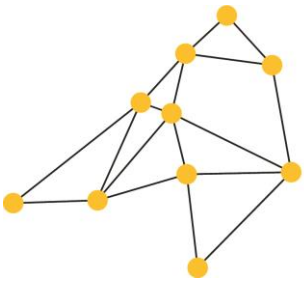

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EUPAP GUIDELINE

Part 1

The PAP-S Methodology

The EUPAP Guideline

The final guideline for EUPAP (A European Physical Activity on Prescription model) will contain three parts; 1) the PAP-S methodology; 2) application of EUPAP models in partner countries; and 3) results from the implementation. This first part provides guidance for prescribing physical activity within the healthcare system and forms the basis regarding responsibilities and roles. It addresses those involved in planning, administrating, implementing, and evaluating EUPAP models as well as for the organisations receiving patients issued with a prescription.

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Introduction

A starting point for physical activity on prescription is the increasing number of people who suffer from lifestyle-related diseases and the growing social inequalities in health (both of which can be addressed by prescribing physical activity). Internationally, various methods include written prescriptions of physical activity within the healthcare setting. Characteristics of the Swedish physical activity on prescription method (PAP-S) are the individualised counselling and prescription based on the patient's circumstances; and that all licensed healthcare professionals with adequate expertise may prescribe physical activity (1). Furthermore, a central component in PAP-S is that the patients participate in activities outside the direction of healthcare services with the aim to integrate physical activity into a regular routine in everyday life (1, 2). This can be compared to exercise referral methods, which usually involve the patient being referred to take part in group activities at specific exercise facilities for a set period of time.

Several different physical activity prescription methods have been developed with the same aim, namely to increase physical activity among adults with a sedentary lifestyle [for reviews see (3-8)]. In Europe, prescription of physical activity was first introduced at the national level in the UK during the 1990s (3). This was followed by Sweden (9-11), Denmark (12), Norway (13), and Finland (14, 15) where similar methods were developed. Later methods appeared in the Netherlands (16), Italy (17), Belgium (18), Spain (19), Portugal, and France (20). Outside Europe, methods to prescribe physical activity exist in the USA (21), Canada (22), New Zealand (23), and Australia (24). The methods are known as *physical activity on prescription,* but also as *exercise on prescription, exercise referral schemes, exercise is medicine,* or *green prescriptions* (25). Nowadays, researchers use these terms interchangeably (5, 26, 27). The PAP-S method is usually referred to as *physical activity on prescription (in Swedish FaR).*

Most of the methods have been studied scientifically and have been shown to increase the physical activity of the patients, but with mixed results for longer follow-ups. PAP-S has shown positive effects on physical activity levels as well as health outcomes for longer periods in both clinical follow-up studies and randomised controlled trials. The implementation and maintenance of the methods in different countries might differ depending on several facilitating factors and barriers. The common denominator in the various methods for prescribing physical activity is that the physicians or other licensed healthcare professionals discuss the prescription with the patient and give a written prescription for physical activity. One method that is effective under certain conditions might not necessarily be directly transferrable to work in other countries due to differences in the contexts, the healthcare systems, important stakeholders, etc. Thus, each country needs to adapt their methods to local conditions in each region and healthcare delivery organisation. The European Commission, Steering group on Health Promotion, Disease Prevention and Management of Non Communicable diseases (SGPP) has chosen the PAP-S method as best practice model for physical activity on prescription and the EUPAP project aims to facilitate the transfer of this model to other Member States.

The PAP-S method

PAP-S entails issuing a formal individualised prescription of physical activity. It should be used with patients considered to need increased physical activity to prevent or treat disease. A prescription can be issued as prevention, as first treatment or as a complement to other pharmaceutical or rehabilitation treatments. A prescription can also be used at the end of rehabilitation for specific training. This section describes the most relevant aspects of the method, its theoretical foundation, and its core components.

Theoretical framework

There are several theory-based behavioural models that have been used in research on physical activity (28), and the different models have several common components and overlap to some extent. PAP-S is mainly based on two theories – *the social cognitive theory* and *the trans-theoretical model*. Important factors in these theories are confidence in one's own abilities (self-efficacy) and the individual's own goal setting and ambition to increase their physical activity. Counselling with motivational techniques to evaluate readiness to change behaviour is closely related to the *self–determination theory (29)*. The theory emphasize that inner motivation is strengthened when the individual is involved in making decisions. The theory is based on three basic psychological needs - autonomy, competence, and relatedness.

SOCIAL COGNITIVE THEORY

Social cognitive theory emphasises that there is an interaction between the individual, their environment, and their behaviour (30, 31). Three factors have been shown to be important to work with in regard to behavioural change leading to a more physically active lifestyle:

- confidence in one's own ability (self-efficacy)
- goal setting to increase physical activity
- self-monitoring of physical activity and reflecting on it

Self-efficacy in performing physical activity is associated with the individual's current and future physical activity level (31, 32) and is influenced by their thoughts and beliefs about physical activity. The individual's self-efficacy is strongly situational. An individual can have a very high confidence in their ability to be physically active in one situation, but can at the same time have a very low confidence in another situation. Past experiences of physical activity or other behaviour changes are important in order to strengthen the individual's self-efficacy. Setting realistic goals and gradually increasing activity are therefore essential, so that the individual can reach their goals.

