.	0[e]	Cohort	778	Older employees, aged 55 years and older and their partners, working in more than 50 operating companies of two large Dutch multinational companies active in the field of retail, trade and industry	Dutch panel study on retirement behaviour

Table 2 – (*Continued*)

Health outcome and references	Relationship	Study design	Sample size	Study Population	Data
Behncke S. Does retirement trigger ill health? Health Econ. 2012;21:282–300.	–	Cohort	1439	People born before 1952 who live in England	English Longitudinal Study of Ageing (ELSA)
Östberg H, Samuelsson SM. Occupational retirement in women due to age: Health aspects. Scand J Soc Med. 1994;22:90–6.	+	Cohort	116	Female Municipal employees (age 62–64 years old) in Malmö, Sweden	Malmö Municipal Employees Panel
Mojon-Azzi S, Sousa-Poza A, Widmer R. The effect of retirement on health: A panel analysis using data from the Swiss Household Panel. Swiss Med Wkly. 2007;137:581–5.	+	Cohort	696	Individuals aged 55 to 75 years residents in Switzerland, working in 1999	Living in Switzerland Survey of the Swiss Household Panel (SHP)
Bonsang E, Klein T. Retirement and subjective well-being. Institute for the Study of Labor discussion paper No. 5536, 2011. Available from: http://ftp.iza.org/dp5536.pdf.	+	Cohort	4018	Men living in West-Germany who are between 50 and 70 years old	German Socio-Economic Panel (GSOEP)
Westerlund H, Kivimaki M, Singh-Manoux A, Melchior M, Ferrie JE, Pentti J, et al. Self-rated health before and after retirement in France (GAZEL): A cohort study. Lancet. 2009;374:1889–96.	+	Cohort	14104	Employees in 1989 of the French national gas and electricity company: Electricité de France-Gaz de France (EDF-GDF)	Large French occupational cohort (the GAZEL study), 1989–2007
Rijs KJ, Cozijnsen R, Deeg DJH. The effect of retirement and age at retirement on self-perceived health after three years follow-up in Dutch 55–64-year-olds. Aging Soc. 2012;32:281–306.	+	Cohort	506	Employees who live in Amsterdam with 55–64-year-old	Longitudinal Aging Study Amsterdam (LASA)
Diabetes:					
Westerlund H, Vahtera J, Ferrie JE, Singh-Manoux A, Pentti J, Melchior M, et al. Effect of retirement on major chronic conditions and fatigue: French GAZEL occupational cohort study. BMJ. 2010;341:c6149.	0	Cohort	14104	Employees in 1989 of the French national gas and electricity company: Electricité de France-Gaz de France (EDF-GDF)	Large French occupational cohort (the GAZEL study), 1989–2007
Behncke S. Does retirement trigger ill health? Health Econ. 2012;21:282–300.	0	Cohort	1439	People born before 1952 who live in England	English Longitudinal Study of Ageing (ELSA)

Adapted from the RIVM report "Europeans of Retirement age: chronic diseases and economic activity",[32] confirmed and updated here in a brief literature review.

"+" refers to a positive effect of retirement on health; "–" refers to a negative effect of retirement on health; "0" refers to no effect of retirement on health.

[a] Merely retirement at 60 years.
[b] Merely early retired men.
[c] Merely early retirement perceived as not expected.
[d] Merely early retirement.
[e] Merely involuntary retirement.

variety of factors, not only the health of individuals but also the availability of a health insurance, eligibility for Social Security, financial resources and the interdependence of couples.[19] It is in fact a complex issue studied mainly by researchers on the areas of Economy, Psychology and Sociology.

For instance, the impact of health status versus economic factors on the retirement decision has long been debated.[48–50] Bazzoli found that economic variables play a more important role than health in retirement decisions,[49] yet Dwyer and Mitchell found the opposite.[20]

Regarding the effects of retirement on health status, it is commonly assumed that there is a lack of consensus between different studies.[25–27] However, if we focus merely on the effects of retirement on chronic diseases,

the majority of disagreeing studies concern depression and cerebro-cardiovascular diseases. However the number of studies on this matter (effects of retirement on chronic diseases) is so small that it is difficult to discuss whether there is a consensus or not. In fact, we found only one study (see Table 2) which investigates the effect of retirement on the probability of having cancer.

