



Universiteit
Leiden
The Netherlands

Peer coaching as a population approach to increase physical activity in older adults

Vijver, P.L. van de

Citation

Vijver, P. L. van de. (2022, April 12). *Peer coaching as a population approach to increase physical activity in older adults*. Retrieved from <https://hdl.handle.net/1887/3283473>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3283473>

Note: To cite this publication please use the final published version (if applicable).



CHAPTER 1

General introduction

Paul van de Vijver

Based on:

Van de Vijver PL, Van Bodegom D

De rol van de sociale omgeving bij veroudering.

Geron 2016;18:37-40.

Van de Vijver PL, Schalkwijk FH, Van Bodegom D

Peer coaching om ouderen gezond te houden.

Huisarts en wetenschap 2017;60:444-446.

INTRODUCTION

The world population is ageing. In the past 160 years, average life expectancy increased from 40 to 80 years.¹ This success is the result of advances in sanitation, income, medicine and nutrition.^{1,2} In the same period, presumed boundaries in the increasing life-expectancy have always been broken.¹ Several countries that experienced a stagnation of the increasing trend in life expectancy, have caught up in the last years.³ Current projections also predict with high probability that female life expectancy at birth will break the 90 year barrier by 2030 in South Korea.⁴ In addition, in the first decades after the Second World War life expectancy increased rapidly in the Western World.⁵ So, regardless of the exact trends and limits in future life expectancy, the number and proportion of adults aged over 65 will increase in almost all countries of the world.^{6,7}

As a consequence, many countries nowadays face a high prevalence of age-related diseases. Increasing prevalence of diabetes, cardiovascular disease and risk factors for these diseases has been seen in the past decades almost everywhere.⁸⁻¹⁰ In 2019, the global cardiovascular disease prevalence was estimated to be 523 million people. Global diabetes prevalence was estimated to 463 million in 2019.¹⁰ Additionally, the risk factors hypertension, hypercholesterolemia and obesity have a high prevalence, especially in the high income regions of the world.¹¹⁻¹³

Many of the age-related diseases are modifiable by lifestyle. Healthy lifestyle is associated with a 66% reduced risk on cardiovascular disease.¹⁴ An unhealthy lifestyle increases diabetes risk with 75% compared to a healthy lifestyle.¹⁵ Major components of lifestyle are physical activity, diet, alcohol consumption, smoking behaviour, stress, sleeping pattern and personal hygiene.

Physical activity is consistently identified as one of the best means to impact healthy ageing.¹⁶⁻²¹ Daily physical activity has been found effective at preventing and treating many age-related diseases and risk factors such as cardiovascular disease, diabetes, hypertension, obesity, osteoporosis, and sarcopenia.¹⁶⁻¹⁸ In older adults it also reduces depression, anxiety, the risk of falls and increases mobility, quality of life and longevity.¹⁸⁻²⁰ According to the World Health Organisation (WHO), the recommended level of physical activity is 150 minutes of moderate-intensity aerobic physical activity or 75 minutes of vigorous-intensity aerobic physical activity a week for older adults (>64 years).

However, an estimated 31% of the global population does not reach the recommended level of physical activity.²² Physical inactivity is a driving force behind the high prevalence and incidence in age-related diseases and mortality.^{23,24} It is estimated that physical inactivity causes 5.3 million deaths worldwide annually.²⁵ Physical activity is negatively associated with age. The estimated number of older adults not reaching the recommended level of physical activity ranges between 17 – 97.6% and increasing age is associated with a higher risk of physical inactivity.^{26–28} Perceived barriers for the adoption or maintenance of physical activity in older adults are age, poor health, unsafe environment, distance from recreational facility, lack of knowledge and understanding of physical activity, lack of company, lack of interest, lack of opportunities and lack of transport.^{29,30} Facilitators for physical activity included the motivation to maintain physical and mental health, increased self-efficacy, social support, group cohesiveness, and access to affordable, convenient, and stimulating physical activity options.^{30–32}

Interventions are effective in increasing physical activity behaviour in older adults during the intervention period.^{20,33,34} This increase in physical activity subsequently also has effect on clinical meaningful outcomes.^{33,35} However, long term effects of interventions are scarce, when the intervention period ends physical activity behaviour often declines.^{20,36–38} Long term effects on physical activity behaviour after an intervention depend on intervention technique, intervention duration, physical activity intensity during intervention and self-efficacy.^{39,40} Behaviour, or social-cognitive change techniques focusing on increasing self-efficacy and physical activity do increase the long term effect of interventions, but not indefinitely.^{41,42} To obtain sustainable effect, physical activity interventions must be permanent. However, there are not enough professionals and financial resources to deliver physical activity interventions permanently to all inactive older adults.