TRANS-THEORETICAL MODEL

This model explains the individual's readiness for change and the stage of change that the individual is in, in order to design a strategy that can best give rise to a behavioural change (28, 31, 33, 34). An individual can go straight through these stages to maintenance, but often the process occurs cyclically, and it might take several attempts before the new behaviour is maintained (34). The behavioural change is seen as a process that gradually develops in the following stages:

- precontemplation – this describes individuals who are not even considering changing their physical activity behaviour, as well as those who are consciously intending not to change;
- contemplation – the stage at which a person considers making a change to a specific physical activity behaviour (ambivalent);
- preparation or determination – the stage at which a person makes a serious commitment to change physical activity behaviour and takes some steps in this direction;
- action – the stage at which behaviour change is initiated and physical activity behaviour is changed for less than 6 months; and
- maintenance - the stage of sustaining the change (changed physical activity behaviour for more than 6 months) and of the achievement of predictable health gains.

IMPLEMENTATION THEORY

On the organisational level, the implementation can be guided by management theory and practice. It provides useful clues as to how to analyse different organisational settings and how to plan for change, like previous mention theory of change. It is important to recognise the different stages and matching strategies to promote change in each stage. A four-stage model has been proposed (35): awareness raising, adoption, implementation and institutionalisation. The first stage is intended to stimulate interest and support for the organisational change at a senior level. If they are convinced of the importance of a problem and the need for a solution involving their organisation, then the strategy moves to the next stage. The second stage, adoption, includes the planning for adoption of the innovation addressing the local problems. This stage includes the gatekeepers, who are more closely associated with the day-to-day running of the organisation. The third stage, implementation, is concerned with the technical aspects of the program delivery, including the provision of training and material support needed for introducing the innovation. The capacity building is essential for the successful introduction and maintenance of change in the organisation. The fourth stage, Institutionalisation, is concerned with the long-term maintenance of an innovation once it has been successfully introduced. Decision-makers become lead players by establishing systems for monitoring and quality control as well as continued funding of resources and training.

Implementation research has resulted in a number of theories, models and frameworks, in which the importance of preparations as well as identifying and handling factors that may obstruct and promote implementation is emphasised. A widely used method is the RE-AIM (reach, effectiveness, adoption, implementation, maintenance) framework (36). The framework was developed to enhance the impact of health promotion interventions by evaluating the dimensions considered most relevant to real-world implementation. The reach dimension of the framework refers to the percentage and characteristics of individuals receiving the intervention. Effectiveness refers to the impact of the intervention, including anticipated as well as unanticipated outcomes. Adoption concerns the percentage and representativeness of settings that adopt the intervention. Implementation refers to the consistency and cost of delivering the intervention, and maintenance refers to long-term sustainability at both the setting and individual levels.

Core components of PAP-S method

The PAP-S method is composed of five core components, which should be included in EUPAP implementation models (Figure 1). The specialness is the interplay between the five components. The person-centred approach is central in the PAP-S method. Person-centred individualised counselling using diagnosis-specific and evidence-based recommendations of physical activity results in an individualised written prescription that should be accompanied by a follow-up. Furthermore, the healthcare services collaborate with various activity organisers in the local community to help individuals both increase and maintain their activity level. PAP-S has been shown to be an effective method in healthcare to increase physical activity, and the adherence is as good as to other long-term treatments.

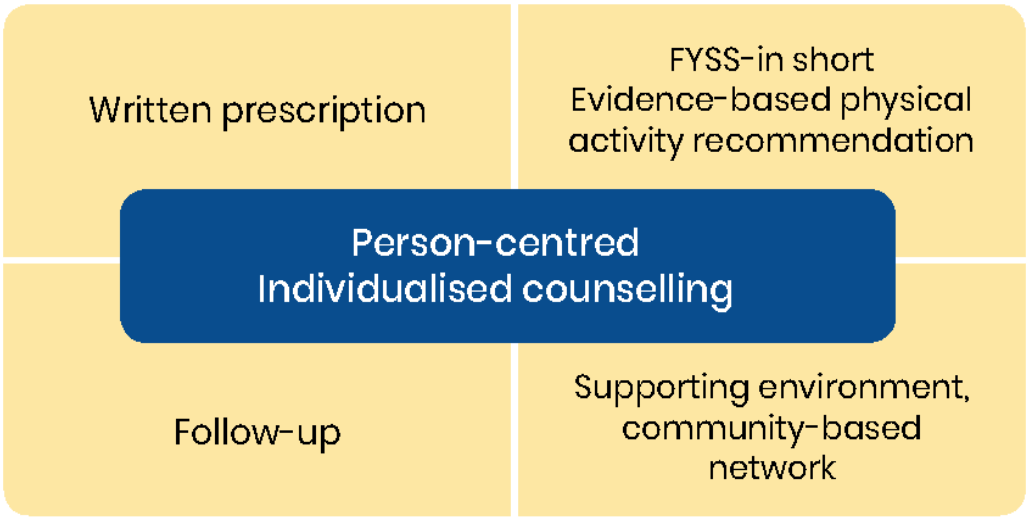

Figure 1. The five core components of the method. Adopted from Kallings 2008 (1).

