Physical activity motives, barriers, and preferences in people with obesity: a systematic review

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Abstract

Background. Although the benefits of physical activity (PA) are well known, physical inactivity is high in people with obesity. The objective of this systematic review was to i) appraise knowledge on PA motives, barriers, and preferences in individuals with obesity, and ii) quantify the most frequently reported PA motives, barriers and preferences in this population.

Methods. Six databases (Pubmed, CINAHL, Psycarticle, SportDiscus, Web of science and Proquest) were searched until June 2020 by independent reviewers to identify relevant quantitative or qualitative articles reporting PA motives, barriers or preferences in adults with body mass index ≥ 30 kg/m². Risk of bias for each study was assessed by two independent reviewers with the Mixed Methods Appraisal Tool (MMAT).

Results. From 5,898 papers identified, 13 quantitative, 10 qualitative and 3 mixed studies were included (k=26). About 31% of studies have a MMAT score below 50 % (k=8). The three most reported PA motives in people with obesity were weight management, followed by energy/physical fitness and social support. The three most common PA barriers were lack of self-discipline/motivation, pain or physical discomfort, and lack of time. Based on the only 4 studies available, walking seems to be the preferred mode of PA in people with obesity.

Conclusions. Weight management, lack of motivation and pain are keys PA motives and barriers in people with obesity, and should be addressed in future interventions to facilitate PA initiation and maintenance. Further research is needed to investigate the PA preferences of people with obesity.

Introduction

Obesity is a major public health issue in North America affecting more than 25 % of adults in Canada, and 40 % of adults in the United States (1, 2). Obesity contributes to impaired physical and mental health-related quality of life, and increased morbidity and mortality (3, 4). Physical activity (PA) is a cornerstone of interdisciplinary obesity treatment (5, 6). Indeed, the benefits of regular PA on weight management, body composition, physical fitness, and cardiometabolic health in people with obesity are well documented (7-10). However, more than half of Canadians and Americans living with obesity report to be insufficiently active (11, 12). Furthermore, adherence to structured PA interventions is poor and drop-out rates range from 20 % to 80 % (13).

In the context of PA intervention, a mismatch between patients' preferences or motives, and the PA intervention planned could adversely impact level of PA engagement (14). Integrating preferences into interventions has been considered as a patient-oriented strategy to improve participation and adherence as patients feel considered in their decisions (14-17). Moreover, from a PA perspective, previous research highlights that when people with obesity were offered to self-select their PA intensity, they accumulated more PA over time (18, 19). Along with PA preferences among individuals with obesity, it is important to understand PA motives and barriers to inform clinicians, and health stakeholders on the development of strategies to better improve PA behavior in this population (20-23).

Past systematic reviews on motives, barriers and preferences to PA have been performed in various clinical populations (e.g., type 2 diabetes) (24-27). Although several qualitative and quantitative studies are available on this topic in people with obesity, to our knowledge, none have systematically summarized this information. Only one systematic review of qualitative studies has been carried out on PA motives and barriers in people with severe

obesity (28), and reported that weight loss was the main reason for exercising, followed by other motives, such as the risk of diseases, and skills improvement. Physical (e.g., health problems, weight, and, pain), and psychosocial barriers (e.g., embarrassment, self-blame, lack of safety, and time) were also reported in this study (28).

Therefore, the objectives of the present systematic review were to i) appraise current qualitative and quantitative knowledge on PA motives, barriers and preferences in people with obesity, and ii) quantify which PA motives, barriers and preferences were more common in this population.

Methods

Protocol and Registration

The Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used to perform this review (29). The protocol was pre-registered in PROSPERO (CRD42020141447).

Eligibility Criteria

Quantitative and qualitative studies were included in this review if they met the following inclusion criteria: i) constituted primary research published in peer-reviewed journals with full-text available in English or French; ii) focused on adults (≥ 18 years old) with a body mass index (BMI) ≥ 30 kg/m² (or more than 75 % of the sample with BMI ≥ 30 kg/m² if the study did not exclusively include people with obesity or did not perform sub analysis in people with obesity); iii) reported motives, barriers or preferences to PA.

Motives were defined as any perceived reasons to increase and maintain PA, and barriers as any challenges reported by participants reducing PA initiation and maintenance (25).

Preferences were considered as patient-reported favourite choices concerning PA modalities, context, type, and supervision.

Information Sources and Search

A systematic search of eligible studies was conducted in six different databases (Pubmed, CINAHL, PsycArticles, SportDiscus, Web of science and Proquest). Selected experts (AB, AJR, DB) screened references from included articles and personal records.

The search was performed on July 23, 2019 without date restriction, using research equation including keywords and Medical Subject Headings (Mesh) terms developed with a university librarian. For example, the PubMed search strategy was the following: "Exercise"[Mesh] AND "Obesity"[Mesh] AND ("Motivation"[Mesh] OR "Patient Preference "[Mesh] OR "preference*"[All Fields] OR "barrier*"[All Fields] OR "facilitator*"[All Fields]) OR "obstacle*"[All Fields]) AND "humans"[MeSH Terms] AND (English[lang] OR French[lang]) AND "adult"[MeSH Terms]. The search strategy was modified for each database, considering their specificities. An updated search was performed on June 04 (2020) to retrieve any studies published since the initial search. See supplemental material S1 for detailed search strategies for each database.

Study Selection

All retrieved citations were imported into EndNote software (Version X9), and duplicate records were removed by one reviewer (ML). Two independent students' reviewers (ML and MS) paired with senior reviewers (AB and AJR) screened records against inclusion and exclusion criteria, first according to titles and abstracts, and then to the full-text papers of the selected abstracts. Disagreements were resolved by a third party (AB or AJR). If necessary, authors were contacted in case of missing or incomplete data for the study

selection step. After reading the full-text papers of the selected abstracts, authors (AB, AJR, ER) decided by consensus to exclude studies performed in very specific population in order to better answer to our main objective (pregnant women (30-32), cancers survivors (33-36), people with intellectual disabilities (37), veterans living with schizophrenia (38), and bariatric surgery patients (39-50)).

Data Collection Process

The following data were extracted by one review author (SC) using a data extraction form developed for the present review, and double-verified by two others (NBP, MS): authors; publication year; study setting; country; study design; sample size; participants' characteristics (age, sex, BMI and comorbidities); methods to assess PA motives, barriers and preferences; and results : survey/questionnaire items with the score or frequency associated for quantitative studies, and first and second constructs with adjectives reflecting the importance of the outcomes (many, several, etc.) for qualitative studies. To be extracted, the PA motives and barriers items should have been reported in the results section. Disagreements were resolved by having a fourth review author (AB) returning to the full text(s) to check the accuracy of extracted data.

Data Synthesis Process

A thematic synthesis of the data extracted from qualitative studies was used following the steps proposed by Thomas and Harden (51). First, line-by-line coding driven by the objectives was performed by one reviewer (NBP). Then, similar codes were grouped into descriptive themes, including first and second order constructs, which were verified by a second reviewer (SC). Analytical themes were generated by the interpretation of descriptive themes and validated by two authors (SC, AB). Finally, themes were compared

and integrated to quantitative categories. Results on PA motives and barriers extracted from qualitative and quantitative studies were classified in three main categories: physical, psychological and socio-ecological by two reviewers (SC and NBP) (25), and then reviewer authors (AB, AJR, SC, NBP) created subcategories by consensus to merge similar items and constructs.

Analyses

Regarding the statistical part, though a meta-analysis of proportion was planned to further rank each PA motives, barriers and preferences individually, this option was not found to be feasible given the small number of included studies per section and the high heterogeneity between these studies. Alternatively, based on the scale from Clifford et al. (24), we created a score of importance for each PA motive and barrier subcategory. Briefly, a score of importance ranging from 0 to 3 was assigned to each PA motive and barrier subcategory in each study (see table 1 for details). To then obtain a rank for each PA motive and barrier, a global score was calculated by summing each PA motive and barrier score across all the studies (maximal score of 33 for PA motives; $11 \text{ studies} \times 3$, and 69 for PA barriers; $23 \text{ studies} \times 3$). Two authors (AB, SC) realized this step.

For PA preferences, a narrative synthesis was favoured given the small number of studies ($k=4$) and the high heterogeneity between studies.

1 **Table 1.** Physical activity barriers and motives score of importance based on the studies of Clifford et al. (24)

Scores	0	1	2*	3
Quantitative data				
Percentage of participant who checked item as a barrier (yes or no question)	PA barrier and motive not reported in the study	0-24 %	25-49%	50-100%
Percentage of participants that agreed based on a Likert scale		0-24 %	25-49%	50-100%
Percentage of participant who rated item as <i>major</i> barrier (responses ranged between 0.7 to 23.4%)		0-9 %	10-19%	20-25%
Score: 5-point Likert (1 = strongly disagree, 3 = neither agree nor disagree, 5 = strongly agree)		1-2.0	2.1-3.0	3.1-5.0
Score. 5-point Likert scale, (1 = never, 2 = rarely, 3 = sometimes, 4 = often, or 5 = very often)		1-1.9	2.0-2.9	3.0-5.0
Qualitative data				
Adjectives	PA barrier and motive not reported in the study	A few women; Some participants; Several participants		Mentioned by all members; Commonly mentioned; Most mentioned; The first to third most common; Substantial barrier; Mentioned by many participants and as a significant barrier; Majority of participants; Prominent theme; Extreme barriers; One of the most expressed; Mentioned in all focus group

2 * A default score of 2 was assigned for barriers that were not able to be rated, but were reported.

