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Participation in recreational activities varies with socioeconomic position and is associated with self-rated health and well-being

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ABSTRACT

Recreational activities may promote and maintain health and well-being, but empirical evidence is limited. The aim of this study was to explore socioeconomic variations in participation in recreational activities in the local community and to examine associations with health and well-being in the general population.

Participants ≥ 16 years from the Danish Capital Region Health Survey, conducted in 2017 (N = 55,185, response rate 52.6%) were included. Participation in community-based recreational activities, self-rated health, quality of life, and health status was assessed by questionnaire. Socioeconomic variables (educational level, occupational and marital status) were obtained from national registers. Multiple logistic regression models were used to examine associations.

Less than half of the population participated in community-based recreational activities. Individuals with a higher educational level were 55% more likely to participate in recreational activities compared to those with a lower educational level (OR = 1.55, CI:1.45–1.66). Individuals with a low educational level who participated in recreational activities, were more likely to have an excellent/good quality of life (OR = 2.03 (95% CI:1.86–2.21)) and an excellent/very good self-rated health (OR = 1.61 (95% CI:1.51–1.71)), than those who did not participate in recreational activities.

Regardless of educational level, recreational activity participation was associated with better self-rated health and quality of life. Thus, to counter-balance social inequality in health, a focus on participation in recreational activities is important when planning community public health interventions.

1. Introduction

Observational studies have shown that participation in recreational activities is associated with better health and well-being among working adults (Sonnentag, 2001; Winwood et al., 2007) middle-aged (Takeda et al., 2015) and elderly people (Niedzwiedz, 2016; Curvers et al., 2018; Vozikaki, 2017; Fitzpatrick, 2009; Paggi et al., 2016; Zimmer and Lin, 1996). Among adolescents, recent studies have linked participation in recreational activities to less academic stress and better perceived health (Badura et al., 2015; Zhang and Zheng, 2017). Also, among selected groups with high emotional strain, recreational activities have been associated to improved self-rated health and well-being (Goodman et al., 2017; Schüz, 2015).

Participation in recreational activities is influenced by factors such as age, gender, family/marital status, socioeconomic position (Curvers et al., 2018; Galenkamp et al., 2016; Chen et al., 2018) and health-related limitations (Galenkamp et al., 2016; Menec and Chipperfield, 1997; Ihle et al., 2017). Moreover, the structural environment may influence the extent to which individuals engage in recreational activities such as access to facilities and meeting points in the nearby neighbourhood (Travert et al., ; Silva, 2013). Thus, socioeconomic inequalities in recreational activity participation may arise due to e.g. diversity in individual or neighbourhood specific financial resources, cultural norms or health conditions that affects the possibilities for activities away from home.

Recreational activities are mainly performed in leisure time and covers sport and exercise activities, cultural activities, outdoor activities, social activities and similar activities with the purpose of bringing pleasure, joy, amusement and meaning to our lives (Pressman et al., 2009). The effect of participation in recreational activities on health and well-being is expected to work through a number of pathways: 1) It provides opportunities for social interactions and thereby increases

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social satisfaction and builds supportive relations; 2) It helps to unwind, relax and "recharge the battery" which may counterbalance stress; 3) Participating in meaningful activities can help increase the quality of life 4) It increases physiological and cognitive functioning 5) It increases social connectiveness and cohesion in the local community (Elliott et al., 2014; Delhey et al., 2016).

The relationship between socioeconomic position and health outcomes is well established as low socioeconomic position is associated with poorer health outcome (Berkman Lf, 2014). However, little is known about the socioeconomic differences in the health benefits of participation in recreational activities.

The aim of this study was to explore socioeconomic variations in participation in community-based recreational activities in the general population and to examine associations with self-rated measures of health and well-being. Further, to investigate whether participation in recreational activities modified socioeconomic inequalities in health and well-being.