New intervention strategies are needed to promote and support physical activity. These interventions need to successfully promote physical activity, be able to reach large numbers of older adults and have a sustainable effect on physical activity behaviour. Expensive interventions using scarce professionals are inherently unfitted to meet these three requirements.

One alternative solution that has been suggested to solve this problem are eHealth interventions. Online physical activity promotion is a method that could be suitable to sustainably increase physical activity in large numbers of older adults. However, results of these studies do not show long term effectivity yet and fail to engage large numbers of older adults.^{43–46} New studies need to focus on how to increase effectiveness and adherence of these interventions, especially in older adults.

Furthermore, most of these studies are not specially designed for older adults.^{47,48} Phone-based interventions show promising effects.⁴⁹ However, phone-based interventions with professionals are unable to reach large numbers of older adults because they are conducted one on one. Phone-based interventions without the use of professionals could be a promising solution.

Studies show that the preference of face-to-face contact during intervention is especially present in older adults.⁵⁰⁻⁵³ Classic face-to-face group interventions with a professional are too expensive to be sustainable and are limited by the scarcity of professionals. Similar to phone-based interventions, classic face-to-face group interventions could be a promising solution without the dependency on professionals. Removing professionals from physical activity interventions is a new and emerging philosophy. Replacements of these professionals are, in the case of eHealth, webpages, apps or algorithms. In phone-based or face-to-face interventions, professionals can be replaced by volunteers or peers.

Peer coaching is a particular promising solution to avoid the use of costly and scarce professionals.⁵⁴⁻⁵⁷ Peer coaching is a face-to-face intervention to reach a common goal given by a non-professional, who has a common background with the recipient, either through a similar life experience or other shared characteristics.⁵⁸ The strength of peer-coaching lies in empathy and using the experiential knowledge of the peer coach, to understand the other peers wishes, motivations, possibilities and limitations. The most successful and widely-known peer coaching initiative is Alcoholics Anonymous, with more than two million members spread over 150 countries.⁵⁹⁻⁶¹

In physical activity interventions, empathy from peer coaches could help improving long term maintenance of physical activity.⁶² Also, unsupervised peer coaches showed similar effects regarding physical activity promotion compared to professionals, students and supervised peer coaches.^{57,63} Additionally, the handful of studies that do report on adverse events show no difference in the number of adverse events between peers and professionals.⁶⁴ These insights make peer coaching a suitable delivery method for physical activity interventions for older adults.

Thus far, no study has investigated peer coached physical activity interventions where peer coaches are also responsible for the organization of the intervention. A completely sustainable intervention must be able to operate independently of expensive and scarce professionals. Also, the intervention must be able to be self-supporting and not dependent on financial resources from the public or private sector.

AIM OF THIS THESIS

In this thesis we investigate the possibility of a face-to-face group intervention exercising outside to sustainably increase physical activity in older adults. By replacing the professional with a peer coach, there are in theory no limitations in terms of reach and sustainability due to scarcity of professionals and high structural costs. By using the public space there is no need for expensive and scarce venues. In principle, each neighbourhood or community could start a peer coach physical activity intervention. However, there was no study regarding the effect, reach and sustainability of such an intervention. Moreover, implementation strategies of this intervention were also unknown. All these aspects are studied and described in this thesis. Additionally, possible referral schemes in primary care and ways to structure future umbrella organization are explored.

The goal is to show first proofs of effect and feasibility of a peer coach physical activity intervention for community dwelling older adults. In this thesis we first study the effectivity of such an intervention. Secondary, we study the feasibility of implementation of this intervention. Thirdly, we study a possible referral scheme from primary care to this intervention. Finally, we describe a possible structure of a nationwide implementation of this intervention.