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Risk of bias in individual studies

Risk of bias for each of the included studies was assessed by two independent reviewers (AB, SC) for quantitative studies, two other independent reviewers for qualitative studies (NBP, EN), and two independent reviewers for mixed studies (NR, AB) with the Mixed Methods Appraisal Tool (MMAT-Version11), adapted for this review. Any discrepancies were mediated by a third reviewer (AJR). Given the descriptive nature of our research objectives, the following criteria were used for quantitative studies: 1) Is the sampling strategy relevant to address the research question? 2) Is the sample representative of the target population? 3) Are the measurements appropriate? 4) Is the risk of nonresponse bias low? The 5 criteria for qualitative and mixed methods studies were those reported in the MMAT (52, 53). Each criterion was assessed as having been fulfilled (1 point) or not fulfilled/insufficient information for adequate assessment (0 point), leading to a global score of 4 for quantitative studies, and 5 for qualitative and mixed studies. Scores were then converted to percentage to facilitate between-studies comparison.

Results

Study Selection

The electronic searches generated 5,898 studies; which was reduced to 4,188 after removing duplicates. Following this step, 3,857 records were excluded based on title and abstract, with 52 % of them because they did not present the outcomes of interest. Twenty-six studies in total were included in this review (figure 1).

29 **Figure 1. PRISMA Flow Diagram**

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Study Characteristics

Table 2 describes study and participants' characteristics. Briefly, 13 quantitative studies (50.0 %) (54-66), 10 qualitative studies (38.5 %) (67-76), and 3 mixed studies (11.5 %) (77-79) were included. Half of the studies were performed in the United States (k=13) (55, 57, 58, 60-62, 64, 67, 68, 72, 77-79), and 34.6 % published in the five last years (2015-2020; k=9) (54, 55, 64, 67-69, 72, 73, 77). A total of 7,613 participants with obesity were assessed within the included studies (k=26), with a median age of 46 years old (range 37.8-62.0) (k=10 because information is missing for people with obesity in 16 studies). More than half of the studies included > 70 % of women in their sample (53.8 %; k=14) (55, 57, 58, 60-62, 64, 67, 70, 72, 75, 77-79), 38.5 % included only women (k=10) (55, 57, 60-62, 67, 72, 75, 77, 79), and 7.7 % included only men (k=2) (54, 76).

Regarding our outcomes of interest, PA barriers were assessed in 23 studies (88.5 %) [10 quantitative, 10 qualitative, and 3 mixed studies] (54-62, 64, 67-79), motives in 11 studies (42.3 %) [2 quantitative, 8 qualitative, and 1 mixed studies] (54, 63, 67, 69-73, 75, 76, 79), and preferences in 4 studies (15.4 %) [3 quantitative and 1 qualitative studies] (59, 65, 66, 72).

54 **Table 2.** Characteristics of the studies included (k=26)

(Reference) Publication Year (Country)	Sample size (% of women)	People with obesity [all sample data]			Comorbidities (%) and specific characteristics	Outcomes assessed+	Methods/Tools	MMAT scores
		%	Age years±SD or (range)	BMI kg/m ² ±SD or (range)				
Quantitative studies								
Ashton (54) 2017 (Australia)	282 (0%)	10 %	NR [22.3±2.1]	NR [24.7±4.4]	NR	Barriers Motives	Online questionnaire	25
Masterson (55) 2017 (USA)	630 (100%)	41 %	49.7±15.4	NR	T2D (30.6%), HBP (25.7%) Mild (15.8%) and moderate-severe depression (26.1%) Urban Latinas	Barriers	5 questions the Influences on PA Instrument about barriers to PA	25
Egan (56) 2013 (Ireland)	145 (36%)	100%	59.0±11.0	34.0 (IQR: 32.0- 37.5)	T2D (100%)	Barriers	List with scale	0
Genkinger (57) 2006 (USA)	120 (100%)	65%	NR [48.0±11.0]	NR	NR African American in church-based, PA intervention	Barriers	Adapted version of Steinhardt/Dishman Barriers for Habitual PA Scale	50
James (58) 2008 (USA)	823 (71%)	41%	Class I: 51.0 (19-84) Class II: 48.3 (18-87)	NR	NR African American and part of a colorectal cancer prevention intervention churches rural	Barriers	Phone questionnaire	50
Labrunee (59) 2012 (France)	23 (57%)	100%	52.8±8.5	40.1± 7.3 (control) 39.3±9.9 (intervention)	Diabetes (100%) Enrolled in PA intervention	Barriers Preferences	Phone questionnaire	0
Napolitano (60) 2011 (USA)	280 (100%)	38%	NR [47.3±10.7]	NR [28.7±5.2]	NR Previously inactive women	Barriers	Expected outcomes and barriers for habitual PA scale	25
Rimmer (61) 2010 (USA)	33 (100%)	91%	NR [60.1 ± 10.1]	NR [49.1±12.4]	Arthritis (67%), Multiple sclerosis (6%), Stroke (6%), Back problem (6%) Sedentary African-American	Barriers	Barriers to PA Questionnaire for People with Disabilities	25

Rye (62) 2009 (USA)	702 (100%)	60%	NR [52.2±6.8]	NR	NR White, low-income women	Barriers	Questionnaire	50
Skov-Ettrup (63) 2014 (Denemark)	55655 (61%)	6%	NR	NR	NR PA during the past year	Motives	Internet or paper-based questionnaire	25
Stankevitz (64) 2017 (USA)	124 (93%)	100%	45.0±9.0	37.7± 6.7	NR	Barriers	Internet or mail questionnaire	25
Burton (65) 2012 (Australia)	7784 (56%)	23%	NR [(42-67)]	NR	NR	Preferences	Mail questionnaire	75
Short (66) 2014 (Australia)	1137 (50%)	30%	[52.8±16.3]	[30.0±14.7]	Chronic illness (46%)	Preferences	Phone questionnaire	50
Qualitative studies								
Bowen (67) 2015 (USA)	9 (100%)	78%	NR [75.0±5.3]	NR [27-41]	67% reported using canes or walkers	Barriers Motives	Semi-structured interviews	100
Coe (68) 2017 (USA)	13 (54%)	100%	42.0 (29-53)	52.5 (37-81)	100% at least one comorbidity (HBP, dyslipidemia, or T2D) African American	Barriers	Focus group	100
Danielsen (69) 2016 (Norway)*	8 (63%)	100%	NR (35-63)	NR (37-60)	Part of a 10-14 weeks inpatient lifestyle modification program	Barriers Motives	Interviews	100
Guess (70) 2012 (UK)	29 (83%)	21%	37.8±10.9	46.8±5.6	Attending dietetic clinics for weight management	Barriers Motives	Focus groups and semi- structured interviews	60
Igelström (71) 2012 (Sweden)*	15 (47%)	100%	62.0 (IQR 8.5)	37.0 (IQR 5.0)	Obstructive sleep apnea and CPAP treatment (100%)	Barriers Motives	Semi-structured interviews	100
Joseph (72) 2017 (USA)	25 (100%)	100%	38.5±7.8	39.4±7.3	Sedentary lifestyle (100%)	Barriers Motives Preferences	Focus group	100

Lidegaard (73) 2016 (Denmark)	28 (46%)	86%	NR [59.4±8.8]	NR [34.4±5.0]	T2D (100%); Heart disease or musculoskeletal disorders (79%)	Barriers Motives	Focus group + probes in the form of images, statements and quotations regarding PA.	100
Piana (74) 2013 (Italy)	80 (63%)	100%	53.2±12.2	36.5±5.9	HBP (49%); T2D (35%) Coronary Heart Disease (4%)	Barriers	Focus group	100
Groven (75) 2010 (Norway)	5 (100%)	100%	NR (35-63)	NR (40-48)	Part of a weight loss program	Barriers Motives	Semi-structured interviews	100
Lewis (76) 2011 (Australia)	36 (0%)	100%	46.0 (21-69)	37.1 (30-61)	HBP (33.3%); Arthritis and joint problems (30.6%); Sleep apnea (16.7%); Diabetes (13.9%), Cardiovascular problems (11.1%)	Barriers Motives	Interviews	60
Mixed-methods studies								
Adachi-Mejia (77) 2016 (USA)*	78 (100%)	76%	NR [52.8±14.5]	NR [35.4±9.2]	NR Enrolled in a lifestyle community- based program for vulnerable populations	Barriers	Survey + one open question	80
Lattimore (78) 2011 (USA)	384 (78%)	46%	NR [50-75+]	NR	NR Adults 50 years and older	Barriers	Interviews	80
Leone (79) 2013 (USA)	Quanti 195 (100%)	51%	NR [55.7±7.0]	NR [35.7±7.0]	NR Inactive white women over 50 years old	Barriers Motives	Online survey	80
	19 (100%)	100%	55 (50-72)	36.0 (28.2-46.6)			Focus group	

* when country of recruitment was not reported country of the authors is reported; + = only outcomes assessed in people with obesity were reported in this column; BMI=body mass index; CPAP=Continuous positive air pressure; HBP= High blood pressure; MMAT=Mixed Methods Appraisal Tool; NR=not reported; PA=physical activity; T2D=type 2 diabetes.

Risk of Bias

More than half of the quantitative studies have a MMAT score below 50 % (61.5 %, k=8) (54-56, 59-61, 63, 64), and none in qualitative and mixed studies (see table 2 and supplemental Table S1). The scores of the quantitative studies below 50 % are explained by the fact that non-probability sampling was performed in these studies, impacting the representativeness of the sample and our ability to know the nonresponse rate.

