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Sport as a medicine for health and health inequalities

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Chapter |7|

Chapter 7. Conclusions and policy implications

The premise of this thesis is the knowledge that the odds of living a long life or being healthy are strongly related to someone's educational or income level. In addition, the chances of participating in physical activities and sport are also positively related to one's socioeconomic status (SES). However, until recently, there was relatively limited knowledge about the role of sport participation, as a distinct component of physical activity, in relation to health or health care costs, let alone their socioeconomic gradient. The aim of this thesis is to get a better understanding of the relationship between sport participation on the one hand, and health, health care costs and their inequalities on the other hand.

Using individual-level data from the Lifelines cohort study in the north of the Netherlands, we investigated the relationship between sport participation on the one hand and health outcomes, such as mortality and the incidence of type 2 diabetes mellitus (T2DM), on the other. We differentiated the outcomes by socioeconomic groups (education and income) and health status (BMI-level), in order to identify whether the association between sport participation and health differed between groups. We also looked at to what extent differences in sport participation can contribute to socioeconomic differences in health outcomes. Next, we investigated to what extent a neighborhood's socioeconomic status (NSES) was related to its average health care costs, using full-population, neighborhood-level data for the Netherlands. In addition, we investigated to what extent lifestyle behaviors, including physical activity and sport club membership, were related to these socioeconomic differences in health care costs. Finally, we researched to what extent the Covid-19 pandemic was affecting socioeconomic inequalities in physical activity in the Netherlands in 2020. In the following sections we will summarize the findings of the five studies that were conducted in this thesis, draw the main conclusions and present some advice for public health and sport policies.

7.1 Summary of the results

In the first study (chapter 2), we found that sport participation was associated with significantly lower risks of early mortality, T2DM and obesity, but there was no evidence of additional dose-response effects for the amount, intensity or number of sports practiced. For fitness activities the health effects seemed significantly less strong than for other types of sport, in particular team sports. Our findings also showed that those socioeconomic differences in health outcomes could partly be contributed to inequalities in sport participation. This contribution of sport participation to socioeconomic health inequalities seems to be much larger for than that of (moderate to vigorous) physical activity in general. Between socioeconomic groups, there were

no significant differences in the magnitude of the relationship between sport participation and health outcomes. These findings indicate that the rate of sport participation may be an important driver of socioeconomic health differences. In order to reduce the socioeconomic inequalities in health, public health policies may want to focus on increasing sport participation levels, rather than physical activity levels, among low SES groups.

In the second study (chapter 3), the research population was stratified by health status, in the form of body mass index (BMI) levels: healthy weight, overweight and obese. We found that sport participation was associated with improved life expectancy and reduced risk of T2DM and prediabetes, a serious health condition with dangerous blood sugar levels, just below the value for being diagnosed with T2DM. Sport participation was associated with significant higher life expectancy and lower risks of prediabetes for individuals with a healthy weight, than for obese individuals. These findings indicate that sport participation may be the most beneficial for individuals on a healthy weight. Compared with other types of commuting and leisure time physical activity (walking, cycling, gardening, doing odd jobs), sport participation (as well as cycling) was in many cases associated with significantly larger reductions in health risks. The outcomes indicate that future public health policies as well as physical activity advice (from health professionals) should be personalized regarding the individual's health status.

Next, we turned our attention to socioeconomic differences in health care costs and the relationship with sport and physical activity. In the third study (chapter 4), we investigated to what extent, in the Netherlands, a neighborhood's socioeconomic status (NSES) is related to its insured health care costs. We found that there is a socioeconomic gradient in these health care costs. More specifically, relatively high potential reductions could be found in the pharmaceutical and mental health care costs. Taking into account differences in population structure, health care costs in the most deprived quintile of neighborhoods have around 20% higher costs those in the most affluent quintile. Also, within similar NSES categories, large cost differences between neighborhoods were observed. Interestingly, neighborhood socioeconomic differences seemed to contribute to comparatively large health cost effects for individuals between 40 and 60 years old. Also, females accounted for a relatively large portion of health care cost inequalities *between* the NSES groups, while inequalities *within* NSES groups were relatively higher for males. The findings indicate that socioeconomic inequalities seem to be related to health care costs inequalities. This suggests that improving the socioeconomic characteristics of neighborhood, especially the most deprived ones, will also reduce the average health care costs.

In the fourth study (chapter 5) we looked at how lifestyle factors were associated with differences in average health care costs at the neighborhood level. We found that, again accounting for demographical differences, neighborhoods with a one percentage point higher portion of sport club members had, on average, €25 lower annual health care costs per person.

Neighborhoods with a one percentage point higher portion of the adult population complying with the physical activity guidelines had on average €14 less health care costs per person. Sport club membership (but not physical activity) seems to have a complementary effect to the impact of socioeconomic status in explaining variations between neighborhoods in health care costs. Our findings suggest that policies aiming at increasing the number of sport club members would be beneficial in reducing health care costs for all neighborhood socioeconomic levels, while increasing the percentage of individuals complying with the physical activity guidelines may only be effective in low socioeconomic status neighborhoods.