The intervention studied in this thesis is unique as it is not depending on a specific sector. This is important because many means to population change are in different sectors than healthcare. For example the sectors urban planning, transportation, education, employment and politics.⁶⁵ Secondly, the implementation of this intervention does not need many resources and high executive power and implementation of intervention often happens at levels with poorer resources and lower executive power.⁶⁵

TERMINOLOGY

Using peers in physical activity promotion comes with a variety of terms and ideas. It is important to note that in this thesis we follow the typology of Matz-Costa et al.⁵⁸ A peer coach is strategy-planner and motivator. Similar to a professional gym teacher during gym class at school. The primary objective of a peer coach is to plan exercise sessions and encourage participants to complete these exercises. This is how the role of a peer coach was implemented in the intervention. A peer coach can also fulfil the roles of a peer mentor or peer support where he or she acts as an experienced other or a moral support-provider. These are secondary roles that can happen when peers are grouped together, but this was not implemented in the intervention.

Matz-Costa et al. also make a distinction between peer-delivered interventions, where the peer directly delivers the physical activity program content or a portion of the content, and peer-assisted interventions, where the peer assists in the delivery of the program content or a portion of the content.⁵⁸ Matz-Costa et al. do mention that an intervention can be a hybrid form of these two and that this distinction has not been explicitly made in the literature. The physical activity intervention in this thesis is peer-delivered, as the peer coaches deliver the program content directly to the participants.

OUTLINE OF THIS THESIS

This chapter, **chapter one**, provides a general introduction to the thesis

Chapter two investigates the relationship between the timing and magnitude of physical peak performance and life expectancy. This relation is based on life-history theory. A theoretical framework that seeks to explain how natural selection shapes key life events of an organism's life. These key life events, including growth, sexual maturation, behaviour and lifespan, are intertwined and the timing of one event influences the other. Physical activity is an important factor that influences health, but this study also shows there is a biological predisposition for timing and magnitude of physical peak performance and lifespan regardless of an individual's efforts.

Chapter three describes a proof-of-principle of a peer coach physical activity intervention of community dwelling older adults. This self-organising intervention, created and organised by older adults themselves, is a successful example of long-term physical activity promotion. In this chapter we describe the components of the intervention and the effects on health and well-being. This chapter is the basis when implementing new physical activity interventions for a feasibility study.

After chapter three, the question arises if healthcare professionals could create a self-organizing peer coach physical activity intervention. **Chapter four** describes a feasibility study. It studies the process of implementing a new peer coach physical activity intervention and making them self-organizing after a short period of time. This part gives insight if the self-organizing physical activity intervention, that was previously created by older adults themselves, can be actively implemented by healthcare professionals in different settings.

Although chapter four showed that healthcare professionals can implement a self-organizing physical activity intervention, there was no active recruitment strategy to reach older adults. The peer coach physical activity intervention is successful by itself it was largely based on healthy older adults in the neighbourhood. Linking the intervention to primary care could increase the recruitment of older adults that benefit from daily physical activity the most. **Chapter five** describes the experiment that tested the effect of a primary care referral scheme. Prevention is becoming an increasingly important objective in primary care. A successful physical activity intervention at the disposal of primary care physicians could increase prevention efforts.

The future of peer coach physical activity interventions as a population approach is described in **chapter six**. Here, we describe the *Círculos de Abuelos*, a Cuban example of a population approach to increase physical activity in older adults. The organizational structure and success of the *Círculos de Abuelos* can act as inspiration for policy makers and healthcare professionals to implement physical activity promotion on a population level.

Chapter seven summarises the main conclusion and discusses possible considerations of this thesis. Additionally, several implications of the results of the study are stated. Finally, several recommendations for future studies are discussed.