Findings for Physical Activity Motives

The 12 PA motives found were classified in different categories of motives: 6 psychosocial (50.0 %), 3 socio-ecological (25.0 %) and 3 physical motives (25.0 %) (figure 2 and supplemental data S2). More than half (k=7/12, 58.3 %) of PA motives comes from both quantitative and qualitative studies, 33.3% (k=4/12) from qualitative studies only, and 8.3 % (k=1/12) from quantitative study (Figure 2). In the different included studies, the three most reported PA motives among studies were weight management (k=8/11, 72.7 %), energy/physical fitness (k=6/11, 54.5 %), and social support (k=6/11, 54.5 %) (Figure 2). In terms of ranking, the three PA motives with the highest scores of importance were also weight management (score=20), energy/physical fitness (score=13) and social support (score=12) (figure 3).

Figure 2. Number of studies according to each categories of physical activity motives in people with obesity

Figure 3. Importance scores of motives to physical activity in people with obesity

Findings for Physical Activity Barriers

Barriers were classified in three categories being socio-ecological barriers (k = 9; 39.1 %), psychological barriers (k = 8; 34.8 %), and physical barriers (k = 6; 26.1 %) (Figure 4 and supplemental data S3). Except for stigma (only qualitative studies), each PA barrier was studied in both quantitative and qualitative studies, and the most reported PA barriers among studies being lack of self-discipline/motivation (k=14/23, 60.9 %), pain/ physical discomfort (k=13/23, 56.5 %), and lack of access to equipment, facilities or professionals (k=13/23, 56.5 %) (Figure 4).

The three physical barriers to PA with the highest score of importance were pain/physical discomfort (score=31.5), fatigue/lack of energy (score=23.5) and poor health (score=20) (Figure 5). Regarding psychological barriers to PA, lack of self-discipline/motivation (score=32.5), lack of interest/enjoyment (score=17.7), and lack of skills/confidence (score=17.0) were the most frequently reported (Figure 5). For socio-ecological barriers to PA, lack of time (score=28.5), lack of social support (score=22.0) and poor access to equipment, facilities or professionals (score=21.2) were the three barriers with the highest score of importance (Figure 5).

Figure 4. Number of studies according to each categories of physical activity barriers in people with obesity

Figure 5. Importance scores of barriers to physical activity in people with obesity

Findings for Physical Activity Preferences

Among the four studies reporting results on PA preferences in people with obesity, two provided information on PA preferences (50 %)(59, 72), one on preferred PA context (25 %)(65), and one on preferred PA delivery mode for intervention (25 %) (66).

Labrunée et al. (2012) and Joseph et al. (2017) ranked preferred types of PA among people with obesity (n=23 and 25, respectively), and found that walking was the most preferred activity for both men and women (59, 72). Otherwise, the other preferred PA were cycling, swimming and rowing in the Labrunée et al. (2012) study (59), and dance or Zumba, cycling, water activities, and martial arts in the Joseph et al. (2017) study which was performed among women with obesity (72). Resistance training was less often identified as a preferred type of PA (72).

Regarding the preferred PA context, Burton et al. (2012) examined it among 1781 middle-aged adults with obesity (65). Results showed that 78 % of participants preferred low-cost or no-cost PA, 61 % preferred PA interventions that are not just about exercise, and 50 % opted for PA with a format/routine set. Moreover, 26 %, 15 %, and 16 % of participants, respectively, preferred supervised, team-based and competitive PA. Nearly a quarter (23 %) of participants reported a preference toward PA requiring skills and practice, and less than half of participants preferred vigorous PA (30 %) done at a fixed schedule time (43 %). In terms of location, 86 % of participants reported a preference for PA that can be done close to home, and 59 % preferred outdoor activities. Regarding social settings, 73 % of individuals indicated a preference towards activities that can be performed alone, 49 % preferred activities with people around their age and 28 % with individuals with same sex.

Short et al. (2014) rather analyzed the preferred PA intervention delivery mode, and provided the prevalence of people with obesity in four groups of people according to their most preferred mode of delivery (n=1137 with 341 people with obesity): face-to-face program with an instructor (36 % of survey responders including 35 % of people with obesity), group-based program (44 % of survey responders including 27 % of people with obesity), program that can be done on their own using mailed and printed materials (11 % of survey responders including 26 % of people with obesity), programs that can be done on their own using internet (9 % of survey responders including 24% of people with obesity) (66).

Comparison between BMI Classes

Among the currently available studies (k=26), only a few have investigated whether PA motives (k=2), barriers (k=5) and preferences (k=2) differed among individuals with and without obesity. As shown in table 3, weight management (k=2/2), was the only motive that differed across BMI classes (54, 63). Studies reported that weight management was a more prevalent PA motivator in adults with obesity compared to adults without obesity (54, 63). Regarding PA barriers, though no difference between BMI classes were noted in socio-ecological barriers, weight (k=3/3; (60, 77, 79)), lack of self-discipline/motivation (k=3/4; (58, 60, 77, 78)) and self-consciousness (k=3/3; (58, 60, 79)) were more frequently reported by individuals with obesity than those without obesity.

Based on the two studies that have investigated associations of BMI or obesity with PA preferences (65, 66), social context seems particularly important among obese individuals. In fact, supervised (65) face-to-face (66) intervention was preferred to group-based

intervention. However, in a context of group-based intervention, Burton et al. (2011) reported that homogeneous groups in terms of age and sex were preferred for individuals with a BMI greater than 30 kg/m² (65).

Table 3. Physical activity motives and barriers comparison across body mass index classes (k=7)

Motives	-	0	+	++
Physical factors (k=2)				
Weight management (k=2)			(63)	(54)
Energy/physical fitness (k=2)		(54)	(63)	
Health (k=2)		(54)		
Psychological factors (k=2)				
Fear to die/live longer (k=1)		(54)		
Well-being (k=1)		(54)		
Appearance (k=1)		(54)		
Pleasure (k=2)		(54, 63)		
Stress management (k=1)	(63)*			
Socio-ecological factors (k=2)				
Socialize (k=1)		(63)		
Social influence (k=1)		(54)		
Barriers				
Physical factors (k=4)				
Poor health (k=4)		(60, 78)		(77, 79)
Weight (k=3)				(60, 77, 79)
Pain (k=1)				(60)
Fatigue/lack of energy (k=4)	(77)	(60, 78, 79)		
Psychological factors (k=5)				
Fear (k=2)		(60)		(77)
Lack of self-discipline/motivation (k=4)		(78)		(58, 60, 77)
Lack of interest/enjoyment (k=3)		(60, 78)		(79)
Mental health concerns (k=1)				(77)
Lack of skills (k=1)		(60)		
Self-consciousness (k=3)				(58, 60, 79)
Negative past-experience (k=1)		(78)		
Beliefs (k=1)				(79)
Socio-ecological factors (k=5)				
Lack of time (k=4)	(78)	(60, 77)	(55)	

Too many obligations (k=2)		(55, 60)	
Lack of social support (k=4)	(78)	(60, 77, 79)	
Bad weather (k=3)		(60, 77, 78)	
Lack of knowledge/information (k=1)		(60)	
Cost (k=2)		(60)	(55)
Poor access to facilities (k=4)		(60, 78, 79)	(55)

- = less reported in people with obesity compared to normal and overweight people; 0 = no significant difference between BMI classes, + = more reported in people with overweight and obesity compared to normal weight people, ++ = more reported in people with obesity compared to normal and overweight people, * Compared to normal weight adults only.

Discussion:

The objective of the present study was to investigate PA motives, barriers and preferences in people with obesity. To our knowledge, the present review is the first to systematically address these questions in this population. From the studies (i.e. 13 quantitative, 10 qualitative, and 3 mixed methods) included in this review, half were performed in the United States with a clear predominance of women participants. Barriers to PA were most frequently investigated (k=23) followed by PA motives (k=11), and preferences to PA (k=4).

The three most common PA motives reported by people with obesity, based on the scale of Clifford et al. (24), were weight management, energy/physical fitness and social support. Unsurprisingly, weight management was the most popular motive for PA in people with obesity, in accordance with previous qualitative review in people with severe obesity (28). In addition, weight management is the only motive in individuals with obesity, which differs significantly from adults without obesity according to our literature review (54, 63, 79) (table 3). This motive is important for health professionals, and should be considered in PA interventions to rescale weight loss. Indeed, previous studies showed that PA alone produces only modest weight loss (7), and could therefore lead to PA discontinuation. So,

to facilitate PA over time, people should be informed that in a weight management context, PA has a more important role in terms of weight loss maintenance or waist circumference reduction, (6, 7). If weight loss remains the main motive of the patient, an intervention focusing on both PA and diet/energy intake should be recommended (7). However, from a motivational point of view, it is critical to focus PA interventions on other motives than weight loss because, not only because PA is associated with several other health benefits (even in the absence of weight loss) (10, 80), but also because external PA motives are more likely to be associated with drop-out from PA interventions (21, 81).

The second most frequently reported PA motive in people with obesity was physical fitness improvement. This result is interesting given that it can be achieved through PA interventions (6). Moreover, previous studies highlighted physically fit people with obesity have a reduced rate of all-cause mortality compared to unfit people with and without obesity (82). However, weight and low physical fitness are also barriers to PA in people with obesity, as shown in our results (Figures 4 and 5). Nevertheless, these barriers can be reduced with PA counseling, and intervention tailored to physical fitness and weight related limitations of participants (83, 84).