2. Methods

2.1. Study design and population

This study is based on data from the cross-sectional Danish Capital Region Health Survey conducted in 2017 in the Capital region of Denmark. The questionnaire survey was a part of The Danish National Health Survey (Christensen et al.,). A random sample of 104,950 adults aged 16 and above were identified using the Danish Civil Registration System and invited to participate and respond to a questionnaire. A total of 52.6% (n = 55.185) completed the questionnaire. The study was approved by the Danish Data Protection Agency (id number 16/94616). The research project was approved by the Danish Data Protection Agency according to the Danish Act on Processing of Personal Data. Approval from the Danish Health Research Ethics Committee System was not required according to Danish law, as the research project was purely based on data from questionnaires and national registers. Written informed consent for publication based on the questionnaire data was given by the participants when returning the questionnaires. Data from the population-based survey was linked to nation-wide socio-economic registers by using the unique personal identification number (CPR-number).

2.2. Participation in recreational activities

Participation in community-based recreational activities was self-reported by replying to the question: "Do you participate in any recreational activities in the neighbourhood, where your live? (e.g. sport, dancing, theatre, community activities, volunteer work)"? (yes/no). Participation was measured at the time of data collection which was in February to May 2017. All participants answering "yes" were categorized as participating in recreational activities.

2.3. Self-reported health and well-being

Quality of life was measured by the question: "In general, how would you rate your quality of life?" Responses were distributed on a five-point Likert-scale, ranging from 1) excellent, 2) good, 3) neither poor nor good, 4) poor, to 5) very poor and dichotomized as 'excellent/good' or 'neither poor nor good/poor/very poor'.

Self-rated health was measured by the following single item question extracted from the 36-item Short-Form Health Survey (SF-36) (Ware and Sherbourne, 1992) and the 12-item Short-Form Health Survey (SF-12) (WARE et al., 1996). "In general, would you say that your health is: 1) excellent, 2) very good, 3) good, 4) fair, or 5) poor?" dichotomized as 'excellent/very good' or 'good/fair/poor'.

2.4. Socio-economic factors

Information on demographic and socioeconomic variables such as age, educational level, occupational, marital/cohabitation status, living with children at home, and residential municipality were based on population-based registers and retrieved from Statistics Denmark. Educational level refers to highest number of years of schooling obtained at the end of the survey period. The variable was categorised into 1) primary and secondary school, 2) vocational education, 3) professional/academy programmes and 4) university degree and then further dichotomized into high (Professional/academy programs/University) and low (Primary and secondary school / Vocational education) educational level in subsequent analyses with combined categories of education and recreational activity participation.

Employment status was categorised into 1) working, 2) studying, 3) retired and 4) unemployed, early retirement, or sick leave. Marital/cohabitation status was categorised into 1) married/living with partner and 2) single/living alone. Living with children at home was categorised as 1) participants living with children $\leq$ 15 years and 2) not living with children $\leq$ 15 years. Information about place of residence (residential municipality) was categorized as 1) urban, 2) suburban or 3) rural. Easy access to sport facilities or local community activity centers was self-reported by a positive response to the question: "*Do you have easy access to the following facilities, in the neighbourhood where you live*? a) sport facilities (e.g. football fields, public pools, recreational, sport- or fitness centers) and b) community health center, community activity center or senior citizen center.

2.5. Other co-variates

Physical activity was measured by the Nordic Physical Activity Questionnaire-short which consists of two questions asking for 1) moderate-to-vigorous and 2) vigorous physical activity during the last week during leisure time and transportation (Danquah et al., 2018). Participants were categorized as having a physical activity level below or at least equal to the WHO recommendations (150 mins of moderate physical activity/week, or 75 mins of vigorous physical activity, or equivalent combination). Loneliness was measured using a Danish version of The Three-Item Loneliness Scale T-ILS (Lasgaard, 2007). The sum of the items ranges from 3 to 9 points with higher scores indicating greater loneliness. Participants were categorized as being lonely with a score above 6 on the T-ILS scale. Smoking status was classified as: 1) daily smoker and 2) occasional smoker (yes, minimum once a week or yes, less often than every week), 3) ex-smoker, or 4) never smoker.