REFERENCES

1. Oeppen J, Vaupel JW. Broken limits to life expectancy. *Science*. 2002;296:1029-1031.
2. Riley JC. *Rising life expectancy: a global history*. Cambridge University Press; 2001.
3. Ho JY, Hendi AS. Recent trends in life expectancy across high income countries: retrospective observational study. *bmj*. 2018;362.
4. Kontis V, Bennett JE, Mathers CD, Li G, Foreman K, Ezzati M. Future life expectancy in 35 industrialised countries: projections with a Bayesian model ensemble. *The Lancet*. 2017;389:1323-1335.
5. Sugiura Y, Ju Y-S, Yasuoka J, Jimba M. Rapid increase in Japanese life expectancy after World War II. *Biosci Trends*. 2010;4:9-16.
6. Bloom DE, Canning D, Lubet A. Global population aging: Facts, challenges, solutions & perspectives. *Daedalus*. 2015;144:80-92.
7. Fehlings MG, Tetreault L, Nater A, et al. The aging of the global population: the changing epidemiology of disease and spinal disorders. *Neurosurgery*. 2015;77:S1-S5.
8. Harding JL, Pavkov ME, Magliano DJ, Shaw JE, Gregg EW. Global trends in diabetes complications: a review of current evidence. *Diabetologia*. 2019;62:3-16.
9. Jagannathan R, Patel SA, Ali MK, Narayan KV. Global updates on cardiovascular disease mortality trends and attribution of traditional risk factors. *Current diabetes reports*. 2019;19:1-12.
10. Roth GA, Mensah GA, Johnson CO, et al. Global burden of cardiovascular diseases and risk factors, 1990–2019: update from the GBD 2019 study. *Journal of the American College of Cardiology*. 2020;76:2982-3021.
11. Morgen CS, Sørensen TI. Global trends in the prevalence of overweight and obesity. *Nature Reviews Endocrinology*. 2014;10:513-514.
12. Mills KT, Bundy JD, Kelly TN, et al. Global disparities of hypertension prevalence and control: a systematic analysis of population-based studies from 90 countries. *Circulation*. 2016;134:441-450.
13. Farzadfar F, Finucane MM, Danaei G, et al. National, regional, and global trends in serum total cholesterol since 1980: systematic analysis of health examination surveys and epidemiological studies with 321 country-years and 3·0 million participants. *The Lancet*. 2011;377:578-586.
14. Barbaresco J, Rienks J, Nöthlings U. Lifestyle indices and cardiovascular disease risk: a meta-analysis. *American journal of preventive medicine*. 2018;55:555-564.
15. Zhang Y, Pan X-F, Chen J, et al. Combined lifestyle factors and risk of incident type 2 diabetes and prognosis among individuals with type 2 diabetes: a systematic review and meta-analysis of prospective cohort studies. *Diabetologia*. 2020;63:21-33.
16. Penedo FJ, Dahn JR. Exercise and well-being: a review of mental and physical health benefits associated with physical activity. *Current opinion in psychiatry*. 2005;18:189-193.
17. Warburton DE, Nicol CW, Bredin SS. Health benefits of physical activity: the evidence. *Canadian medical association journal*. 2006;174:801-809.
18. Vogel T, Brechat PH, Leprêtre PM, Kaltenbach G, Berthel M, Lonsdorfer J. Health benefits of physical activity in older patients: a review. *International journal of clinical practice*. 2009;63:303-320.
19. Gremeaux V, Gayda M, Lepers R, Sosner P, Juneau M, Nigam A. Exercise and longevity. *Maturitas*. 2012;73:312-317.