One reason for the lack of agreement on the relations between health and retirement studies may be that most of these studies refer to research conducted in different countries, which may have different laws regarding work and retirement, different labour markets, different ways of perceiving disease, and also different economic incentives to retirement.

Several studies are cross sectional in design and make a comparison between the groups of retirees and workers, ignoring the heterogeneity among individuals belonging to these groups. Others, although having a cohort design, are based on small samples lacking statistical power to detect the exposure effects or are based on non-representative samples which cannot be generalized to the general population.

Retirement is not an isolated event in peoples' lives, but also a choice, often influenced by events and circumstances that precede it, which can include not only the health status, but also the death or health state of a close relative, the work relationships, the fitness for work, economic reasons, partner retirement, as well as other possible associated factors rarely taken together into account in such studies.

Almost all studies ignore the complexity of the retirement transition, not commonly including matters such as the retirement timing, previous health, quality of the job, as well as the performance of physical activity after retirement, or the engagement in an activity such as volunteering.[51]

Regarding the retirement timing, Calvo et al. concluded that workers who began their retirement transition before cultural (in Portugal 65 years old) and institutional timetables experienced the worst health outcomes. Continued employment after traditionally expected retirement age, however, did not seem to offer health benefits. Retiring too early could be problematic but no disadvantages were seen in late retirement.[27]

Recent studies attempted to find a better way to analyze the effects of retirement on health. Their strategy is to use the method of instrumental variables to allow more consistent estimation of those effects. An instrumental variable is a variable that does not itself belong in the explanatory equation of the effects of retirement on health, but is correlated with the exposure variable.[52] This is a variable that only affects the retirement decision, but does not affect the health outcome. According to Behncke studies which use instrumental variables tend to find positive effects of retirement on health, while the studies that attempt to control for potential confounders tend to find negative effects.[26]

Examples of studies that use instrumental variables are Charles and Neuman in which individuals are given financial incentives to retire at a particular age via collaboration with the U.S. Social Security.[53,54] These studies showed that retirement had positive effects on the subjective measures of health, but did not have any effects on the objective measures of health.

An example of a study that controlled for confounding variables is Dave et al. in the United States, in which the sample was stratified between individuals with and without serious health problems during the period immediately before retirement.[19] The argument used was that for these individuals the reason for retirement could be exogenous to their health, in contrast to those who had previously experienced health problems. The conclusions of this study were that retirement increased depression in 6–9%, occurrence of disease in 5–6%, and difficulties associated with mobility and daily activities in 5–16%.[19]

We may also assume that the lack of consensus among different studies may be due to a considerable diversity of factors involved in the relationship between retirement and health. In that sense, one possible explanation, and perhaps one of the most plausible, is that different research strategies result in different estimates of the effect. For an instance, studies on the effects of retirement on depression use diverse case definitions, such as various depression measurement scales, or self-assessed depression, which may be responsible for measuring different effects of retirement on depression. This use of different measurement instruments and case definitions could certainly difficult the comparison between studies in this context.

Regarding the studies in the Portuguese population described here,[40–44] it should be emphasized that all of them gave positive contributions for the knowledge on the relationship between health and retirement in Portugal. However, it is difficult to reach a general conclusion, since each of those studies focused on different health status indicators, namely self-perceived health, a health index (with subjective and objective health measures), chronic diseases and health behaviours.[40–44]

The need remains for the establishment of more methodologically valid research studies, mainly epidemiologic studies involving the quantification of association and impact measures, and performed with large and representative samples of the Portuguese population. Actually, a cohort study that could allow observing health status indicators before and after retirement in each sampled individual should be carried out. Portugal started to participate in the Survey of Health Ageing and Retirement in Europe (SHARE) in 2011 (4th wave). The analysis of SHARE data could constitute a good way to better understand this issue in our country.[55]

Nowadays, it is increasingly important to study the consequences of changes in the retirement age on the Portuguese workers health, in order to establish conscientious political decisions. Primarily, it is increasingly important to know which consequences it might have on chronic diseases which represent the major contribution for the global burden of disease and which are more frequent in elderly individuals.