Alcohol consumption was measured as a combination of the following questions: 'Have you been drinking alcohol the last 12 months?' and 'How much alcohol have you typically been drinking every day during the week?'. The respondents were dichotomized according to beverages limits announced by the Danish Health Authorities: 0–14 units per week for women and 0–21 units per week for men or above.

Information on Chronic disease was obtained from registers and defined as having at least two out of eleven prespecified diagnosis.

2.6. Statistical analyses

We calculated descriptive statistics for socioeconomic factors by recreational activity participation. Proportions with 95 % confidence interval (CI) and OR are presented.

Associations between variations in educational differences in recreational activity participation and health indicators (quality of life and self-rated health) were estimated and tested using multiple logistic regression estimating odds ratios adjusting for the potential confounding factors. Potential confounders were selected a priori based on theoretical considerations and previous findings in the literature on associations between participation in community-based recreational activities

and health. We constructed (four) models with varying degree of adjustment to test the impact of potential confounding and mediating factors. Model A was adjusted to sex and age, Model B (main model) was further adjusted for educational level, employment status, marital/cohabitation status, children at home, chronic disease, smoking and alcohol consumption. Model C was further adjusted for physical activity and loneliness (potential mediating factors) and Model D was additionally adjusted for place of residence and access to community recreational facilities (contextual factors).

The interplay between participation in recreational activities and educational level was examined by combining categories of educational level and recreational activity participation. Effect modification between recreational activity participation and educational level was explored by including interaction terms in stratified analyses and visually plotted as a combined category. In sensitivity analyses we further repeated the analyses of the interplay between participation in recreational activities and educational level using different categorizations of educational level. Also, to examine the robustness of our findings we supplementary stratified by age, adjusting for various potential socioeconomic factors and examined the associations with two other self-reported measures of health (mental and physical health functioning measured by the Short Form 12) (See appendix, Tables A3 and A5-A8). All models were weighted for non-response and survey design. Analyses were performed using survey procedures in SAS statistical software version 9.4, SAS Institute Inc, USA.

3. Results

3.1. Characteristics of the study population

Table 1 shows the baseline characteristics of the 55,185 participants included in the study according to educational level. In total, 30,290 were women (55%), the median age was 52 years, and 34% had primary or secondary school as the highest educational level. The proportion of respondents that reported to participate in community-based recreational leisure time activities was 38%. Among participants with low education this was 30% and 32% among men and women, respectively. A substantial proportion of the study participants reported to be physically active according to the WHO recommendation (74%) and reported to have easy access to sport facilities and community activity centers (91%).

3.2. Associations between participation in recreational activity and health outcome

Age-adjusted analyses in Table 2 (Model A) show that women were slightly more likely to participate in recreational activities than men. Also, compared to the younger age-group (<35 years old), the older age

Table 1
Characteristics (number and weighted percentage) among all 55,185 participants from the Danish Capital Region Health Survey 2017 according to sex and educational level.