PERSON-CENTRED INDIVIDUALISED COUNSELLING

The individualised counselling is a dialogue with the patient about motivation to change physical activity habits and potential obstacles. The counselling builds on the patient's state of health (symptoms, diagnoses, and potential risk factors) and on the patient's motivation, prior experiences, preferences, and need of support for increasing their level of physical activity. A person-centred approach and counselling with motivational technique to evaluate readiness to change behaviour is therefore essential for eliciting behavioural change in physical activity. Physical activities that the patient finds fun and possible to do should be emphasised in the counselling, and the support should be adapted according to the patient's degree of motivation and self-efficacy. The counselling is concluded by writing down the prescription on the prescription form, which also can be viewed as an agreement.

EVIDENCE-BASED PHYSICAL ACTIVITY RECOMMENDATION

The shorter version of the handbook *Physical Activity in the Prevention and Treatment of Disease, FYSS-short,* is an evidence-based handbook on the effects of physical activity and includes recommendations for various diseases and diagnoses. *FYSS-short* is an essential tool for healthcare professionals when prescribing individualised types and doses of physical activity based on the patient's conditions. *FYSS-short* is also useful for physical activity organisers. The patient's own choice of activity should always guide the prescription. However, experience shows the benefits of starting with physical activity that can be carried out in everyday life, such as walking, and then eventually adding organised activities.

WRITTEN PRESCRIPTION

The individualised written prescription should state the type of physical activity (aerobic physical activity, balance, flexibility and muscle strengthening activity), dose (frequency, relative intensity, and duration), prescribed activities, contraindications, and a plan for follow-up. Current physical activity level, reason for prescription, and the patient's own goals should also be stated on the prescription form. A prescription form can be beneficial for several reasons. A written prescription can enhance patient's motivation. For prescribers the prescription form may assist in the documentation and can be used for referrals to coaches and activity providers. The prescription should always be documented in the patient's clinical record as a basis for follow-ups. Together with the written prescription, the patient might receive a physical activity diary and/or a pedometer.

FOLLOW-UP

As with any other treatment, it is important to follow up on the prescribed physical activity. The prescriber is responsible for ensuring that follow-up is done and for evaluating both the health outcome and the level of physical activity. In addition, follow-up of the prescription is important in order to adjust the dosage and/or physical activity, and/or give patients more motivation and support when necessary. The prescriber or other healthcare personnel can have renewed contact with the patient through return visits or by phone/video, letter, e-mail, or text message.

SUPPORTIVE ENVIRONMENT AND COMMUNITY-BASED NETWORK

A basic concept of the PAP-S is that the prescribed physical activity is performed outside of the healthcare services. The prescribed physical activity can include both everyday activities and more structured exercise, which can be activities that patients either do on their own or through participation in organised groups. Thus, collaboration with a variety of physical activity organisers is important in order to provide a supportive environment and to help individuals to both increase and maintain their physical activity level. Collaborators can be NGOs such as sports associations, pensioners' associations and patient associations, or municipal facilities and private businesses such as gyms and fitness centres.

The PAP-S process

In Sweden, all licenced health professionals can prescribe physical activity if they have relevant knowledge and are trained to prescribe physical activity to patients. Physicians, physiotherapists, and nurses issue the largest share of prescriptions. All patients in need of physical activity in the prevention or treatment of disease may receive a prescription of physical activity if their health condition allows performing the activity on their own. Prescription of physical activity can be summarised as a process that is based on a person-centred dialogue (Figure 2) and there is a sequence of steps to follow and a few factors to consider. In the assessment, the patient's levels of physical activity, physical function, and disease-specific markers are noted as well as the individual's readiness and motivation to change. The goal setting aims to provide realistic goals that are acceptable to the individual. The individually tailored choice of activity is based on the set goal, the type of activity, and the dose, which can be found in *FYSS-short*. If necessary, contraindications should be considered. The physical activity should be monitored according to the prescription and advice, and an evaluation of the progress should be made as well as any necessary modifications.