The question remains on what would result in greater benefits for our country with the retirement age raise: on one hand, the possible resulting aggravation of workers' health, leading to increasing health care expenditure; and on the other hand, the need to increase labour force in order to manage the ageing of the population and guarantee the economic sustainability of our pensions system.

Conclusions

The current conclusion of this literature review is that self-perceived health and chronic diseases both have important effects on retirement, although there is less agreement about the latter health status indicators.

There are a small number of studies on the impact of retirement on self-perceived health and chronic diseases. Findings on this subject are conflicting and it is thought that the nature of the analysis (cross-sectional or longitudinal), the timing and the reason for retirement, the circumstances of an individual before and after retirement and the health measure under investigation could be responsible for the lack of agreement.

Concerning the Portuguese population, there were only five studies found about health and retirement, which focused on different health status indicators, making it difficult to reach a general conclusion. The need remains for the establishment of more methodologically valid research studies in Portugal, mainly epidemiologic studies involving the quantification of association and impact measures.

An understanding of the relationship between chronic diseases and retirement in Portugal may be important for three main reasons: first, to support interventions designed to prevent or reduce the burden of disease; second, to help assess the cost-effectiveness of such programmes; and third, in the context of our current population ageing, as increasingly more individuals will reach the retirement age.

REFERENCES

1. Hamblin KA. Active ageing in the European Union: Policy convergence and divergence. London: Palgrave Macmillan; 2013 [internet] available from: http://books.google.pt/
2. Sanderson WC, Scherbov S. Remeasuring aging. Science. 2010;329:1288–97.
3. Herrmann M. Population aging and economic development: Anxieties and policy responses. J Popul Aging. 2012;5:23–46.
4. Emery T. Intergenerational conflict: Evidence from Europe. J Popul Aging. 2012;5:7–22.
5. World Health Organization. Active ageing: A policy framework. Geneva: World Health Organization; 2002 [internet] available from: http://whqlibdoc.who.int/hq/2002/who_nmh_nph_02.8.pdf
6. Instituto Nacional de Estatística. Census 2011: resultados definitivos. Lisboa: Instituto Nacional de Estatística; 2012 [internet] Available from: http://tinyurl.com/o9gwqy5
7. Pordata. Pensionistas. Lisboa: Fundação Francisco Manuel dos Santos; 2013 [internet] available from: http://www.pordata.pt/Municipios/Indice+de+envelhecimento-458
8. World Health Organization. Noncomunicable diseases country profiles 2011; 2012 [Internet] available from: http://whqlibdoc.who.int/publications/2011/9789241502283_eng.pdf
9. World Health Organization. The WHO Global status report on noncommunicable diseases 2010. Geneva: World Health Organization; 2011 [internet] available from: http://whqlibdoc.who.int/publications/2011/9789240686458_eng.pdf
10. Portugal. Ministério da Saúde. Instituto Nacional de Saúde Dr. Ricardo Jorge. Observatório Nacional de Saúde. Quarto Inquérito Nacional de Saúde: relatório final. Lisboa: INSA; 2007.