Educational level[a]	N = 55,185	% of all[#]	Men (% of all men, N = 24,895) [#]			Women (% of all women, N = 30,290) [#]		
			Low (n = 6,876)	Middel (n = 7,935)	High (n = 9,704)	Low (n = 8,414)	Middel (n = 8,303)	High (n = 13,118)
Age								
16–34 years	12,293	32.8	47.5	13.7	29.3	47.3	13.3	32.8
35–64 years	27,783	46.8	35.8	56.0	55.2	29.9	55.8	30.9
65 + years	15,109	20.4	16.7	30.2	15.5	22.8	30.9	13.4
Participation in recreational activities								
Yes	22,873	38.3	30.0	38.3	42.1	32.2	40.1	46.2
No	30,845	61.7	70.0	61.7	57.9	67.8	59.9	53.8
Marital/cohabitation status								
Married/co-living	36,063	59.6	46.2	71.1	73.5	41.5	60.8	66.4
Single	7,383	40.4	53.8	28.9	26.5	58.5	39.2	33.6
Employment status								
Working	31,316	56.8	42.9	62.8	75.1	31.6	56.5	71.3
Studying	5,238	14.3	28.7	1.4	6.9	32.3	1.8	8.9
Retired	14,014	20.4	16.5	29.2	13.5	24.1	32.2	13.6
Unemployed, early retirement, sick leave	3,339	8.5	11.9	6.6	4.4	12.0	9.5	6.3
Severe feeling of loneness								
Yes	3360	8.2	9.4	5.8	6.5	11.6	7.7	6.4
No	50,513	91.8	90.6	94.2	93.5	88.4	92.3	93.6
Physically active according to WHO recommendation								
No	12,667	25.9	26.7	29.3	21.1	27.9	30.5	22.9
Yes	35,580	74.1	73.3	70.7	78.9	72.1	69.5	77.1
Place of residence								
Urban	13,815	40.0	38.6	27.9	48.5	38.5	25.6	48.2
Suburban	10,247	16.7	16.6	18.4	15.3	17.3	19.5	15.2
Rural	31,123	43.3	44.4	53.8	36.1	44.2	54.9	36.7
Easy access to sport facilities or local community activity centers								
No	4,172	9.2	10.8	7.3	7.5	12.4	8.9	6.8
Yes	49,669	90.8	89.2	92.7	92.5	87.9	91.1	93.2

#The percentages displayed are weighted for non-response and stratified sampling and can therefore not be calculated from the number of respondents. Numbers do not add to total n due to variations in missing values.

[a] Educational level is categorized as: 1) Low: Primary and secondary school, 2) Middle: Vocational education, 3) High: Professional/academy programs/University.

Table 2
Associations (proportions and odds ratios) of recreational activity participation by selected socio-economic factors estimated from a logistic regression model (N = 55,185).

	Recreational activity participation						
	n	%		Model A[a]		Model B [b]	
			95 % CI	OR	CI (95%)	OR	CI (95%)
Total	22,873	39.6					
Sex							
Men	9,878	36.9	(36.2–37.6)	1.00	-	–	–
Women	12,995	39.6	(38.9–40.2)	1.14	(1.09–1.18)	–	–
Age							
16–34 years	3,667	31.0	(30.0–32.0)	1.00	-	–	–
35–64 years	11,532	39.2	(38.5–39.9)	1.44	(1.37–1.52)	–	–
65 + years	7,674	48.0	(47.1–49.0)	2.06	(1.94–2.19)	–	–
Educational level (%)							
Primary and secondary school	5,000	31.1	(30.3–32.0)	1.00	-	1.00	–
Vocational education	6,772	39.1	(38.3–40.0)	0.79	(0.74–0.84)	0.80	(0.75–0.85)
Professional/academy programs	6,761	43.9	(42.9–44.9)	1.39	(1.32–1.47)	1.37	(1.30–1.45)
University degree	4,072	44.9	(43.5–46.1)	1.55	(1.45–1.66)	1.55	(1.45–1.66)
Employment status							
Working	12,651	38.3	(37.6–38.9)	1.00	-	1.00	–
Studying	1,676	32.8	(31.4–34.3)	1.20	(1.24–1.52)	1.53	(1.39–1.70)
Retired	7,218	48.7	(47.7–49.7)	1.37	(1.08–1.33)	1.31	(1.17–1.46)
Unemployed, early retirement, sick leave	932	26.7	(24.9–28.4)	0.57	(0.52–0.63)	0.68	(0.62–0.76)
Marital/cohabitation status							
Married/co-living	15,861	40.2	(39.6–40.8)	1.00	-	1.00	–
Single	6,774	36.0	(35.1–36.8)	0.87	(0.83–0.92)	0.96	(0.92–1.01)
Children at home							
No	14,949	38.8	(38.2–39.4)	1.00	-	1.00	–
Yes	7,901	37.4	(36.6–38.2)	1.13	(1.07–1.91)	1.11	(1.05–1.18)
Place of residence							
Urban	5,091	35.8	(34.9–36.7)	1.00	–	1.00	–
Suburban	4,098	36.9	(35.8–38.0)	0.96	(0.90–1.03)	1.01	(0.95–1.08)
Rural	13,684	41.1	(10.5–41.8)	1.12	(1.07–1.18)	1.18	(1.12–1.24)
Easy access to sport facilities or local community activity centers							
No	918	20.2	(18.7–21.7)	0.36	(0.32–0.39)	0.37	(0.33–0.40)
Yes	21,889	40.2	(39.7–40.7)	1.00	–	1.00	–