According to our literature review, keys PA barriers were lack of motivation/self-discipline, pain/physical discomfort, and lack of time in people with obesity. When comparing BMI classes, weight and self-consciousness were more frequently reported as PA barriers by individuals with obesity than those without obesity.

We found that low motivation and lack of time are non-weight related PA barriers prominent in non-clinical and clinical populations (24, 47, 85, 86). However, studies

included in our review seems to indicate that lack of self-discipline/motivation is more often reported in people with obesity (table 3). Behavioral interventions including motivational interviewing are effective options to address lack of motivation, given its efficacy to improve PA adherence (87). However, lack of time to exercise is harder to address because several time-use studies highlighted that this PA barrier is more likely to reflect PA being viewed as a low priority (86, 88). Moreover, people who have free time are not more active, thus simply helping them to find time for PA in their day might not improve PA in people with obesity (86). Indeed, time-related PA barrier are more a perception of “time pressure”, and a personal choice to allocate time to other activities (86). Behavioral interventions in people with obesity are needed to support them to find motivation to change PA habits in this context. Several time-efficient solutions can be proposed like PA during transportation, PA during work break, reducing TV viewing, (86, 87). As a response to lack of time, it may be tempting to recommend high-intensity interval training to overcome time barriers, given the assumption that with higher intensity, exercise duration can be reduced, and seems more effective to reduce fat mass loss and increases physical fitness in people with obesity compared with traditional exercise (89-91). Nevertheless, there is a debate regarding the relevance of high- compared to moderate-intensity exercise in adults living with obesity to increase PA levels (92). Indeed, strategies to increase the level of PA should not be solely based on weight loss or health-related benefits, but also on the potential of the strategy to modify lifestyle on a long-term basis (93). Knowing that adults living with obesity 1) avoid vigorous-intensity PA (94, 95), and 2) are willing to accept longer exercise durations if the intensity remains low (96) emphasizing high intensity could be counter productive.

Regarding pain, the second most frequently reported PA barriers, people with obesity are more likely to suffer from pain (97, 98), explaining why it is an important barrier to PA in this population, consistently put forward in other studies (98), and also compared to other BMI classes (60). Indeed, from previous studies, a bidirectional association between pain and PA had been hypothesized in people with obesity. Musculoskeletal pain, the main source of pain described in qualitative studies can act as a functional limitation to engage and maintain PA (98). At the same time, regular PA can reduce chronic musculoskeletal pain in people with obesity, due to its potential positive impacts on inflammation, psychological outcomes (e.g., mood, pain catastrophizing, etc.), muscle strength and coordination (98). Nevertheless, PA for the pain management in people with obesity requires support to tailor the practice of PA and to assure safe and effective PA practice (98). The adjustment of PA volume (duration, intensity, frequency), joint range of motion during exercise, as well as the type of PA (non-impact PA) are valuable strategies that can be used for the pain management in order to increase PA adherence (98).

Weight is also a major physical obstacle to PA in people with obesity compared to people without obesity (60, 77, 79). Interestingly, qualitative data from a study included in this review (79) revealed that women tend to perform more exercise when they lose weight because doing so gets easier. However, weight loss cannot be considered as facilitator given previous studies underlined that even after massive weight loss, people remain physically inactive (99, 100).

No conclusion on PA preferences can be drawn due to the small number of studies, and the different assessment of preferences (context vs. mode of delivery). However, walking

seems to be preferred by people with obesity, as in the general North American population (101, 102), probably because walking required no specific skill, equipment or place, and can be integrated easily into everyday life (103). In addition, walking interventions are feasible and effective to improve the health of people with obesity (104). Thus, regular walking can be proposed by health professionals as an option in the management of obesity and inactivity. Considering the comparison between BMI classes, unfortunately, the paucity of data regarding how obesity classes affect PA preferences strongly limits generalization (65, 66). Nevertheless, some reflections emerge from this review and may be considered when PA recommendations are provided. Indeed, it appears that supervised (65) and individual (66) PA is preferred among individuals with obesity compared to their counterparts without obesity. Finally, while there is still inconsistency about the interest in group-based PA (65, 66), it seems that exercising with people of the same age and sex may be of importance for adults living with obesity. This suggests that feeling emotionally secure and socially accepted should not be underestimated (105). This is consistent with the fact that self-consciousness, a psychological barrier related to self-image and embarrassment during exercise, is a major PA barrier in adults living with obesity compared to other BMI classes (table 3). In addition, people with obesity declared that socialization, group belonging, family, professional or peer support motive them to engage, perform and maintain PA practice (table S2). This result is in accordance with several previous studies showing positive associations between social support with PA attendance and adherence (106, 107). Nevertheless, additional studies should be done in people with obesity, due to inverse results (no or negative association) in order to better understand the complex relationship between PA and social support (106, 107). Indeed, social support can

be perceived as a PA barrier or motive according to people or context of practice, resulting in PA avoidance and isolation or PA adherence and socialization (28). Hence, it may be relevant to work on public health messages to successfully promote PA and favour a lower obesity stigmatization by providing a better training to health professionals (108).

The main strength of the present review is the systematic inclusion of both qualitative and quantitative literature, allowing a larger integration of PA barriers, motives, and preferences of people with obesity. However, some limitations should be considered to better interpret data. First, only English and French full texts have been included. A second limitation is due to the characteristics of the included studies. Indeed, half of studies comes from the United States, and all from occidental countries, and men with obesity are underrepresented. In addition, socioeconomic data of people with obesity are often missing in the included studies, not reported or only reported in all the sample, including people with and without obesity. However, it should be considered that ethnic diversity within the included studies is quite present, with 5 (19.2%) studies performed in ethnic minority groups (Urban Latinas, and African American) (55, 57, 58, 61, 68). Third, the use of a scale to quantify the importance of each barrier and motive is not the most accurate method compared to meta-analysis, but allowed in this context the integration of quantitative and qualitative studies, as well as to compare quantitative results with different kinds of questions (score vs. prevalence, Likert scale vs. yes/no answers). In addition, especially for PA motives, the relevance of this score is limited due to the high number of missing data (score 2 was attributed to more than 60 % of the PA motives). Finally, publication bias could also affect our findings.

Based on identified gaps in the literature, future research should focus on more representative sample of people with obesity. To date, most of the studies were conducted with women in occidental countries, and several included quantitative studies have selection bias. A strong need to determine PA preferences in people with obesity has been also identified, given only four studies are currently available. In addition, future works should provide data on the importance of PA motives, barriers and preferences in people with obesity. The use of a common unit (e.g., percentage rather than score) or the development of validated questionnaire in people with obesity could be useful to harmonize results and obtain better idea of the importance of each PA motives, barriers and preferences. Otherwise, self-consciousness, an important barrier in people with obesity (table 3), as well as stigmatization which was considered only in qualitative study according to our findings (figure 4) should be systematically considered in future studies. Finally, there is also a need to consider PA motives, barriers, and preferences differences according to gender, age, socioeconomic status, health status, PA level to better address diversity and specific needs. Indeed, differences between sexes have been already shown in people with overweight, with women reported more often being too fat, embarrassed, and with not good enough health as a PA barrier compared to men (109).

To conclude, PA motives and barriers are both weight and non-weight related in people with obesity. For this reason, weight loss can not be the only solution to remove PA barriers, and these should be addressed in PA interventions with the support of health professionals to facilitate PA initiation and maintenance. Further research is needed to investigate the PA preferences of people with obesity. Although, one size intervention does not fit all, the improvement of knowledge on PA barriers, motives and preferences would

help health professionals to better address them, and develop intervention to reach the larger number of people with obesity in order to decrease physical inactivity in this population.

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S1. Search equation

PUBMED with MesH-terms

((Exercise[MeSH Terms]) AND (((((Motiv*) OR preference*) OR barrier*) OR facilitator*) OR obstacle*)) AND Obesity[MeSH Terms]) AND humans [MeSH Terms]
Limits: humans / English or French / adult 19+ years

PUBMED with keywords

(Exercise*[All Fields] OR Endurance [All Fields] OR Aerobic* [All Fields] OR Resistance adj1(activit* or train*)[All Fields] OR Muscl* adj2 (exercis* or strength) [All Fields] OR Sport [All Fields] OR Physical adj3 (activit* or train* or therap* or rehabili*) [All Fields] OR Relaxation [All Fields] OR Flexibility [All Fields] OR Stretch* [All Fields] OR Walk*[All Fields] OR Yoga[All Fields]) AND (obes*[Title/Abstract]) AND (motiv*[All Fields] OR preference*[All Fields] OR barrier*[All Fields] OR facilitator*[All Fields] OR obstacle*[All Fields])

Filters : English/French; Adult:19+; Humans

Cinahl

(MH "Obesity") AND ((MH "Exercise") OR (MH "Physical Education and Training") OR (MH "Physical Fitness") OR (MH "Physical Activity") OR (MH "Therapeutic Exercise") OR (MH "Yoga") OR (MH "Dance Therapy") OR (MH "Tai Chi") OR (MH "Sports")) AND ((TX "Motiv*") OR (TX preference*) OR (TX barrier*) OR (TX facilitator*) OR (TX obstacle*))