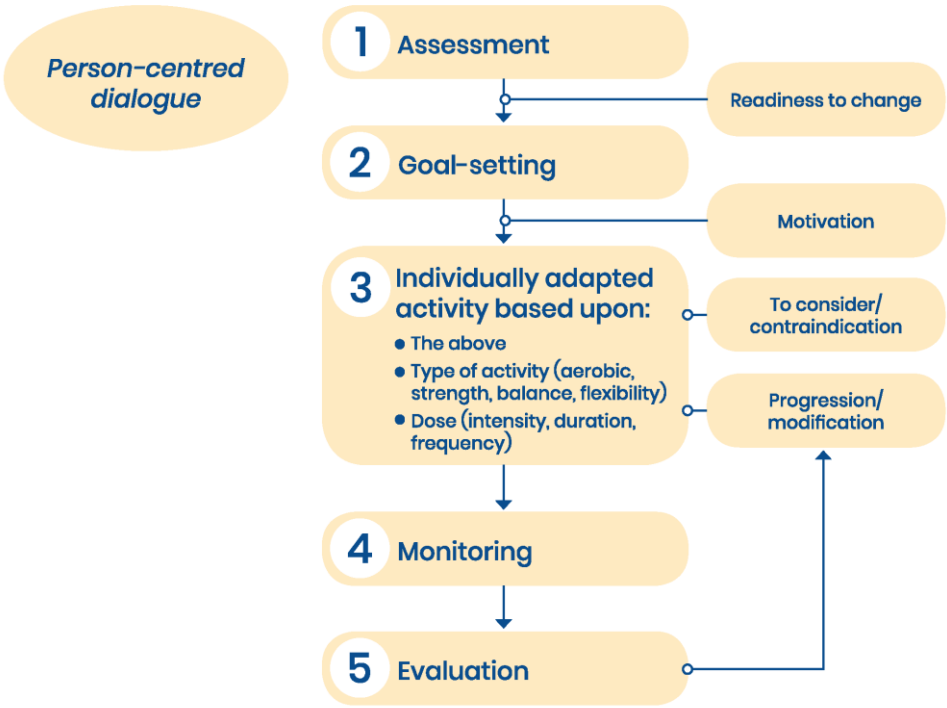

Figure 2: A flowchart of the prescription of physical activity process. Adopted from FYSS 2017 (37).

The PAP-S models

There is a clear distinction between individualised counselling in prescribing physical activity, as in the PAP-S method and various methods to increase physical activity among patients, e.g. exercise referral schemes. A general concept in these schemes is that healthcare professionals refer patients to group activities at specific exercise facilities for a set period. Exercise coaches (mostly physiotherapists) within the healthcare setting use counselling with motivational techniques, conduct exercise tests, and have follow-ups of the physical activity. The effect of exercise referral schemes has been evaluated in systematic reviews (4, 7) in which a small or moderate increase in physical activity level has been demonstrated, but with mixed results.

In the PAP-S method, the prescription is individualised and aims to integrate physical activity into everyday life. The prescription may include activities performed by the patient alone or group activities or a combination of both. It is important that both the activity prescribed, and the support provided is adapted to the patient. The Swedish regions are self-governed with a considerable degree of autonomy and based on the basic PAP-S model there are locally modified versions adapted to the specific conditions of the region. Many regions have developed various kinds of guidance and support functions (PAP-S coaches/coordinators) within or outside the healthcare setting that they can offer to patients who need more assistance. These PAP-S coordinators can also facilitate and

simplify the routines for the prescriber (38, 39). Two complementary PAP-S models have been developed, with added support from PAP-S coaches/coordinators within or outside the healthcare setting (Figure 3) (40).

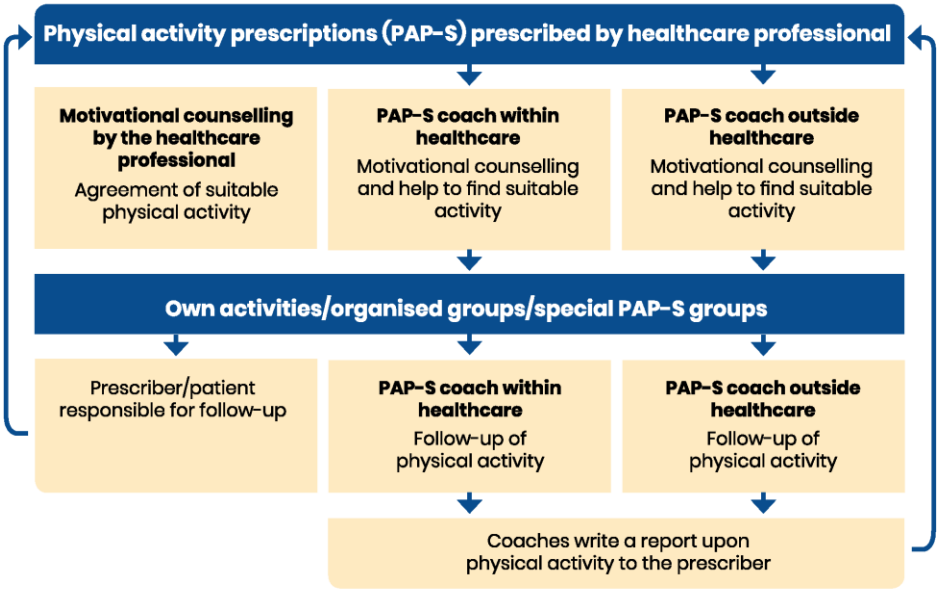

Figure 3: Organisation of PAP-S. The basic model and the two main variants of the model, with PAP-S coaches within or outside healthcare (40) .