Data shown are weighted % (95% confidence intervals) and p-values for X^2; The shown percentage refers to the proportional distribution within each subcategory e.g. 39.6 % of all women participate in recreational activities. Numbers do not add to total n due to variations in missing values.
[a] Adjusted for age and sex.
[b] Adjusted for age, sex, educational level, employment status, marital/cohabitation status, children at home.

groups were more likely to participate (Table 2). Multiple adjusted analyses (Model B) show that compared to participants with primary and secondary school as the highest educational level, those with a university degree were 55% more likely to participate in recreational activities (OR = 1.55, CI:1.45–1.66) (Table 2). Conversely, participants who were unemployed, on sick leave or early retired were significantly less likely to participate in recreational activities compared to working participants (OR = 0.68, CI:0.62–0.76). Although most of the participants

Table 3
Associations (Odds ratios) of quality of life and self-rated health by participation in recreational activities stratified by categories of educational level estimated by a logistic regression model.

Educational level	Recreational activity	N	%	Model A[a]		Model B[b]		Model C[c]	
				OR	CI (95%)	OR	CI (95%)	OR	CI (95%)
		Excellent/good quality of life (n = 44,215; 81%)							
Primary and secondary school / Vocational education	No	13,833	72.7	1.00	–	1.00	–	1.00	–
	Yes	10,144	84.9	2.15	(1.99–3.32)	2.03	(1.86–2.21)	1.62	(1.47–1.79)
Professional/academy programs/University	No	9728	82.9	1.00	–	1.00	–	1.00	–
	Yes	9909	90.9	2.08	(1.81–2.38)	2.03	(1.86–2.01)	1.96	(1.75–2.20)
		Excellent/very good self-rated health (n = 25,376; 49 %)							
Primary and secondary school / Vocational education	No	7194	39.7	1.00	–	1.00	–	1.00	–
	Yes	5470	48.5	1.73	(1.63–1.84)	1.61	(1.50–1.71)	1.39	(1.29–1.49)
Professional/academy programs/University	No	5945	53.4	1.00	–	1.00	–	1.00	–
	Yes	6422	61.7	1.64	(1.52–1.74)	1.58	(1.48–1.72)	1.38	(1.27–1.48)

d) Adjusted for c) and physical activity and loneliness.
[a] Data shown are weighted % (95% confidence intervals) and p-values for X^2; Numbers do not add to total n due to variations in missing values.
[b] Adjusted for age and sex.
[c] Adjusted for age, sex, employment status, marital/cohabitation status, children at home, chronic disease, smoking and alcohol consumption.

(91%) reported to have easy access to sports facilities or community activity centers, those who did not were significantly less likely to participate in recreational activities (OR = 0.37, CI:0.33–0.40). Further adjustment for place of residence and access to sport facilities did not change estimates.