Opérateurs de restriction : All Adult; Peer Reviewed; English, French

PsycNET

((Any Field: (Weightlifting)) OR (Any Field: (Physical Activity)) OR (Index Terms: (Aerobic Exercise)) OR (Index Terms: (exercise)) OR (Any Field: (Yoga))) AND ((Index Terms: (obesity))) AND ((Any Field: (motiv*)) OR (Any Field: (obstacle*)) OR (Any Field: (preference*)) OR (Any Field: (barrier*)) AND (Any Field: (facilitator*))) AND Publication Type: Peer Reviewed Journal AND Age Group: Adulthood (18 yrs & older)

Sportdiscus

SU "OBESITY" AND SU "EXERCISE" AND (motiv* OR preference* OR barrier* OR facilitator* OR obstacle*)

Limiters: Peer Reviewed; English, French

Web of science

TOPIC: (exercis* OR endurance OR aerobic* OR "resistance activit*" OR "resistance train*" OR "Muscl* exercis*" OR "Muscl* strenght*" OR Sport OR "Physical activit*" OR "physical train*" OR "physical therap*" OR "Physical rehabili*" OR Relaxation OR Flexibility OR Stretch* OR walk OR yoga) AND **TOPIC:** (motiv* OR barrier* OR facilitator* OR obstacle* OR preference*)
AND **TOPIC:** (obes*)

Refined by: LANGUAGES: (ENGLISH OR FRENCH) AND DOCUMENT TYPES: (ARTICLE) AND RESEARCH AREAS: (HEALTH CARE SCIENCES SERVICES OR OBSTETRICS GYNECOLOGY OR PUBLIC ENVIRONMENTAL OCCUPATIONAL

HEALTH OR REPRODUCTIVE BIOLOGY OR ENDOCRINOLOGY METABOLISM OR
SOCIAL SCIENCES OTHER TOPICS OR NUTRITION DIETETICS OR SOCIOLOGY OR
BEHAVIORAL SCIENCES OR MEDICAL LABORATORY TECHNOLOGY OR
PSYCHOLOGY OR SOCIAL WORK OR RESEARCH EXPERIMENTAL MEDICINE OR
ORTHOPEDICS OR GENERAL INTERNAL MEDICINE OR SPORT SCIENCES OR
SURGERY OR FOOD SCIENCE TECHNOLOGY OR LIFE SCIENCES BIOMEDICINE
OTHER TOPICS OR NEUROSCIENCES NEUROLOGY OR COMMUNICATION OR
PSYCHIATRY OR ENVIRONMENTAL SCIENCES ECOLOGY OR NURSING OR
REHABILITATION OR CARDIOVASCULAR SYSTEM CARDIOLOGY OR RESPIRATORY
SYSTEM OR EDUCATION EDUCATIONAL RESEARCH)

PROQUEST - Physical Education Index

SU("Exercise") AND SU("Obesity") AND (all(barrier*) OR all(preference*) OR
all("facilitator*") OR all("obstacle*") OR all ("Motiv*"))

Limits : peer reviewed + English + humans

Table S1: Risk of bias assessed with the Mixed Methods Appraisal Tool

Quantitative studies						
	1. Is the sampling strategy relevant to address the research question?	2. Is the sample representative of the target population?	3. Are the measurements appropriate?	4. Is the risk of nonresponse bias low?	Total score %	
Ashton (54)	No	No	Yes	Can't tell	25	
Masterson (55)	No	No	Yes	Can't tell	25	
Egan (56)	No	Can't tell	No	Can't tell	0	
Genkinger (57)	No	No	Yes	Yes	50	
James (58)	No	No	Yes	Yes	50	
Labrunee (59)	No	No	No	Can't tell	0	
Napolitano (60)	No	No	Yes	Can't tell	25	
Rimmer (61)	No	No	Yes	Can't tell	25	
Rye (62)	Yes	Yes	No	Can't tell	50	
Skov-Ettrup (63)	Yes	No	No	No	25	
Stankevitz (64)	No	No	Yes	No	25	
Burton (65)	Yes	Yes	No	Yes	75	
Short (66)	Yes	No	Yes	No	50	
Qualitative studies						
	1. Is the qualitative approach appropriate to answer the research question?	2. Are the qualitative data collection methods adequate to address the research question?	3. Are the findings adequately derived from the data?	4. Is the interpretation of results sufficiently substantiated by data?	5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	
Bowen (67)	Yes	Yes	Yes	Yes	Yes	100
Coe (68)	Yes	Yes	Yes	Yes	Yes	100
Danielsen (69)	Yes	Yes	Yes	Yes	Yes	100
Guess (70)	Yes	Yes	Yes	No	No	60
Igelström (71)	Yes	Yes	Yes	Yes	Yes	100
Joseph (72)	Yes	Yes	Yes	Yes	Yes	100
Lidegaard (73)	Yes	Yes	Yes	Yes	Yes	100
Piana (74)	Yes	Yes	Yes	Yes	Yes	100

Lewis (76)	No	Yes	Yes	Yes	No	60
Groven (75)	Yes	Yes	Yes	Yes	Yes	100
Mixed studies						
	1. Is there an adequate rationale for using a mixed methods design to address the research question?	2. Are the different components of the study effectively integrated to answer the research question?	3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	
Adachi-Mejia (77)	Yes	Yes	Yes	Yes	No	80
Lattimore (78)	Yes	Yes	Yes	Yes	No	80
Leone (79)	Yes	Yes	Yes	Yes	No	80

Table S2. Data extraction and classification details for physical activity motives

References	Survey items/question OR Second-order construct: “ <i>First-order construct</i> ”	Average response	Scores
Physical factors			
Ashton (54)	Lose weight	46.4 % reported as key motivator	3
Skov-Ettrup (63)	Lose weight		2
Leone (79)	Weight management, Weight-loss may be the only benefit which is desirable enough to motivate obese women to overcome their barriers to exercise; “ <i>Losing weight, seeing the numbers go down on the scale, feeling as though my clothes are fitting better or I get into, you know my smaller size clothes and that sort of thing that motivates me to work out, to be more purposeful in doing physical activity</i> ”	Most common perceived	3
Guess (70)	Weight loss as a primary motivation: “ <i>Right, and when you’re looking at the scale, each time maybe I go to the gym, you lose 1 pounds 2 pounds, so I think afterwards, I am losing, so I think to myself I need to keep going, it’s motivating to me.</i> ”; “ <i>Yes, always 3 times a week, after working, losing the weight, it motivates you, makes you feel you want to do a little bit more</i> ”; “ <i>I mean, does the person really come to the doctor and say I want to exercise because I want to be healthy or send me to the gym because I want to be healthy? No! They go on exercise and diet programs because they want to lose weight</i> ”; “ <i>Nothing is stopping me at the moment once I start to lose a little bit of weight I start to feel motivated</i> ”	Primary motivation for nearly all women	3
Danielsen (69)	Persistence in weight regulation grounded in a fundamental fear of gaining weight. What they feared the most was to “go back to where I was.”		2
Igelström (71)	Desire for a change: “ <i>I want to lose weight</i> ”; “ <i>I am fed up with being in this situation</i> ”		2
Groven (75)	Weight reduction is seemed by women as essential; “ <i>You actually exercise your entire body. You go through every muscle in your body. I think that is very important, especially when it comes to burning fat. You have to push your body in order to burn fat and lose weight.</i> ”.		2

Lewis (76)	To lose weight to becoming “fit,” “healthy,” and “athletic” rather than “thin”. <i>“Men don’t want to be thin. Our goal is to have low body fat, to be muscular. The ideal body shape for men is quite a muscular one in men’s minds.”</i>	Described by many men	3
Ashton (54)	Improve fitness, improve muscle mass, improve sporting performance		2
Skov-Ettrup (63)	Get or stay fit		2
Bowen (67)	To increase energy: <i>“When you do it [physical activity], you do feel better. I’m not tired I just feel good”; “I’m not as tired as I used to be. And I just feel good. ”</i>	One of the most expressed motivational factors.	3
Danielsen (69)	<i>“Now I notice that I get a lot more energy from being active. Therefore, if I’m tired, going to the gym or going for a walk or doing something [physical activity] is useful for me”.</i> Change in lifestyle and self-perception due to improved physical fitness: <i>“Before I was a spectator in my own life, now I’m participating.”</i>		2
Joseph (72)	Increase energy: <i>“Have more energy”. “Being able to maybe keep up with family – with my son and my husband – and being able to do those things and not be exhausted or not sit out the ride or sit out the trip for whatever reason”</i>		2
Lidegaard (73)	Give energy to the rest of everyday life; <i>When you do it [physical activity], you do feel better. I’m not tired I just feel good”. “I’m not as tired as I used to be. And I just feel good.”</i>		2
Ashton (54)	Improve overall health, to live longer		2
Bowen (67)	To decrease pain and stiffness	The most commonly expressed motivational factors	3
Joseph (72)	Health outcomes; Reduced risk for chronic disease <i>“Ultimately it’s just increased health. Be healthier, you’ll feel better, have more energy. Better response to stress, all those kinds of things”</i>	Mentioned in all focus group	3
Lidegaard (73)	To maintain or improve health; Increased motivation if visible improvement in health parameters; Reviewing/reaching health goals <i>“One of the good things about diabetes is that you can measure pretty quickly if what you’re doing is the right thing [. . .] instead of waiting for the rather long-term effect of exercise on my weight. The immediate responses is really motivating to me. ”</i>		2