20. Taylor A, Cable N, Faulkner G, Hillsdon M, Narici M, Van Der Bij A. Physical activity and older adults: a review of health benefits and the effectiveness of interventions. *Journal of sports sciences*. 2004;22:703-725.
21. Taylor D. Physical activity is medicine for older adults. *Postgraduate medical journal*. 2014;90:26-32.
22. Kohl 3rd HW, Craig CL, Lambert EV, et al. The pandemic of physical inactivity: global action for public health. *The lancet*. 2012;380:294-305.
23. Al Tunajji H, Davis JC, Mackey DC, Khan KM. Population attributable fraction of type 2 diabetes due to physical inactivity in adults: a systematic review. *BMC Public Health*. 2014;14:1-9.
24. de Rezende LFM, Rabacow FM, Viscondi JYK, do Carmo Luiz O, Matsudo VKR, Lee I-M. Effect of physical inactivity on major noncommunicable diseases and life expectancy in Brazil. *Journal of Physical Activity and Health*. 2015;12:299-306.
25. Lee I-M, Shiroma EJ, Lobelo F, et al. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *The lancet*. 2012;380:219-229.
26. Sun F, Norman IJ, While AE. Physical activity in older people: a systematic review. *BMC public health*. 2013;13:449.
27. Gomes M, Figueiredo D, Teixeira L, et al. Physical inactivity among older adults across Europe based on the SHARE database. *Age and ageing*. 2017;46:71-77.
28. Watson KB, Carlson SA, Gunn JP, et al. Physical inactivity among adults aged 50 years and older—United States, 2014. *Morbidity and Mortality Weekly Report*. 2016;65:954-958.
29. Moschny A, Platen P, Klaaßen-Mielke R, Trampisch U, Hinrichs T. Barriers to physical activity in older adults in Germany: a cross-sectional study. *International Journal of Behavioral Nutrition and Physical Activity*. 2011;8:1-10.
30. Schutzer KA, Graves BS. Barriers and motivations to exercise in older adults. *Preventive medicine*. 2004;39:1056-1061.
31. Bethancourt HJ, Rosenberg DE, Beatty T, Arterburn DE. Barriers to and facilitators of physical activity program use among older adults. *Clinical medicine & research*. 2014;12:10-20.
32. Bauman AE, Reis RS, Sallis JF, et al. Correlates of physical activity: why are some people physically active and others not? *The lancet*. 2012;380:258-271.
33. Chase J-AD, Phillips LJ, Brown M. Physical activity intervention effects on physical function among community-dwelling older adults: a systematic review and meta-analysis. *Journal of aging and physical activity*. 2017;25:149-170.
34. Hobbs N, Godfrey A, Lara J, et al. Are behavioral interventions effective in increasing physical activity at 12 to 36 months in adults aged 55 to 70 years? A systematic review and meta-analysis. *BMC medicine*. 2013;11:1-12.
35. Blake H, Mo P, Malik S, Thomas S. How effective are physical activity interventions for alleviating depressive symptoms in older people? A systematic review. *Clinical rehabilitation*. 2009;23:873-887.
36. Hall KS, Sloane R, Pieper CF, et al. Long-term changes in physical activity following a one-year home-based physical activity counseling program in older adults with multiple morbidities. *Journal of aging research*. 2011.
37. van der Bij A, Laurant M, Wensing M. Effectiveness of physical activity interventions for older adults: a review. *American journal of preventive medicine*. 2002;22:120.