3.3. Associations between participation in recreational activity and health outcome stratified by educational level

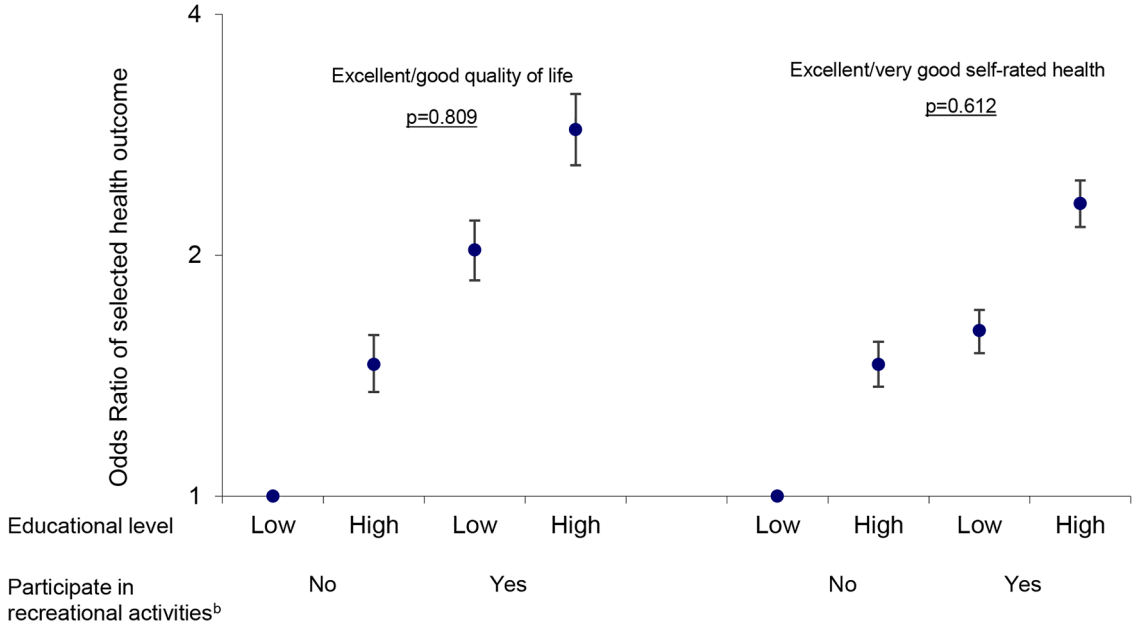
Associations between participation in recreational activity and health outcomes showed that the odds ratios of having an excellent/good quality of life or excellent/very good self-rated health were 1.99 (CI:1.86–2.14), and 1.60 (CI:1.52–1.67), respectively, for those participating in recreational activities compared to not participating (Table A1, Model B). Associations stratified by educational level are shown in Table 3. A strong association between participation in recreational activities and both self-rated quality of life and health was observed in both educational strata. Further adjustments for physical activity and loneliness attenuated the estimates slightly, but associations remained significant (Table 3, Model C).

3.4. Associations between combinations of educational level and participation in recreational activity with health outcome variables

Figure 1 shows the odds for the combinations of educational level and participation in recreational activities in relation to quality of life and self-rated health. Individuals with a high educational level who participated in recreational activities were most likely to report better health and well-being than those not participating. Participants with low educational level who participated in recreational activities had higher odds of excellent/good quality of life (OR = 2.03, (95% CI:1.86–2.21)) and excellent/very good self-rated health (OR = 1.61, (95% CI:1.51–1.71)) than participants with high educational level who did not participate in recreational activities (OR = 1.46 (95% CI:1.35–1.59) and OR = 1.46 (95% CI:1.37–1.56), respectively) (estimates can be seen in Appendix Table A4, Model B). When testing for statistical interaction no statistically significant interaction between education and participation in recreational activity was observed. Combined analysis with educational level in three categories (Appendix, Table A5) and further adjustment for employment status and ethnic background showed fairly similar results (Table A8). When stratified by age, higher OR was observed among the oldest age group compared to youngest group (See Appendix Table A3). Compared to those with the lowest educational level and no recreational activity participation, the odds ratio for excellent/good quality of life was 3.44 (95% CI: 2.86–4.14) among highly educated 65 + years old who participated in recreational activities and 2.50 (95% CI: 1.94–3.22) among highly educated 16–34 years old participating in recreational activities.

4. Discussion

We found a significant socioeconomic gradient in participation in community-based recreational activities as those with a higher educational level were more likely to participate in recreational activities. However, regardless of educational level, participation in recreational activity was associated with quality of life, suggesting that participation in recreational activities may counter-balance the socio-economic inequality in health and well-being.