Psychological factors			
Igelström (71)	Threat or coercion; Direct advice from a health care provider <i>“If someone told me you’re going to die tomorrow if you don’t exercise, then of course I would be more physically active”</i>	Some participants	1
Joseph (72)	Reduced risk of chronic conditions; <i>“For me, the motivating factor is I want to live. You know. Straight up, I want to live...you see people who are passing away at your age, I guess. And, you know, because of heart attacks or, you know, things, diabetes or whatever these things”</i>	Mentioned in all focus group	3
Ashton (54)	Improve mental health and well-being, improve sleeping patterns,		2
Danielsen (69)	Feeling of vigor and better mood	Important incentive for PA	3
Lidegaard (73)	Good sense in the body, sense of well being		2
Ashton (54)	Improve body image, attract a partner		2
Joseph (72)	To improve physical appearance: <i>“My motivation would be clothes, actually. Yeah, and not having to buy plus size clothes, and not having to spend ridiculously large amounts of money for clothing.”</i>	Mentioned by some women	1
Ashton (54)	Enjoyment		2
Skov-Ettrup (63)	Have fun		2
Skov-Ettrup (63)	Unwind		2
Lidegaard (73)	An opportunity to reduce stress and recharge		2

Bowen (67)	<i>"It has helped me with stress"</i>		2
Joseph (72)	Self-care: <i>"If we love ourselves, then we'll do this for ourselves."</i>		2
Lidegaard (73)	To have time for yourself		2
Socio-ecological factors			
Bowen (67)	To maintain independence with Daily Living and Instrumental. Activities of Daily Living. Independence was a factor that was valued among all the women and a motivator to be physically active because it played a vital role in their health.	All women	3
Joseph (72)	Being a good role model to others, particularly their family: <i>"I have children. They're teenagers, and I'm trying to break out of the statistics category regarding African-American women [referring to cardiometabolic health disparities]". "I would say setting a good example for my children is another motivating factor."</i>	Several women	1
Asthor (54)	Social influences		2
Skov-Ettrup (63)	Socialize		2
Lidegaard (73)	Being physically active with others; Social interaction <i>"I think it's a good idea to work out with other people. I like that a lot because of the social aspect. . . I play football, and we've got a tradition of a "third half", with food and having fun. That's really good [. . .] all that stuff with the locker room. I think that's important for a lot of people."</i> Commitment; Sharing good experiences; Friendly competition; Mutual inspiration: <i>"I do fitness twice a week with other people. Well, I do it that way because if I was to do it alone, I'd just procrastinate [. . .] I just have to oblige myself to do it with other people; otherwise, I'd never do it."</i>	Emphasized by many participants	3

Groven (75)	<p>Motivated by treatment group: <i>"The others stayed in the program, which made me hang in as well. It sort of motivated me, seeing the other participants pushing themselves"</i>.</p> <p>Motivated by a physiotherapist: <i>"She (physiotherapist) is direct whether it can hurt us or please us. She tells us how to do things better. But I think it important that she also tells me that I can do better. I like the way she pushed us,"</i></p> <p>They emphasized that exercising together with persons in the same situation as themselves (treatment group for organized for patients with obesity problem) made them feel more recognized and accepted. Sense of belonging. Treatment group provides a common ground in which the women can feel equal, regardless of their body weight.</p>		2
Lewis (76)	<p>More motivated to engage in physical activity if it involved family members or friends: <i>"You'd never go and run around the track 4 times a week, but you might if you knew it was a good time and you'd meet other people who were all doing the same."</i></p>		2
Danielsen (69)	<p>Challenged by others in a group class to "try things": <i>"It was motivating. Because most of them were "in the same boat" as me, they wanted to exercise and got a "kick" from it. They wanted to exercise more and get involved and engaged, so we motivated and helped each other,... "</i></p> <p>Share positive and negative experiences <i>"Here I can meet others with the same problems as myself. For everyone have problems due to their weight, right. And we share the same problems,... We understand each other"</i></p> <p>Being in the same boat: <i>"We looked a little similar, everything was in a way very safe"; "It was okay to breathe and wheeze and it was okay to [let the fat] wiggle and all this, you know, when we exercised."</i></p>	Several participants	1

Table S3. Data extraction and classification details for physical activity barriers

	References	Survey items/question OR Second-order construct: “ <i>First-order construct</i> ”	Average response	Scores
Poor health	Physical factors			
	Napolitano (60)	Poor health	1.45 /5 for agreement	1
	Rimmer (61)	Health concerns prevent me from exercising	39% agreed	2
	Adachi-Mejia (77)	Lack of general good health	As weight ↑, this item ↑ in frequency	2
		Arthritis; Hip issues; Chronic illness; Foot issues; Knee issues; Health issues; Ankle injury; Asthma; Back issues; Migraines; Diabetes; Smocking.	Knee issues were described as a barrier in all weight classes. Asthma was mentioned as barriers in all obese classes. Participants described more types of physical barriers as weight class increased	
	Coe (68)	Health concerns Physical limitations	Mentioned by all members Mentioned by all male participants	3
	Guess (70)	“(Physical activity) is not really for someone like me with my health conditions”. “I feel comfortable, the problem is as soon as I feel I have problem with my asthma”		2
	Igelström (71)	Medical problems		2
	Lattimore (78)	Health: “Arthritis, fibromyalgia, muscular, degeneration, heart conditions, and surgeries”	32.3%	2
	Leone (79)	Chronic condition: “I can’t do it anymore, because I can’t walk like that anymore ‘cause my blood pressure spikes” Injury or surgery	Second most common barrier to exercise.	3
Pain/ physical discomfort	Lidegaard (73)	Poor physical conditions: “I can’t ride a bicycle and walk as I used to because of problems with my legs, right?”	Substantial barrier	3
	Labrunee (59)	Pain following PA	very frequent (>60%)	3
	Napolitano (60)	Minor aches and pain	2.13/ 5 for agreement	2
	Egan (56)	Physical discomfort	23.4 % reported as a major barrier (# 1 barrier)	3
	Rimmer (61)	Pain prevents me from exercising	64% agreed	3
	Stankevitz (64)	Pain or discomfort	2.7/5 for frequency	1,5
		Feeling nauseated	1.5/5 for frequency	

	Adachi-Mejia (77)	Pain	Mentioned as barrier in all obese classes (I, II and III)	2
	Bowen (67)	Chronic pain: <i>"My legs hurt when I walk and [with] standing; when I stand too long, it's my back" "I don't participate in the exercise. I used to but my back bother me now... So I don't exercise. I can't go through that exercise [at the gym]"</i>	Mentioned by many participants and as a significant barrier.	3
	Leone (79)	Physically uncomfortable while exercising		2
	Danielsen (69)	Exercise is painful; Pain related to limited mobility: <i>"I've never had so much pain"</i>	Experienced by all participants.	3
	Igelström (71)	Pain as a side effect of physical activity; Bodily sensations: <i>"Unpleasant sensations from the heart while exercising"</i>		2
	Lidegaard (73)	Pain: <i>"I'm pretty sure I do get the exercise, but I should do more of it. But when I do more of it, well then it's hard on my knees and back."</i>	50%	3
	Piana (74)	<i>"Muscle pain" "injuries, accidents"</i>		2
	Groven (75)	Pain: <i>"Pain in my knees, in my back, in my groin. I really felt like a failure."</i>	Many	2
Weight	Napolitano (60)	I am too overweight	2.74/5 for agreement	2
	Leone (79)	My current weight makes it difficult for me to exercise Weight: <i>"...the weight goes down and then I feel better about exercising, because who wants to be, you know, big, fat, tight clothes, that kind of thing, getting out of breather earlier or something like that, although my breath really is pretty good. "</i>	46.5% agreed Weight-related barrier was the first common theme	2,5
	Lattimore (78)	Being overweight (both currently and for life)		2
	Danielsen (69)	Living a heavy body: <i>"I couldn't do anything "</i>		2
	Guess (70)	Weight	Majority of participants	3
	Adachi-Mejia (77)	Weight	Mentioned as barriers in all obese classes.	2
	Piana (74)	Weight: <i>"Difficulty of movement caused by obesity" "Difficulty in tying my shoe-laces and/or standing up"</i>		2
	Napolitano (60)	Lack of energy I am usually too tired to exercise	3.47/5 for agreement 3.11 /5 for agreement	3
Fatigue/lack of energy	Rimmer (61)	Lack of energy	36% agreed	2
	Egan (56)	Too tired to exercise	15.9 % reported as a major barrier	2
	Genkinger (57)	Too fatigued by exercise Too tired	13% strongly agreed or agreed 37% strongly agreed or agreed	1,5
	Stankevitz (64)	Fatigue (lack of energy)	3.3/5 for frequency	3
	Leone (79)	I don't have the energy to exercise	57,8% agreed	3