In all three models, the prescriber has a person-centred dialogue with the patient and together they find suitable individually tailored physical activities. All models also use a written prescription of physical activity and arrange for follow-ups for both health effects and physical activity. The physical activity is conducted outside the healthcare setting (primary care/hospitals) and is conducted by the patient on their own or in an organised physical activity group (in ordinary training groups at activity organisers or specific groups for patients with a prescription). Agreements and local rules (often at the regional level in Sweden) have been developed that outline how the collaboration between healthcare providers and the activity organisers should be arranged in order to facilitate the patient's behavioural changes and to increase their physical activity.

BASIC MODEL OF PAP-S

- The prescription includes increased physical activity during daily life such as walking, gardening, active commuting, using stairs instead of the lift or other personal physical activities. Depending on the patient´s needs and choices, organised activities might also be part of the prescription.
- The patient and the prescriber agree on the time and method for follow-up of the prescribed activities.

Swedish experience: Clinical experiences suggest that this procedure of receiving a prescription of physical activity might not be enough for all patients to initiate and

maintain an active lifestyle. Some patients need more and individualised external support depending on their motivation, self-efficacy, and health. Support might be given through motivational counselling for a longer time and through assistance in identifying adequate physical activities depending on one's interests, health status, and socioeconomic status. This may be provided by the prescriber at revisits or follow-ups, especially when the prescriber is a physiotherapist or a nurse.

PAP-S WITH A COACH WITHIN THE HEALTHCARE SETTING

- The prescriber (often a physician) sends a copy of the prescription to another health professional (often a physiotherapist or a nurse) who continues the motivational dialogue and assists in finding suitable activities. Additional physical assessments might be made.
- The prescription includes increased physical activity in daily life, and depending on the patient´s needs and wishes, organised activities might also be part of the prescription.
- The coach follows up on the prescription and/or physical activity level and gives the prescriber feedback on the patient's adherence to physical activity.
- The patient and the prescriber agree on the time and method for follow-up of the prescribed activities.

Swedish experience: In some regions, patients have in addition to a prescription also received guidance from a coach within the healthcare setting (41, 42). The aim is to lessen the workload for the prescriber and to offer patients extra support when needed. The inclusion of coaches whereby physicians initiate the process resulted in one region seeing a significant increase in the number of prescriptions compared to when prescriptions were issued without support from a coach (38).

PAP-S WITH A COACH OUTSIDE THE HEALTHCARE SETTING

- The prescriber sends a copy of the prescription to a coach outside the healthcare setting. The coach provides additional motivational counselling and assists in finding suitable activities.
- The prescription includes increased physical activity during daily life, and depending on the patient´s needs and wishes organised activities might also be part of the prescription.
- The coach follows up on the physical activity and gives the prescriber feedback on the patient's adherence to physical activity.

Swedish experience: In some regions, patients have in addition to a prescription also received guidance from coaches outside of the healthcare setting (26, 27). The prescriber sends a copy of the prescription to a PAP-S coordinator, and a coach offers support through a telephone or face-to face meeting for a dialogue on the prescribed physical activity.

Opportunities and challenges

Systematic work with counselling and prescription of physical activity can prevent diseases, lessen the risk of complication with diseases, and reduce the health gap in the population. This might lead to a healthier population, which in turn might lead to reduced need for health care and pharmaceutical products. There are great opportunities, but also challenges and barriers to the implementation of EUPAP models.

It is beneficial for all individuals to become more physically active, especially for people with a sedentary lifestyle. The PAP-S method has been developed for meeting the needs of different patients to be assisted by the health care system in order to enhance health through increased physical activity. In order to be successful, there are several lessons learned in the Swedish work on prevention and treatment of unhealthy life habits (43):

- Long-term, strategic, and integrated work is needed as part of the prevention and treatment of diseases and risk conditions.
- Active ownership is critical, i.e. the work is prioritised by the management and backed up by economic and personnel resources and knowledge support.
- The work should be included and integrated in the regular health services.
- Structural preconditions for recognising and supporting changes to unhealthy lifestyle habits are needed, including structures and roles facilitating cooperation between different levels of healthcare.
- The documentation in IT-based records should be structured to facilitate easy access and planning and evaluation of work.
- Interprofessional collaboration is facilitated and based on the needs of the patient. Professions contribute with their special competence in a synergistic way.
- Cooperation with patients is a cornerstone, and the objective for healthcare is to enhance the capabilities of the individual to live an active and meaningful life.

Scientific basis for the PAP-S method

The few studies that have compared different PAP-S models (see figure 3) have not been able to show any difference in effect in terms of physical activity level. Furthermore, there is not yet any scientifically published evaluation that has specifically investigated the effects of the PAP-S model with a coach outside of healthcare. One study indicated that there is no difference in effect on physical activity or glucose metabolism between PAP-S and PAP-S reinforced with additional long-term support in the form of group meetings (44). PAP-S with or without extra motivational support from a physiotherapist and group exercise for 4 months showed equivalent effects on physical activity level and a submaximal condition test after both 4 and 12 months (10, 45).