[a]Adjusted for sex, employment status, marital/cohabitation status, children at home, chronic disease, smoking and alcohol consumption. P-values for the interaction term between educational level and participation in recreational activities

[b]Educational level is categorized as 1) Low: primary and secondary school/Vocational education and 2) High: Professional/academy programs/University.

Fig. 1. Odds ratios of excellent/good quality of life and excellent/very good self-rated health by categories of educational level combined with participation in recreational activities estimated from a multiple adjusted logistic regression model[a]. [a]Adjusted for sex, employment status, marital/cohabitation status, children at home, chronic disease, smoking and alcohol consumption. P-values for the interaction term between educational level and participation in recreational activities [b]Educational level is categorized as 1) Low: primary and secondary school/Vocational education and 2) High: Professional/academy programs/University.

Evidence has shown that socioeconomic position is a predictor of health (Mackenbach et al., 2019). Socio-economic position is considered a distal risk factor that affects health and well-being through mediating health behaviours such as recreational activities (Lynch and Kaplan, 2000). In line with previous findings (Sonnentag, 2001; Zimmer and Lin, 1996; Takeda et al., 2015; Niedzwiedz, 2016; Curvers et al., 2018; Vozikaki, 2017; Fitzpatrick, 2009) we find that participating in recreational community-based activities is associated with self-rated health and quality of life. Also, consistent with our findings, previous research has shown that individuals with lower educational level were less likely to participate in recreational activities compared to those with a higher educational level (Curvers et al., 2018; Galenkamp et al., 2016; Chen et al., 2018). A higher educational level is generally a prerequisite for better working conditions and higher income but is also associated to more healthy life style choices and behaviours (Lynch and Kaplan, 2000). Being employed can be associated with work-related stress and less free time for participating in recreational activities. On the other hand, having a job is strongly related to income and unemployment is also associated to perceived stress.

Results from our study show that, within each stratum of educational level, participating in community-based recreational activity was found to increase the likelihood of better self-rated health and well-being. Moreover, our study indicates that participation in recreational activities may modify social inequality in health and well-being suggesting that there is a potential for individuals with low educational level to improve quality of life and self-rated health with participation in recreational activities.

To our knowledge, this is the first study to illustrate that participation in recreational activities may compensate for socioeconomic inequality regarding quality of life and self-rated health in the general population. Previous studies have shown associations between leisure time physical activity and self-rated health in the general population (Paggi et al., 2016; Blomstrand et al., 2009; Galán et al., 2010). In line with our finding, Johansen et al. have shown that physically active people with low socioeconomic position, had the same or even better odds to report good self-rated heath compared to those with low physical activity and high socioeconomic positing (Johansson, 2019). However, recreational activities cover more than physical activities including cultural activities, volunteering etc. Although the association between participation in volunteer work and health outcome is less clear than for leisure time physical activities (Niebuur et al., 2018), previous studies have demonstrated beneficial effects on well-being among all socioeconomic groups (Yeung et al., 2017).

Self-rated health and quality of life have been shown to predict morbidity and mortality in the population (DeSalvo et al., 2006; Phyo et al., 2020). Our results highlight the potential value of promoting recreational activities as a broader concept to achieve good self-rated health in groups with low educational level. One of the psychosocial pathways that may be involved in the health benefits of recreational activity participation is social contacts. There is a growing realization that social relations play an influential role for mental health and wellbeing (World Health, 2013; Andersson, 1998). Evidence shows that socially active people with supportive relations generally have better health and well-being and lower risk of mortality than those who lack these networks (Berkman, 2014; Holt-Lunstad et al., 2010; Pynnönen, 2012). Conversely, if people do not have the opportunity to interact socially with each other, they can feel lonely, isolated, or depressed depending on the quality of their relationships. Thus, social activities are expected to lead to more life satisfaction although some studies have found that also solitary activities improve health and well-being (Menec and Chipperfield, 1997; Everard et al., 2000).