Poor physical fitness	Adachi-Mejia (77)	Lack of energy Low energy; Sleep issues; Tiredness	Low energy was mentioned in two obese classes (I and II); Sleep issues in one obese class (II); Tiredness in all obese classes.	2
	Joseph (72)	“Once I get home, I’m done. I don’t want to do nothing.”	Commonly reported barrier	3
	Lattimore (78)	Lack of energy	15%	1
	Bowen (67)	Fatigue; Fatigue contributed to a person’s inability to perform regular physical activity and leads to a sedentary lifestyle	Mentioned by two women (22%)	1
	Piana (74)	Fatigue: “ <i>Fatigue</i> ”		2
	Labrunee (59)	My poor effort capacity	very frequent (>60%)	3
		The bad tolerance to efforts (dyspnea, muscular fatigue, feeling of discomfort, pain)	very frequent (>60%)	
	Napolitano (60)	Physical activity is hard work	2.38 /5 for agreement	2
	Adachi-Mejia (77)	Out of shape; Exhaustion	Out of shape was mentioned in two obese classes (I and III); Exhaustion in one obese class (I)	2
	Igelström (71)	Exhaustion: “ <i>Exhaustion</i> ”		2
Aging	Rimmer (61)	Too old to exercise	6% agreed	1
	Bowen (67)	Aging; Exercise becomes more difficult with aging: “ <i>The older I get I can’t run or jump like I use to</i> ”.	Mentioned by 3 participants (33%)	2
Psychological factors				
Fear	Adachi-Mejia (77)	Fear of injury	As weight ↗, item ↗ in frequency	2
	Rimmer (61)	Exercise will make my condition worse	6% agreed	1
	Napolitano (60).	Fear of injury	1.45 /5 for agreement	1
	Stankevitz (64)	Fear of injury	2.0/5 for frequency	2
	Ashton (54)	Injury		2
	Labrunee (59)	Doing a physical activity frightens me because of: 1- The risk of hypoglycemia; 2- The risk of not controlling my diabetes 3- The risk to get tired; 4- The risk to be injured; 5- The risk of having a cardiac problem	< 40%	2
	Danielsen (69)	Fear of get injured: “ <i>I was sure I would die</i> ”.		2
	Guess (70)	Fear of get injured: “ <i>I don’t want to do myself damage</i> ” “ <i>Due to my knee at this moment in time I do feel like that [a need for specialist advice] would maybe be the case</i> ”.		2
	Piana (74)	Fear of get injured; Fear of not succeeding: “ <i>Fear of failing</i> ”		2
	Leone (79)	I usually only exercise if I am trying to lose weight	42.4% agreed	2

<i>Lack of interest or enjoyment</i>	Stankevitz (64)	Lack of self-discipline	3.5/5 for frequency	3
		Procrastination	3.3/5 for frequency	
	Ashton (54)	Lack of motivation		2
	Labrunee (59)	Low motivation	very frequent (>60%)	3
	Napolitano (60)	Lack of self-discipline or willpower	4.27/5 for agreement	3
	Rye (62)	Lack of willpower	54.5% agreed	3
	James (58)	I don't have the willpower to exercise	Obese class 1 and 2 reported stronger levels of agreement with this barrier than other weight group	2
	Genkinger (57)	Lack of motivation	63% strongly agreed or agreed	3
	Rimmer (61)	Lack of motivation	30% agreed	2
	Adachi-Mejia (77)	Self-discipline	Most frequently mentioned barrier among people with obesity	2,5
		Lack of motivation; In a rut; Don't see results	Lack of motivation was mentioned for four out of five weight classes; In a rut in one obese class (II); Don't see results in one obese class (III)	
	Piana (74)	Lack of motivation, Too many excuses; Lack of personal incentives : <i>"Not achieving the target"</i> <i>"Why am I trying?"</i> <i>"Excuses for not doing it"</i> <i>"It is hard to get going"</i>		2
	Lattimore (78)	Lack of motivation; motivation	28.3% and 41,6%	2
	Lidegaard (73)	Broken exercise routine and difficulty to start exercising again: <i>"I just didn't do it as a daily routine [. . .] It took several months to get it running again as a routine."</i>	Minor topic	1
	Joseph (72)	Don't see results: <i>"Sometimes all the goals make you feel like the little bit you do isn't worth it."</i>		2
	Genkinger (57)	Exercise is boring	18% strongly agreed or agreed	1
	Egan (56)	Exercise is too boring	20.7 % reported as a major barrier (# 2 barrier)	2
		Dislike of gym	9.7 % reported as a major barrier	
	Napolitano (60)	PA is too boring	2.26 /5 for agreement	2,3
		Lack of interest in PA	3.13 /5 for agreement	
		I do not enjoy PA	2.66 /5 for agreement	
	Rimmer (61)	Lack of interest	9% agreed	1
		PA is boring or monotonous	24% agreed	
		Satisfied with physical appearance	12% agreed	
		Exercise is too difficult	18% agreed	
	Stankevitz (64)	Exercise is not in routine	3.2/5 for frequency	2,4
		Lack of interest in exercise	2.9/5 for frequency	
		Lack of enjoyment from exercise	2.7/5 for frequency	

Mental health concerns		Exercise was boring	2.5/5 for frequency	
		Exercise is not a priority	3.0/5 for frequency	
	Rye (62)	Don't need more	4.6 % agreed	1
	Labrunee (59)	The lack of desire	very frequent (>60%)	3
	Adachi-Mejia (77)	Prefer to do other things; Not fun; Dislike exercise; Not thinking about doing exercise; Sedentary activities	Prefer to do other things was mentioned in one obese class (I); Not fun in one obese class (I); Dislike was mentioned in one obese class (II); Not thinking about doing exercise in one obese class (I); Sedentary activities in one obese class (III).	2
	Lattimore (78)	Lack of interest	5.7%	1
	Piana (74)	Resistance to practice unpleasant activities: <i>"I hate running, and doing physical activity is unpleasant"</i> .		2
	Egan (56)	Too depressed to exercise	5.5 % reported as a major barrier	1
	Adachi-Mejia (77)	Stress; Depression; Mood; Lazy; Procrastination; Impatience; Sadness	Depression was mentioned as a barrier in all three obese classes. Stress and mood were mentioned in one obese class (I). Lazy was mentioned in two obese classes (II, III), Procrastination was mentioned in one obese class (II). Impatience was mentioned in one obese class (III)	2
	Bowen (67)	Laziness	Mentioned by 2 participants (22%)	1
	Igelström (71)	Psychological distress	Some participants	1
	Egan (56)	Negative past experience of exercise	4.1 % reported as a major barrier	1
Negative past experiences	Napolitano (60)	I hate to fail so I do not try	2.13/5 for agreement	2
	Igelström (71)	Negative past experience of exercise	Some participants	1
	Joseph (72)	Being forced to perform activities they did not want to perform; Being uncomfortable with PA due to early onset of physical development; Embarrassment and teasing from other children; Hiring a personal trainer and/or engaging in structured exercise classes that were too intense or beyond their skill level. <i>"My personal trainer was negative in his approach" "I signed up for a free class. It was a Cross-Fit class (....) the next day I felt like I was hit by a truck, and I didn't go back. "</i>	A few women	1
	Lattimore (78)	Negative exercise perceptions or Experience	4%	1

Self-conscious	Egan (56)	Embarrassed about physical appearance	4.1 % reported as a major barrier	1
	Napolitano (60)	Self-conscious about my look when I do activities	2.6 /5 for agreement	2
	Labrunee (59)	Doing a physical activity frightens me because of: 6- The others' look	< 40%	2
	James (58)	I am uncomfortable with how I look while exercising or while wearing exercise clothing	Obese class 1 and 2 reported stronger levels of agreement with this barrier than other weight groups	2
	Rimmer (61)	Feel uncomfortable exercising in a fitness center	30% agreed	2
	Ashton (54)	Intimidation/embarrassment		2
	Leone (79)	I am uncomfortable with how I look while exercising or while wearing exercise clothing	44.4 % agreed	1,5
		Uncomfortable with appearance while exercising: <i>"I want to exercise by myself, but the only reason I don't want to join a club, or anything like that is because everybody in there is like a size 2"</i>	15,8%	
	Guess (70)	<i>"I am too self-conscious to go to the gym with all these skinny little women".</i>		2
	Danielsen (69)	Not fitting in to typical exercise contexts: <i>"As when you enter Elixia [national fitness center] with 140 kg and the others are highly trained people, then you feel a bit like that, you know what I mean?" "Feeling of bodily "otherness."</i>	Some participants.	1
Lack of skill or confidence	Napolitano (60)	Lack of skill	2.14 /5 for agreement	2
	Ashton (54)	Lack of skills/knowledge		2
	Stankevitz (64)	Lack of skill	2.2/5 for frequency	2
	Adachi-Mejia (77)	Lacking coordination Self-perception as non-physical	Lacking coordination and self-perception as non-physical were mentioned as barrier in one obese class (II)	2
	Danielsen (69)	Feeling of not being able to do anything: <i>"I couldn't do anything."</i>	Prominent theme	3
	Guess (70)	Lack of confidence related to ability and perceived ability. <i>"I wouldn't feel comfortable doing it you know in a public place you know, obviously you have limitations."</i>	Many participants	3
	Igelström (71)	Doubt if they will be able to obtain the benefits	Some participants	1
	Joseph (72)	Participants reported their own self as a primary source of discouragement: <i>"I don't necessarily have anyone who's not supportive, but I know I can be my own worst critic."</i>		2
Beliefs	Rimmer (61)	Exercise will not improve my condition	9% agreed	1
	Ashton (54)	Exercising is not a masculine/bloke thing to do		2
	Guess (70)	Resistance exercises as a masculine activity; <i>"I don't want build muscles. To me it's like a man's sport."</i>	Amongst all the participants	3
	Joseph (72)	Participants belief that the racial history contributes to health benefits related to PA: <i>"It's [referring the PA for health benefits] really tailored to the individual because</i>	Few participants	1