The final study (chapter 6) investigated the effects of the Covid-19 pandemic on socioeconomic differences in physical activity behavior in 2020. The outcomes show that, because of the pandemic and the measures to contain the virus, the gap between low and high SES groups in doing moderate to vigorous physical activity (MVPA) widened significantly. Low SES groups were much more likely to decrease MVPA and less likely to increase MVPA during the Covid-19 crisis, compared with higher SES groups. These findings were persistent over a long period, and, alarmingly, included a period when many Covid-19 containing measures that harmed physical activity and sport opportunities, were lifted. Our findings could imply that, even when the Covid-19 crisis is over, it may be unlikely that pre-Covid-19 physical activity levels will be matched, especially for low-SES groups. With physical activity levels already critically low before the Covid-19 crisis, there is an increased urgency for public health policies to increase efforts to stimulate physical activity and – with the forementioned research outcomes in mind – sport participation, with a focus on the low SES groups. The Covid-19 crisis may not only coincide with, but also intensify, an ongoing social and public health crisis of physical inactivity.

7.2 Conclusions

In this thesis we have tried to provide some new scientific insights around the central research question of this thesis: what is the relationship between sport participation and physical activity on the one hand and health and health care costs and their inequalities on the other? From this thesis we can draw no hard conclusions, because we were not able to establish causal relations and our research is far from complete. But from our research we can draw the following conclusions. Sport participation, just like physical activity in general, is positively related to several important health outcomes, including mortality, T2DM, prediabetes and obesity. Going from no participation to any participation in sport seems to be the most important step for improving health, more than increasing the amount or intensity of doing sport. This is remarkable, since economic theory (Cawley, 2004) and empirical evidence (e.g. Humphreys and Ruseski, 2006) show that with increasing income the odds of participating in sport or physical activities increase, but the time spent doing this decreases (as a result of increased opportunity costs). Our research indicates that, in order to improve health, the first decision (whether or not

to participate) is much more important than the second (the amount). Practicing sport seems, together with cycling, to be more beneficial for health than other types of leisure time physical activities, although the effectiveness of sport as ‘preventive medicine’ may be higher for persons on a healthy weight than for obese individuals. Differences in sport participation seem to explain the socioeconomic inequalities in health outcomes to a substantial extent, and much more so than differences in physical activity in general. Similarly, a higher level of voluntary sport club membership seems, at the neighborhood level, to be strongly related to lower health care costs. This relationship appears to be independent from a neighborhood’s socioeconomic status. Compliance with the physical activity guidelines seems to be somewhat less strongly related to health care costs, than sport club membership. Increasing this compliance will most likely have the most effect on lowering health care costs in the most deprived neighborhoods. However, in 2020, the Covid-19 pandemic has hit the physical activity levels of especially the lower income and education groups, alarmingly widening the already large existing socioeconomic disparities in physical activity. This emphasizes the importance and urgency to improve public health policy efforts to increase sport participation, especially among the low socioeconomic groups. Our research indicates that this may not only improve the population’s health, but also decrease health care costs.

7.3 Policy implications

From the five studies we presented, some important conclusions can be drawn that should have implications for public health policies and those involved.

First of all, our research shows that physical activity and sport participation are related, but distinctly different entities, as they have different relationships with health outcomes and health care costs. Much more than physical activity, sport participation seems to explain health differences between the affluent and deprived parts of the (Dutch) population. Also, in order to reduce health care costs, increasing sport participation, more specifically voluntary sport club memberships, may be more effective than increasing the compliance with physical activity guidelines. Public health policies aimed at improving health and reducing health care costs should pay much more attention toward the possibilities to increase sport participation and sport club memberships, for instance by removing or diminishing (financial) barriers to participate in sport activities for low-income groups. In addition, policy makers, but also researchers and the media, should become more aware of these differences, and be very careful to use the terms ‘physical activity’ and ‘sport participation’ interchangeably.

Secondly, our findings show that there is a strong socioeconomic gradient in both health and health care costs and that lifestyle factors play an important role in explaining those differences. This demonstrates that policies aimed at improving public health and containing health care costs should become a more integral part of socioeconomic policies, and vice versa.