The scientific summary below is primarily based on Swedish studies in which PAP-S has been used, i.e. individualised person-centred counselling with a written individualised prescription for physical activity supported by FYSS and follow-ups. A literature search was carried out up to 3 May 2019 using search terms in PubMed as well as in related articles on PubMed and in the reference lists in the articles identified. The PAP-S method can be used in both primary care and specialist healthcare. However, the vast majority of prescriptions are issued in primary care, and thus most of the studies have been carried out in a primary care setting (41, 42, 46). Effects of the PAP-S method have been evaluated in a systematic literature review (47). The aim was to compare PAP-S to non-PAP-S in adults under Nordic conditions in relation to mortality, health status, and health-related quality of life as well as physical activity level and physical capacity. Nine relevant articles were identified, including seven randomised controlled trials (RCTs), one cohort study, and one case series. To be included in the systematic review the intervention group had to have the three main components of PAP-S, i.e. individualised person-centred counselling, individualised written prescription of physical activity, and follow-up. Non-PAP-S components included routine care, general written information about the importance of physical activity for health, and different kinds of group sessions. Results are described more in detail below under each specific outcome heading.

Prescribers and patients

Studies within primary care from 2001-2010 in Sweden show that the largest share of all prescriptions is issued by physicians (35–44%), followed by physiotherapists (18–37%) and nurses (12–26%). Others are psychologists, midwives, dieticians, and occupational therapists (9, 11, 41). One study from 2010 showed that a way to increase number of prescriptions by physicians is to develop special routines to facilitate their work, for example by involving a physical therapist or a nurse to do the motivational counselling and to guide the patient to a suitable activity (38). Of those who are prescribed physical activity in primary care, the majority are women (56–75%). The average age is over 50

years and most of the patients are in the age range of 45–64 years (9, 11, 41, 42, 46). The proportion with university education varies in the studies between 25% and 41%, and the proportion who are married or cohabitating varies between 54% and 79% (11, 42, 46). The majority (84–93%) of the patients are born in Sweden (11, 46). Around a third are virtually inactive and belong to the lowest activity level when they are prescribed physical activity (9, 11, 42, 46). PAP-S patients estimate their physical health at 37–46 and their mental health at 43–45 out of a total score of 100 on the SF-36 (11, 42, 46), and women estimate their physical and mental health lower than men. The majority are overweight, and the average BMI is around 27–30 kg/m^2 (11, 42). Men have worse metabolic health, higher diastolic blood pressure, fasting blood sugar, triglycerides, and total cholesterol and lower HDL compared to women (46).

While healthcare personnel in general are positive to lifestyle counselling (48), there are large variations in attitudes among healthcare professionals. Swedish qualitative studies (48-51) have found several barriers among healthcare professionals. These include physicians who do not prescribe physical activity because of a lack of motivation, knowledge, and training in the method. They also express uncertainty regarding the evidence for the PAP-S method, and they often experience insufficient structural and logistical support. For the patient, this might lead to an unclear message and a feeling of not being listened to (48).

Diagnoses and risk factors

In clinical follow-up studies in Swedish primary care, the following diagnoses and/or risk factors are most frequent: cardiometabolic risk factors, cardiovascular diseases, metabolic diseases, pulmonary diseases, mental health problems/diseases, pain/musculoskeletal problems, and cancer diagnoses (9, 11, 42, 46). RCTs have included patients with overweight, abdominal obesity, and other cardiometabolic risk factors (52, 53); transient ischemic attack (54); and decreased insulin sensitivity (44). A register study from a region, where all first-time PAP-S patients were analysed from both primary healthcare and specialised care, found that the disease burden was much higher among patients who were prescribed physical activity compared with all patients within the same region (41). The prescribed patients had several diagnoses from different diagnosis groups, and it was most common to have 3 or 4 diagnoses (36%). The majority (55%) of the patients receiving a prescription of physical activity had at least 11 care visits during the previous 12 months. A quarter (26%) had been admitted to hospital during the same period. It was twice as common for patients who had been prescribed physical activity to have been admitted to hospital during the previous 12 months compared to all patients (41).

Commonly prescribed physical activity

Every day physical activities, such as walking, are the most common physical activities that are prescribed within PAP-S for all age groups and for both women and men (9, 11, 46). A common dose is walking for 30–45 minutes 2–5 times a week at a moderate intensity (46). Other commonly prescribed activities in Sweden are aqua aerobics (25%), strength and circuit training (19%), aerobics (13%), Nordic walking, i.e. walking with poles (10%), swimming (4%), and running (1%), and 28% are prescribed other activities (9). Structured group training such as aqua aerobics, aerobics, and group Nordic walking are more common for women, whereas aerobics, and strength and circuit training are most commonly prescribed to younger patients.