38. Harland J, White M, Drinkwater C, Chinn D, Farr L, Howel D. The Newcastle exercise project: a randomised controlled trial of methods to promote physical activity in primary care. *Bmj*. 1999;319:828-832.
39. McAuley E, Morris KS, Motl RW, Hu L, Konopack JF, Elavsky S. Long-term follow-up of physical activity behavior in older adults. *Health Psychology*. 2007;26:375.
40. McAuley E, Jerome GJ, Elavsky S, Marquez DX, Ramsey SN. Predicting long-term maintenance of physical activity in older adults. *Prev Med*. 2003;37:110-118.
41. French DP, Olander EK, Chisholm A, Mc Sharry J. Which behaviour change techniques are most effective at increasing older adults' self-efficacy and physical activity behaviour? A systematic review. *Annals of behavioral medicine*. 2014;48:225-234.
42. Wolff JK, Warner LM, Ziegelmann JP, Wurm S. What do targeting positive views on ageing add to a physical activity intervention in older adults? Results from a randomised controlled trial. *Psychology & Health*. 2014;29:915-932.
43. Maher CA, Lewis LK, Ferrar K, Marshall S, De Bourdeaudhuij I, Vandelanotte C. Are health behavior change interventions that use online social networks effective? A systematic review. *Journal of medical Internet research*. 2014;16:e40.
44. Norman GJ, Zabinski MF, Adams MA, Rosenberg DE, Yaroch AL, Atienza AA. A review of eHealth interventions for physical activity and dietary behavior change. *American journal of preventive medicine*. 2007;33:336-345. e316.
45. Han M, Lee E. Effectiveness of mobile health application use to improve health behavior changes: a systematic review of randomized controlled trials. *Healthcare informatics research*. 2018;24:207.
46. Giustini D, Ali SM, Fraser M, Boulos MNK. Effective uses of social media in public health and medicine: a systematic review of systematic reviews. *Online journal of public health informatics*. 2018;10.
47. Devi R, Powell J, Singh S. A web-based program improves physical activity outcomes in a primary care angina population: randomized controlled trial. *Journal of medical Internet research*. 2014;16:e186.
48. Richards J, Thorogood M, Hillsdon M, Foster C. Face-to-face versus remote and web 2.0 interventions for promoting physical activity. *Cochrane Database Syst Rev*. 2013;9:Cd010393.
49. Muller AM, Khoo S. Non-face-to-face physical activity interventions in older adults: a systematic review. *Int J Behav Nutr Phys Act*. 2014;11:35.
50. McNeill LH, Kreuter MW, Subramanian S. Social environment and physical activity: a review of concepts and evidence. *Social science & medicine*. 2006;63:1011-1022.
51. Booth ML, Bauman A, Owen N, Gore CJ. Physical activity preferences, preferred sources of assistance, and perceived barriers to increased activity among physically inactive Australians. *Preventive medicine*. 1997;26:131-137.
52. Burton NW, Khan A, Brown WJ. How, where and with whom? Physical activity context preferences of three adult groups at risk of inactivity. *British Journal of Sports Medicine*. 2012;46:1125-1131.
53. Short CE, Vandelanotte C, Duncan MJ. Individual characteristics associated with physical activity intervention delivery mode preferences among adults. *Int J Behav Nutr Phys Act*. 2014;11:25.
54. Pérez-Escamilla R, Hromi-Fiedler A, Vega-López S, Bermúdez-Millán A, Segura-Pérez S. Impact of peer nutrition education on dietary behaviors and health outcomes among Latinos: a systematic literature review. *Journal of nutrition education and behavior*. 2008;40:208-225.
55. Rossman B. Breastfeeding peer counselors in the United States: helping to build a culture and tradition of breastfeeding. *Journal of midwifery & women's health*. 2007;52:631-637.

56. Joseph DH, Griffin M, Hall RF, Sullivan ED. Peer coaching: an intervention for individuals struggling with diabetes. *The Diabetes Educator*. 2001;27:703-710.
57. Ginis KAM, Nigg CR, Smith AL. Peer-delivered physical activity interventions: an overlooked opportunity for physical activity promotion. *Translational behavioral medicine*. 2013;3:434-443.
58. Matz-Costa C, Howard EP, Castaneda-Sceppa C, Diaz-Valdes Iriarte A, Lachman ME. Peer-based strategies to support physical activity interventions for older adults: A typology, conceptual framework, and practice guidelines. *The Gerontologist*. 2019;59:1007-1016.
59. Humphreys K, Blodgett JC, Wagner TH. Estimating the efficacy of Alcoholics Anonymous without self-selection bias: An instrumental variables re-analysis of randomized clinical trials. *Alcoholism: Clinical and Experimental Research*. 2014;38:2688-2694.
60. Kaskutas LA. Alcoholics Anonymous effectiveness: Faith meets science. *Journal of addictive diseases*. 2009;28:145-157.
61. Wilson B. *Alcoholics Anonymous: Big Book*. AA World Services; 2015.
62. Buman MP, Giacobbi Jr PR, Dzierzewski JM, et al. Peer volunteers improve long-term maintenance of physical activity with older adults: a randomized controlled trial. *Journal of Physical Activity and Health*. 2011;8:S257-S266.
63. Dorgo S, King GA, Bader JO, Limon JS. Outcomes of a peer mentor implemented fitness program in older adults: A quasi-randomized controlled trial. *International journal of nursing studies*. 2013;50:1156-1165.
64. Castro CM, Pruitt LA, Buman MP, King AC. Physical activity program delivery by professionals versus volunteers: the TEAM randomized trial. *Health Psychology*. 2011;30:285.
65. Pratt M, Varela AR, Salvo D, Kohl III HW, Ding D. Attacking the pandemic of physical inactivity: what is holding us back? In: BMJ Publishing Group Ltd and British Association of Sport and Exercise Medicine; 2020.