11. Forman-Hoffman V, Richardson K, Yankey J, Hillis S, Wallace R, Wolinsky F, et al. Retirement and weight changes among men and women in the health and retirement study. J Gerontol B Psychol Sci Soc Sci. 2008;63:146–53.
12. Fonseca AM. Reforma e reformados. Coimbra: Almedina; 2011.
13. Atchley R. Social forces and ageing: An introduction to social gerontology. 9th ed. Belmont, CA: Wadswoth; 2000.
14. Pordata. Caixa Geral de Aposentações: média de idades dos aposentados/reformados à data da aposentação. Lisboa: Fundação Francisco Manuel dos Santos; 2013 [internet] available from: http://www.pordata.pt/Portugal/Caixa+Geral+de+Aposentacoes+media+de+idades+dos+aposentados+reformados+a+data+da+aposentacao-1085
15. Pordata. Média de idades dos novos pensionistas de velhice e invalidez da Segurança Social: total e por sexo. Lisboa: Fundação Francisco Manuel dos Santos; 2013 [internet] available from: http://www.pordata.pt/Portugal/Media+de+idades+dos+novos+pensionistas+de+velhice+e+invalidez+da+Seguranca+Social+total+e+por+sexo-1121
16. Decreto de Lei n.º 167-E/2013. D.R. 253. 1.ª série (2013-12-31). Procede à alteração do Decreto-Lei n.º 464/80, de 13 de outubro, que estabelece as condições de acesso e de atribuição da pensão social.
17. Lei n.º 11/2014. D.R. 46. 1.ª série. (2014-03-06). Estabelece mecanismos de convergência do regime de proteção social da função pública com o regime geral da segurança social.
18. Decreto de Lei n.º 85-A/2012. D.R. 69. 1.ª série. (2012-04-05). Procede à suspensão do regime de flexibilização da idade de pensão por velhice por antecipação.
19. Dave D, Rashad I, Spasojevic J. The effects of retirement on physical and mental health outcomes. National Bureau of Economic Research; 2007 (Working Papers; 12123).
20. Dwyer DS, Mitchell OS. Health problems as determinants of retirement: Are self-rated measures endogenous? J Health Econ. 1999;18:173–93.
21. McGarry K. Health and retirement: Do changes in health affect retirement expectations? J Hum Resour. 2004;39:624–48.
22. Rice N, Roberts J, Jones AM. Sick of work or too sick to work?: Evidence on health shocks and early retirement from the BHPS. Health, Econometrics and Data Group; 2006 (Working Paper; 06/13).
23. Van Rijn RM, Robroek SJW, Brouwer S, Burdorf A. Influence of poor health on exit from paid employment: A systematic review. Occup Environ Med. 2013;71.
24. Szinovacz M, Davey A. Honeymoons and joint lunches: Effects of retirement and spouse's employment on depressive symptoms. J Gerontol B Psychol Sci Soc Sci. 2004;59:233–45.
25. Seitsamo J. Retirement transition and well-being: A 16-year longitudinal study. Helsinki: Finnish Institute of Occupational Health; 2007 [internet] available from: https://helda.helsinki.fi/bitstream/handle/10138/23535/retireme.pdf?sequence=2
26. Behncke S. Does retirement trigger ill health? Health Econ. 2012;21:282–300.
27. Calvo E, Sarkisian N, Tamborini CR. Causal effects of retirement timing on subjective physical and emotional health. J Gerontol B Psychol Sci Soc Sci. 2013;68:73–84.
28. Belgrave LL, Haug MR, Gomez-Bellenge FX. Gender and race differences in effects of health and pension on retirement before 65. Compr Gerontol. 1987;1:109–17.
29. Ettner SL, Frank RG, Kessler RC. The impact of psychiatric disorders on labor market outcomes. Ind Labor Relat Rev. 1997;51:64–81.
30. Pit SW, Shrestha R, Schofield D, Passey M. Health problems and retirement due to ill-health among Australian retirees aged 45–64 years. Health Policy. 2010;94:175–81.