Adherence to PAP-S and patients' experiences

Adherence to physical activity prescription has been evaluated in two different ways in clinical follow-up studies in Swedish primary care, either as self-estimated adherence with the prescription or as the proportion of patients who increased their activity level after the prescription. These methods showed similar results, and after 3, 6, 12, and 24 months the adherence was between 52% and 70%, which is at least as good as for other long-term treatments (42, 46, 55, 56). Adherence was higher among those who were inactive at the time of prescription, with up to 95% of inactive patients increasing their physical activity level (26, 57). A study that investigated patients' experiences of being prescribed physical activity showed that most patients had generally positive experiences, with more than 8 out of 10 thinking that it was positive. A few patients thought that it was negative, and none thought that it was very negative. Among those who adhered to the prescription after 6 months, the most common reasons were the person-centred counselling and the written prescription. Other important reasons were gaining improved knowledge and getting started with behavioural changes that the patients had already considered or being contacted after the prescription by one of the activity organisers (55).

PREDICTIVE FACTORS FOR ADHERENCE AND NEED FOR INCREASED SUPPORT

Those with the lowest physical activity level can benefit the most from a prescription of physical activity. A prospective observational study (57) identified factors that are predictive of increased physical activity at 6 months after prescription, and these factors included high estimation regarding confidence in their ability to be physically active on a regular basis despite barriers and high self-reported preparedness to increase their activity. Other factors were having a BMI <30, low physical activity level before prescription, and high self-reported physical quality of life. The proportion of patients who maintained higher levels of physical activity at 6 months increased with an increasing number of predictors. Almost all patients (87–95%) with a low level of physical activity prior to

prescription and with 1-3 of these predictors increased their physical activity level (57). According to a qualitative interview study with patients who had received physical activity prescription between 2009 and 2012 the following findings were related to patients' long-term adherence to physical activity (58).

1. Individualised prescription based on the patient's physical capacity and previous experience was important for their physical and mental ability to be physically active.
2. The individual's opportunities to be physically active were promoted by the person-centred counselling, written prescription (emphasising the importance of the prescription), follow-up (i.e. support on several occasions based on the individual's needs and support in the form of a diary or pedometer), collaboration between the prescriber and the PAP-S coach, accessibility of suitable physical activities (social and cultural), balanced life situation, and support from others (family and friends).
3. The motivation to be physically active was affected by the individual's desire to improve their health or avoid disease and by the individual experiencing positive health effects and stimulating and fun activities.

Those who want and use extra support in the form of a PAP-S coach are often patients with a particularly high disease burden and healthcare consumption. Endocrine diseases, mental symptoms/diseases, and chronic pain are more common among these patients (41, 51). The PAP-S coach is described as being important for achieving lasting behavioural change (58).

Level of physical activity and physical capacity

Several clinical follow-up studies in Swedish primary care have shown that PAP-S leads to an increased self-reported physical activity level for at least 15 months (10, 26, 42, 45, 46, 55, 59). PAP-S has positive effects on physical activity levels for those who are inactive and those who are somewhat active as well as in rather physically active individuals (11, 26). The effect of PAP-S on physical activity behaviour seems to decline with time when there is no structural and regular follow-up or feedback to the patients after the initial counselling and prescription (42). A systematic literature review showed that PAP-S compared with no PAP-S can probably increase physical activity level, and there was a moderate certainty of evidence (GRADE +++) for this (47). This conclusion was based on three out of five RCTs and one cohort study (60) showing significant positive effects of PAP-S (RCT with positive effects (52, 61, 62) and no difference (44, 54) between the groups). In all of the included studies and all outcome measures for physical activity, the PAP-S group increased more than the comparison group, although the increase was not always statistically significant. However, in most of the studies, the differences in physical activity level were clinically relevant. Nevertheless, because of methodological differences between the studies (e.g. different physical activity measures, different follow-up) it is hard to state any effect size of

PAP-S on physical activity level (47). The fact that different measures have been used for estimating physical activity level is both a weakness and a strength. The weakness is that it is hard to compare the studies and thus no meta-analysis can be carried out. The strength is that despite different measurement methods having been used, they all show positive effects. No study has shown a negative effect on physical activity level. The outcome measures were both subjective (self-reported physical activity) and objective (pedometer, accelerometer), and included the number of training sessions per week of at least moderate intensity , the time spent in training sessions per week or per day, and the proportion in the intervention group versus control who met the activity goal (physical activity level or steps per day).

The systematic literature review states that the studies showing that PAP-S leads to increased physical activity level have included many different patient groups where physical activity was an important part of the treatment, and these results are thus applicable to most patient groups who need to increase their physical activity level (47). The review also showed that physical capacity, which can be seen as an indirect measure of increased physical activity, might be increased by PAP-S (GRADE ++) (47). This conclusion is based on one RCT that used a submaximal test (6MWT) that showed significantly increased performance in the PAP-S group compared to the control treatment after 6 months (54).

GRADE *(Grading of Recommendations Assessments, Development and Evaluation)*

The GRADE approach is a system for grading the certainty of evidence for a given outcome, that is, how confident we are in the estimated effect or association.