This matters not only at the national level, but also at the regional and local level. Effective public health and sport policy strategies need to take into account not only a population's demographics, but also their socioeconomic structure, its (lifestyle) behaviors and health status. Apart from financial means, potential barriers for low-SES groups to engage in sport and physical activities include time-constraints, the accessibility of facilities, the availability of an activity friendly local environment, neighborhood safety, (health-related) sport-devices and a lack of social contacts with whom to participate in sport or physical activities (Kamphuis et al., 2007). Removing these barriers, improving social conditions and decreasing socioeconomic inequalities is not an easy, short-term targets, but the potential rewards in terms of improving health and lowering health care cost, as well as other societal benefits, could be enormous. To achieve this, health in general, and lifestyle in particular, need to become much more important and visible government objectives. For this it would be advisable to give – similar to economic parameters - public health parameters, such as life expectancy and healthy life years as well as health inequality much more political weight.

Thirdly, within public health policies, health prevention, including improving sport and physical activity participation, should be given more attention. While much media attention and political debate was (rightly so) focused on the health effects of Covid-19 pandemic, much less attention was paid to the potential negative health effects of the measures to contain the pandemic. According to Wouterse et al. (2021) the Covid-19 related excess mortality was around 16.000 deaths in the Netherlands in 2020, corresponding to around 90.000 life years. Simultaneously, the (net) change in physical activity behavior in 2020, associated with the Covid-19 pandemic and the measures to contain it, were estimated to have resulted in a loss of 46.000 healthy life years in 2020 (Schoemaker & De Boer, 2021). In addition, our research shows that, the socioeconomic inequalities in physical activity increased considerably in the same period. Moreover, this could have a lasting effect, even when Covid-19 is contained. Given that, before the pandemic, not even half of the Dutch population complied with physical activity guidelines and internationally, physical inactivity was considered a 'pandemic' of its own (WHO, 2019). The urgency to act to increase sport and physical activity behavior, especially among the low income and low educated groups, has perhaps never been as high as now. We believe that our research highlights the importance to drastically increase efforts to improve the standards of a healthy lifestyle, and in particular sport participation within the group with a low socioeconomic status, as a 'preventive medicine' for the health and well-being of many individuals as well as society as a whole. Naturally, new sport and physical activity policies and interventions should be implemented with care and be evaluated for its efficiency and long-term cost-effectiveness (Postma et al., 2011).

Fourthly, our studies suggest that sport participation, more than physical activity, may be able to reduce socioeconomic inequalities in health. Increasing sport participation, especially

among low income and low educated groups, should therefore be a major public health objective. How this can be achieved is a very difficult question to answer. As the Covid-19 pandemic demonstrates, it may be much easier for an individual to forfeit their physical activities than to start to participate in sport or increase the amount of physical activity, especially for individuals that are less affluent. As good habits are easier adopted at a young age, it seems wise for public sport and health policies to focus on improving sport participation among individuals with a background of low socioeconomic status. An obvious starting point would then be to intervene at primary schools, because for children it is often relatively easy to adopt new habits, such as an active lifestyle. At schools there is a more or less equal playing field for each child and where, preferably guided by physical activity professionals, it can discover which sport attracts and suits them (Eime et al., 2013). For practicing sport to become the habit that can be enjoyed for a lifetime, this interest must then be retained and embedded in a fixed and safe social environment, such as a local voluntary sport club.

Fifthly, our research indicates that sport participation may simultaneously improve a population's health and reduce the health care costs for society. Both are very important government objectives. However, public health specialists are still debating what the effects of increasing sport participation will be in the long run (RIVM, 2020; Polder et al, 2012). From our research it is not possible to estimate to what extent the benefits of lower annual health care costs related to, for example an increase in sport participation, may be offset by possible increased health care costs related to an increase in life expectancy. It would be interesting for future research to estimate the shape of the relationship between health (outcomes) and health care costs. This marginal effect is bound to depend on many different factors, including socioeconomic status. However, although the debate and research on the total health care cost effects of an increase in sport participation (or any other lifestyle improvement) is important, it should not cloud some of the major finding of our studies. The bottom line is that sport participation is likely to decrease the average annual health care costs (i.e. the costs of health per unit) *as well as* to improve health, which, on its own, can lead to many other benefits, both personal and societal.

7.4 Finally

Keynes famously wrote: 'in the long run, we are all dead' (Keynes, 1923). From the evidence in this thesis, it seems that participating in sport may extend, as well as improve, the short run in which we are alive.

It is our challenge as human beings to use and improve the possibilities of sport participation as a means to improve 'the good life', that, according to Keynes, should be purpose of any individual, but especially for the those that have the worst odds. Although, in the Netherlands, the standard of living is high and income inequalities are relatively modest, there are very large

differences in health and life expectancy that are related to socioeconomic inequalities. In the light of an inactivity and obesity 'pandemic', that is most likely aggravated by the outbreak of the Covid-19 virus, there is an urgency for public health policies to improve the efforts to promote a healthy lifestyle, especially for lower educated and income groups. Our research indicates that sport participation may be an important preventive medicine for improving health, reducing socioeconomic health inequalities as well as lowering health care costs. Or, as Keynes may have agreed, participating in sport can be an important ingredient to enjoy, improve and prolong 'the good life' for all.