31. Oortwijn W, Nelissen E, Adamini S, van den Heuvel S, Geuskens G, Burdorf L. Social determinants state of the art reviews: Health of people of working age: Full report. Luxembourg: European Commission Directorate General for Health and Consumers; 2011.
32. Dutch National Institute for Public Health and the Environment. Europeans of retirement age: Chronic diseases and economic activity. Bilthoven: Dutch National Institute for Public Health and the Environment; 2012 [internet] available from: http://ec.europa.eu/health/major_chronic_diseases/docs/rivm_report_retirement_en.pdf
33. Mein G, Martikainen P, Hemingway H, Stansfeld S, Marmot M. Is retirement good or bad for mental and physical health functioning?: Whitehall II longitudinal study of civil servants. J Epidemiol Community Health. 2003;57:46–9.
34. Salokangas RK, Joukamaa M. Physical and mental health changes in retirement age. Psychother Psychosom. 1991;55:100–7.
35. Tuomi K, Jarvinen E, Eskelinen L, Ilmarinen J, Klockars M. Effect of retirement on health and work ability among municipal employees. Scand J Work Environ Health. 1991;17:75–81.
36. Ostberg H, Samuelsson S. Occupational retirement in women due to age. Scand J Soc Med Suppl. 1994;2:90–6.
37. Coe NB, Zamarro G. Retirement effects on health in Europe. J Health Econ. 2011;30:77–86.
38. Westerlund H, Vahtera J, Ferrie JE, Singh-Manoux A, Pentti J, Melchior M, et al. Effect of retirement on major chronic conditions and fatigue: French GAZEL occupational cohort study. BMJ. 2010;341:c6149.
39. Overland S, Glozier N, Maeland JG, Aaro LE, Mykletun A. Health status before, during and after disability pension award: The Hordaland Health Study (HUSK). Occup Environ Med. 2008;65:769–73.
40. Fonseca AM, Paúl C. Saúde percebida e "passagem à reforma". Psi Saúde Doenças. 2004;5:17–29.
41. Sequeira CMM. Aposentações por doença cardíaca em Portugal (2002–2008). Rev Port Cardiol. 2009;28:561–5.
42. Verbisck MGV. A saúde subjectiva de pessoas na transição para a reforma: contributos do suporte social percebido e do bem-estar espiritual. Faro: Faculdade de Ciências Humanas e Sociais da Universidade do Algarve; 2010: Dissertação de Mestrado em Psicologia Clínica e da Saúde.
43. Climaco I, Pita-Barros P, Lourenço O. Healthy enough to work longer? Coimbra: Center for Studies and Research in Health, University of Coimbra; 2011 (Working Papers) [internet] available from: http://www.uc.pt/org/ceisuc/Documentos/DocTrab/wp_2011_05_Climaco_Barros_Lourenco_2011.pdf
44. Loureiro H, Fonseca A, Veríssimo M. Evolução dos comportamentos e do estado de saúde na passagem à reforma. Rev Refer. 2012;8:47–56.
45. Karpansalo M, Manninen P, Kauhanen J, Lakka TA, Salonen. Perceived health as a predictor of early retirement. Scand J Work Environ Health. 2004;30:287–92.
46. Van den Berg T, Schuring M, Avendano M, Mackenbach J, Burdorf A. The impact of ill health on exit from paid employment in Europe among older workers. Occup Environ Med. 2010;67:845–52.
47. Galama T, Kapteyna A, Fonseca R, Pierre-Carl M. A health production model with endogenous retirement. Health Econ. 2013;22:883–902.
48. Anderson KH, Burkhauser RV. The retirement-health nexus: A new measure of an old puzzle. J Hum Resour. 1985;20:315–30.
49. Bazzoli GJ. The early retirement decision: New empirical evidence on the influence of health. J Hum Resour. 1985;20:214–34.
50. Rice N, Roberts R, Jones AM. Sick of work or too sick to work?: Evidence on health shocks and early retirement from the BHPS. York: Health, Econometrics and Data Group (HEDG), Department of Economics, University of York; 2006 (HEDG Working Papers; 06/13).
51. Moon JR, Glymour MM, Subramanian SV, Avendaño M, Kawachi I. Transition to retirement and risk of cardiovascular disease: Prospective analysis of the US health and retirement study. Soc Sci Med. 2012;75:526–30.
52. Greenland S. An Introduction to instrumental variables for epidemiologists. Int J Epidemiol. 2000;29:722–9.
53. Charles KK. Is retirement depressing?: Labor force inactivity and psychological well-being in later life. Res Labor Econ. 2004;23:269–99.
54. Neuman K. Quit your job and get healthier?: The effect of retirement on health. J Labor Res. 2008;29:177–201.
55. Munich Center for the Economics of Aging (MEA). Survey of Health, Aging and Retirement in Europe; 2012 [Internet] available from: http://www.share-project.org/