In this study, we find that less than half of the population in the Capital Region of Denmark participated in community-based recreational activities. Participation in recreational activities is shaped by complex and dynamic interrelations between individual, social, and environmental factors. In a public health perspective, participating in recreational activities should be incorporated into our thinking when aiming to deal with socio-economic inequalities of health and well-being. Not only from an individual behavioural perspective but also at the structural level by implementing strategies to enhance participation in community-based recreational activities. Our results show that the availability of local facilities is related to participation in recreational activities in the community. The current literature on participation in physical activity support the influence of neighbourhoods' characteristics and access to overall facilities and services (Barnett et al., 2017). Providing opportunities for social and recreational meeting points foster social connectedness and social interactions in the community (e.g., a soccer game at a local recreational facility, an art class at the local art club, and local walking groups). This indicate that recreational activities participation expands beyond the sphere of individual choices and stress the importance of structural characteristics of the environment such as access to recreational facilities (availability and distance) (Travert et al., 2019). Moreover, communities or neighbourhoods within a built environment that invites people to engage in recreational activities may also share norms influencing the general pattern of participation in the community.

Data for the present study, were collected in 2017, i.e. before the current COVID-19 pandemic. During the lockdown, participation in community-based recreational activities was hampered due the closure of recreational facilities. Consequently, the COVID-19 pandemic may have reduced participation in recreational activities and thus potentially have impacted public health negatively. Given the potential of recreational activities to modify socioeconomic inequality in health, a decrease in recreational activity participation among lower educational groups could possibly increase social inequality in health.

5. Strengths and limitations

The main strength of this study is the large population-based sample of Danish men and women. Another strength of this study was that information on demographic and socioeconomic variables were based on population-based registry information, which precludes sampling errors. However, our study also had some limitations. Because this was a cross-sectional survey, we were not able to establish a causal relationship between participation in recreational activities and self-rated health and well-being. Research has shown that individuals suffering from diseases or adverse health conditions may reduce their participation in recreational activities (Galenkamp et al., 2016; Menec and Chipperfield, 1997; Ihle et al., 2017). Even though we adjusted for chronic disease, it is possible that good health encourage engagement in recreational activities resulting in the observed associations. Future work on longitudinal data is needed to examine whether recreational activities predict better health outcomes and disentangle mechanisms in the health-benefitting function of recreational activities.

The data on health and health related behaviours were self-reported and thus susceptible to possible respondent biases. The question on participation in recreational activities asks participants to respond according to their own perception of neighbourhood rather than to a specific geographic area. Also, our results are limited by the heterogeneous and crude measure of recreational activities covering sport participation, cultural participation, and voluntary work. Thus, it is not possible to neither study the frequency of participating in recreational activities nor to detangle the specific type of activity. Furthermore, recreational participation depends on both individual and neighbourhood level determinants. The broader social and structural context needs to be further examined in future studies examining or explaining health inequalities in participation in recreational activities. Finally, other activities performed elsewhere outside the neighbourhood were not included. However, participation in activities in the local neighbourhood also includes a social context (e.g. bringing neighbours together, creating a livelier community atmosphere).

Limitations aside, our study provides insights on how recreational

activity can contribute to health and wellbeing. Studies on the implications of various types of recreational activities for health and wellbeing represent an important area for future research.

6. Conclusion

We found clear socioeconomic inequalities in recreational activity participation as higher educated were more likely to participate than less educated. Participation in community-based recreational activities was associated to better self-rated health and well-being in all socioeconomic groups. These findings underline the importance of incorporating a focus on recreational activity participation as a potential health promoting strategy to counter sociodemographic inequality in health and well-being.

CRediT authorship contribution statement

Christina Bjørk Petersen: Conceptualization, Formal analysis, Methodology, Investigation, Writing – original draft, Writing – review & editing. **Maj Bekker-Jeppesen:** Methodology, Writing – review & editing. **Mette Aadahl:** Conceptualization, Writing – review & editing. **Cathrine Juel Lau:** Conceptualization, Methodology, Supervision, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pmedr.2021.101610.

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