

# **Physical activity on prescription in primary care**

## **Impact on physical activity level, metabolic health and health-related quality of life, and its cost-effectiveness – a short- and long-term perspective**

*Akademisk avhandling*

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligen försvaras i hörsal Arvid Carlsson, Academicum, Medicinargatan 3, Göteborg, fredagen den 6 november, klockan 09.00.

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### **Avhandlingen baseras på följande delarbeten**

- I. Lundqvist S, Börjesson M, Larsson MEH, Hagberg L, Cider Å (2017). Physical Activity on Prescription (PAP), in patients with metabolic risk factors. A 6-month follow-up study in primary health care. PLoS ONE 12(4): e0175190. [https:// doi.org/10.1371/journal.pone.0175190](https://doi.org/10.1371/journal.pone.0175190)
- II. Lundqvist S, Börjesson M, Larsson MEH, Cider Å, Hagberg L (2019). Which patients benefit from physical activity on prescription (PAP)? A prospective observational analysis of factors that predict increased physical activity. BMC Public Health (2019) 19:482 <https://doi.org/10.1186/s12889-019-6830-1>
- III. Lundqvist S, Börjesson M, Cider Å, Hagberg L, Bylin Ottehall C, Sjöström J, Larsson MEH (2020). Long-term physical activity on prescription intervention for patients with insufficient physical activity level - a randomized controlled trial. Trials (2020) 21:793. <https://doi.org/10.1186/s13063-020-04727-y>
- IV. Ryen L, Lundqvist S, Cider Å, Börjesson M, Larsson MEH, Hagberg L (2020). Cost-effectiveness of physical activity on prescription in previous non-complying patients – comparing two long-term strategies. Manuscript

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# Physical activity on prescription in primary care

## Impact on physical activity level, metabolic health and health-related quality of life, and its cost-effectiveness – a short- and long-term perspective

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### Abstract

Strong evidence indicates a relationship between regular physical activity (PA) and positive health effects, and that PA can be used to prevent and treat diseases. In Sweden, licensed healthcare professionals offer physical activity on prescription (PAP) as a method of supporting patients to increase their PA level. However, further studies are needed to elucidate clinically feasible and effective PAP treatment strategies. The Gothenburg PAP study on which this thesis is based, started in 2010 at 15 health care centers (HCC) by offering PAP to 444 patients (aged 27-85 years) who were physically inactive with metabolic risk factors and following them for 5 years.

The overall aim of this thesis was to evaluate the Swedish PAP treatment regarding PA level, metabolic health, and health-related quality of life (HRQOL), and to explore factors that may predict increased PA levels. In addition, this thesis evaluated two different PAP treatment strategies, supported by either the HCC or a physiotherapist (PT), for patients who still had not reached a sufficient physical activity level after a prior 6-month period of PAP treatment. The cost-effectiveness of the two strategies was evaluated in a health economics study.

A prospective observational study evaluated 6 months of PAP treatment in daily clinical care at the HCC. Of 368 patients, 73% increased their PA level and 42% moved from an inadequate PA level to sufficient according to public health recommendations. Significant improvements were seen in a majority of the metabolic risk factors and HRQOL components measured (Paper I). We also identified potential predictive factors for increased PA after a 6-month PAP intervention: positively valued confidence in readiness to change, and physical health, and BMI <30 kg/m<sup>2</sup>. Among patients with the lowest PA levels at baseline, 84% had increased their PA level at the 6-month follow-up. (Paper II).

In a randomized controlled trial, 190 patients who still had not achieved sufficient PA levels after 6 months of PAP treatment, described in Papers I and II, were randomized to continued, 2-year PAP intervention supported either by a PT or the HCC. Both long-term PAP interventions increased the PA level, metabolic health, and HRQOL with no difference between groups. Results appeared to be independent of any changes in pharmacological treatment (Paper III). In a health economic evaluation of 3 years of PAP treatment, a cost-effectiveness analysis compared the two PAP treatment strategies described in Paper III. From the societal perspective, the cost per gained quality adjusted life years (QALY) for the PT group compared to the HCC group was 147 250 SEK. The willingness to pay for a QALY needed to be > 150 000 SEK for the PT strategy to be a cost-effective choice compared to the HCC strategy indicating a moderate level of costs per QALY. Due to similar results in both groups, it was not possible to draw certain conclusions about the most cost-effective strategy; none of strategies could certainly be chosen before the other (Paper IV).

In summary, this thesis shows that, in ordinary primary health care, both short- and long-term PAP treatment can be a feasible intervention to increase PA, metabolic health, and HRQOL in patients who are physically inactive and have at least one metabolic risk factor. The identification of predictive factors for increased PA levels and the benefit of long-term PAP is essential. These findings offer clinicians an opportunity to better support patients' behavioral changes and the individualization of PAP treatment, and may also create the opportunity for more widespread use of PAP as an important method of gaining health benefits for physically inactive patients.

**Keywords:** *Primary Health Care, Physical activity, Physical activity on prescription, Metabolic syndrome, Health related quality of life, Quality of life, Health behavior, Life style, Correlates of physical activity, Predictive factor, Health economics, Cost-effectiveness, Cost-Benefit Analysis.*