The GRADE approach specifies four levels of the certainty for a body of evidence for a given outcome: high (++++), moderate (+++), low (++), and very low (+).

GRADE assessments of certainty of the body of evidence are determined through consideration of five domains: risk of bias, inconsistency, indirectness, imprecision, and publication bias. For evidence from non-randomized studies, the assessments can be upgraded through consideration of three further domains: large effects, dose-response relationship, and all plausible confounding or bias would reduce a demonstrated effect or would suggest a spurious effect if no effect was observed.

GRADE can give guidance to decision makers in the healthcare system. A positive effect of high or moderate certainty might qualify an intervention for use in routine medical care. If the level of evidence is of low certainty, the use may be motivated if there is an acceptable balance between benefits and risks, cost-effectiveness, and ethical considerations.

Health outcomes

The positive effects of PAP-S on health outcomes have been demonstrated in both clinical follow-up studies and controlled studies where PAP-S has been compared with usual care. PAP-S leads to statistically significant and clinically relevant improvements in several health-related outcomes for at least 24 months in clinical follow-up studies in primary care (42, 46, 56). However, there are no studies on mortality or morbidity, that is, an outcome such as being free from their diagnosis.

HEALTH-RELATED QUALITY OF LIFE

The systematic literature review showed that PAP-S might have little or no effect on quality of life (GRADE ++) (47). This conclusion is based on two RCTs, where one did not find any difference between the groups (54) and the other found that the group prescribed PAP-S increased their mental quality of life (63). Measured with the SF-36, the sum measurement for mental health increased significantly more among those who were prescribed PAP-S (4.4 points, $p < 0.05$), and a larger proportion showed clinically relevant improvements in both mental health (difference = 18%, $p < 0.05$) and the role of emotional limitations (difference = 19%, $p < 0.05$). Within the PAP-S group, the sum measurements for physical health (3.8 points, $p < 0.05$) and general health (10 points, $p < 0.05$) also improved, but these were not significantly different from the control group (63).

HEALTH STATUS

Among primary care patients with increased cardiovascular risk, PAP-S has been shown to lead to improvements in several cardiometabolic risk factors for at least 15 months in clinical cohort studies (46, 59). PAP-S might reduce body weight somewhat (GRADE ++) (47). The relative effect of PAP-S compared with other treatments was calculated in an analysis of two RCTs and showed a significant reduction in the standardised average difference in body weight of 0.33 kg at 6 months after PAP-S [standard mean difference (95% CI): -0.33 kg (-0.62 kg to -0.04 kg), $p = 0.025$] (47). In one study, body weight decreased significantly more in the PAP-S group (-1.8 kg) (53), while in another study there was no significant reduction (52). PAP-S might also reduce waist circumference somewhat (GRADE ++) (47). The relative effect of PAP-S compared with other treatments was calculated in an analysis of two RCTs and showed a non-significant reduction in the standardised average difference in waist measurement of 0.2 cm at 6 months after PAP-S [SMD (95% CI) (-0.20 cm (-0.48 cm to +0.09 cm), $p = 0.18$] (47). In both studies, waist measurement decreased significantly in the PAP-S group (just over 2 cm) but also to some degree in the control group (52, 53).

Furthermore, the systematic literature review showed that the effect of PAP-S on blood pressure is uncertain (GRADE +) (47). This is based on two RCTs investigating the effect of PAP-S on blood pressure compared with other treatment in normotensive patients (44, 53). Blood pressure was therefore not elevated at baseline, and the anticipated effect was thus

not large. None of the studies showed significant differences between the groups. Only one RCT has investigated the effect of PAP-S on blood lipids compared to control treatment after 6 months (53). The effect of PAP-S on blood lipids is therefore uncertain (GRADE +) (47). Significant positive effects on total cholesterol were noted among those who were prescribed PAP-S compared with control treatment (-0.3 mmol/l compared with +0.1 mmol/l, p = 0.042). Among the PAP-S group, triglycerides were significantly reduced without any significant difference between the groups (-0.2 mmol/l vs. 0.0 mmol/l; p = 0.08), and the LDL/HDL ratio tended to differ between the groups (-0.1 vs. 0.1; p = 0.07) (53). Also, PAP-S may lead to little or no difference in glucose metabolism (GRADE ++) (47). This conclusion is based on two RCTs investigating the effect of PAP-S, one among patients with reduced glucose tolerance where no significant effects were seen between the groups (44) and the other among overweight patients with abdominal obesity where a small but significant positive effect in HbA1c was noted between the groups (-0.1% vs. +0.2% of total Hb, p = 0.001) (53).

ADVERSE EVENTS

There are little or no differences regarding risks and side effects of PAP-S (GRADE +++) (47). This conclusion is based on four RCTs and one case series (11, 52, 54, 61, 62). The side effect reported in one study was musculoskeletal pain, but this was the same in the group prescribed physical activity and in the control treatment. Other studies showed no side effects at all (47).

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The Public Health Agency of Sweden coordinates a 3-year project facilitating the transfer and adoption of the Swedish method for prescribing physical activity to nine EU member states.
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