		<i>there's, 'What's your racial history?' And not just what you might think you see, but what's your history because that can contribute to your health benefits."</i>		
	Leone (79)	Only women who are trying to lose weight need to exercise: <i>"I have never had to exercise in my young life to stay in shape."</i> <i>"I think weight gain does drive exercise. If I could weigh 110 pounds and never exercise, I'd be very happy."</i>		2
	Lewis (76)	Being too concern about health is not masculine		2
Socio-ecological factors				
	Napolitano (60)	Lack of time	3.43 /5 for agreement	3
	Rye (62)	Lack of time	25.7% agreed	2
	Rimmer (61)	Lack of time	15% agreed	1
	Egan (56)	No time to exercise	20 % reported as a major barrier (# 3 barrier)	3
	Ashton (54)	Lack of time to exercise because of busy lifetime		2
Lack of time	Genkinger (57)	No time to exercise	50% strongly agreed or agreed	2,3
		Time Inconvenient	28% strongly agreed or agreed	
		Too busy to exercise	47% strongly agreed or agreed	
	799- Masterson et al.	Hard to make time	39 % agreed	2,5
		Cannot make time	81.6 % agreed	
	Stankevitz (64)	Inconvenient exercise schedule	3.1/5 for frequency	3
		Lack of time	3.4/5 for frequency	
	Adachi-Mejia (77)	Lack of time		2
		Lacking time; Schedule	Lacking time was mentioned as barrier in all weight classes; Schedule in one obese class (I).	
	Lattimore (78)	General lack of time. time	13.3% and 30,6%	1,5
	Danielsen (69)	Conflict with other activities and social events; Exercise as time-consuming. <i>"You have to give up other things in order to exercise."</i>		2
	Igelström (71)	Running out of time: <i>"I already have too much to do and adding physical activity will only stress me further. "</i>		2
Too many obligations	Genkinger (57)	Too many family obligations	29% strongly agreed or agreed	2
	Stankevitz (64)	Family responsibilities	3.3/5 for frequency	3
	Napolitano (60)	Family demands	2.77 /5 for agreement	2
		Social demands	2.26 /5 for agreement	
		Work demands	2.70 /5 for agreement	

Lack of social support	Rimmer (61)	Job responsibilities prevent me from exercising	3% agreed	1
		Family responsibilities prevent me from exercising	21% agreed	
	Adachi-Mejia (77)	Obligations; Caregiving duties; Family demands; Home life; Work; Sedentary desk jobs	Caregiving duties and family in one obese classe (I); Home life in two obese classes (I and II); Work in all five of the weight classes; Sedentary desk jobs in one obese class (II).	2
	Lewis (76)	Long working hours; Desk jobs	Extreme barriers to physical activity	2.75
		Work demands; Family commitments “(...) when I got married I basically stopped being active to spend more time with the missus”.	(n=20, 56%) (n=11, 31%)	
	Lattimore (78)	Work and family constraints	7.5 and 15%	1
	Lidegaard (73)	Other priorities and interests: “I just don’t have time for it. Well, when I get home, I just get sucked into family life.”; “I always have so many things to do at home that are a thousand times more important than getting out and exercising.”	All participants	3
	Rye (62)	Lack of support	52.6 % agreed	3
	Ashton (54)	Social influences (e.g., because your partner, family, or friends are NOT active)		2
	Egan (56)	Nobody to exercise with	3.4 % reported as a major barrier	1
		Lack of support from friends and family	0.7 % reported as a major barrier	
	Napolitano (60)	I do not have anyone to do physical activities with me	2.97 /5 for agreement	2
	Stankevitz (64)	Lack of company	2.7/5 for frequency	2
	Leone (79)	I don’t have any one to exercise with	48.5 % agreed	2
Cost	Rimmer (61)	Lack of friends/family support	6% agreed	1
	Adachi-Mejia (77)	Lack of compagny		2
		Being alone; No one to exercise with	Being alone was mentioned in two obese classes (II and III); No one to exercise in one obese class (I).	
	Igelström (71)	Lack of family and friends support; Lack of health care services support	Majority	3
	Coe (68)	Lack of interpersonal support; Lack of community support; Feeling isolated and misunderstood.	Several male and female participants.	1
	Piana (74)	“Loneliness”		2
	Lattimore (78)	Lack of an exercise partner; Lack of social support; Lack of accountability person	0.6, 1.2 and 0.6%	1
	799- Masterson et al.	Cost	50.4 % agreed	3
	Rimmer (61)	Cost of program	67%	3
	Stankevitz (64)	Cost of exercising	2.8/5 for frequency	2
	Napolitano (60)	Lack of money	1.85 /5 for agreement	1
	Rye (62)	Lack of money	37% agreed	2

Lack of access to equipment, facilities or professional	Egan (56)	Too expensive to exercise	4.8 % reported as a major barrier	1
	Ashton (54)	High cost of equipment/facilities		2
	Coe (68)	Low income and gyms/exercise classes costs	Majority of women and one of the most significant barriers	3
	Igelström (71)	Costs		2
	Lewis (76)	Affordability of living a healthy lifestyle: “Exercise equipment and gym memberships are very expensive, and I think manufacturers, particularly of exercise equipment, put their prices up and try to capitalize on people who may be desperate to lose weight and in a desperate bid to lose weight will pay inflated prices for products.”	16.6%	1
	799- Masterson et al.	Accessible place	30.9 % agreed	2
	Egan (56)	Transport issues	1.4 % reported as a major barrier	1
	Ashton (54)	Lack of facilities		2
	Rimmer (61)	Lack of accessible facilities	46% agreed	2
		Lack of personal care attendant	30% agreed	
		Lack of transportation	49% agreed	
	Napolitano (60)	Lack of convenient place to do physical activity	2.30 /5 for agreement	1,5
		Lack of equipment	1.98 /5 for agreement	
	Rye (62)	Lack of place	18 % agreed	1
	Adachi-Mejia (77)	Lack of facilities		2
Bad	Leone (79)	I don’t have any place to exercise.	11.1% agreed	1
	Stankevitz (64)	Lack of equipment	2.3/5 for frequency	1,7
		No facilities or space to exercise	2.1/5 for frequency	
		Lack of knowledgeable exercise staff	1.8/5 for frequency	
	Coe (68)	Lack of health and wellness related programs; Recreation centers in neighborhood had closed down; Transportation (lack of a car)	Mentioned by one female participant Female participants	1
	Igelström (71)	Equipment		2
	Lidegaard (73)	Lack of accessibility to local exercise facilities: ‘For me there’s something with the distance. Well, if it’s too big, I just can’t fit it in.’	Almost half the participants	2
		“I’ve read about the guy Jerry from Allerød who does interval walking (...) I don’t know if there’s someone who does interval walking closer to where I live.”		
	Lattimore (78)	Accessibility concerns	7.5%	1
	Egan (56)	Weather prevents exercise	11.7 % reported as a major barrier	2
	Genkinger (57)	Weather	19 % strongly agreed or agreed	1

Safety issues	Napolitano (60)	Weather is bad	2.62 /5 for agreement	2
	Stankevitz (64)	Bad weather	2.5/5 for frequency	2
	Ashton (54)	Weather (e.g., too hot or too cold to exercise)		2
	Adachi-Mejia (77)	Humidity; Rainy days; Too hot outside; Too cold outside; Too sunny; Too dark outside	Humidity and rainy days were mentioned in one obese class (I); The weather being too hot outside in three obese classes (I, II and III); Too cold outside in one obese class (II); Too sunny in two obese classes (I and III); Too dark outside in one obese class (III).	2
	Igelström (71)	Weather		2
	Joseph (72)	Extreme heat during the summer months.		2
	Lattimore (78)	Weather	15.6%	1
	Genkinger (57)	Concern about safety	10 % strongly agreed or agreed	1
	Egan (56)	Roads too dangerous to exercise	2.8 % reported as a major barrier	1
	Lattimore (78)	Transportation and safety	3.4%	1
Lack of knowledge or information	Napolitano (60)	Lack of knowledge on how to do physical activity	2.05 /5 for agreement	2
	Ashton (54)	Lack of information on appropriate exercise routines		2
	Rimmer (61)	Don't know how to exercise	46% agreed	2
		Don't know where to exercise	39% agreed	
		Not aware of fitness center in the area	46% agreed	
	Adachi-Mejia (77)	Lacking knowledge	Mentioned in 1 class of obese (II)	1
	Lattimore (78)	Lack of exercise knowledge or experience	4.6%	1
	Guess (70)	Lack of knowledge of how to do physical activity and certain types of physical activity ; Lack of knowledge about where to do physical activity. <i>"I don't know which ones (exercises) would tone up my arms or which ones are best for me to build up my strength". "Basically I asked at the local gym and my GP but neither of them knew where to go"</i>	Many participants	3
	Lidegaard (73)	Lack of knowledge about how to exercise or be physically active: <i>"I really don't know what I should do." "If I were to take part in that kind of exercise, I'd make it a condition that there were some professionals who knew what it was all about when you've got the problems I do"</i>	Substantial barriers	3
	Joseph (72)	Lack of information: <i>"I would need something to show me what exercises to do on Monday, which ones to do on Tuesday..."</i>		2
Stigma	Coe (68)	Stigma: Experiencing negative comments from strangers	Mentioned by female participants	2

Piana (74)	Negative experiences: <i>"During the secondary school I never did sports because I was ashamed of my body"</i> <i>"At school they called me "fatty" and let me off the activity. I felt excluded, discriminated against."</i>	Markedly negative influence on the patients' attitude towards it.	2
Groven (75)	The gaze of others: <i>"Sometimes I felt sick before going to the fitness training. I couldn't stand the idea of been stared at."</i> (gym) <i>"It made me feel disgusting. They looked at me because I was fat.. What is she doing her with a body like that kind of look. It made me feel like an idiot."</i>	Mainly barrier	3
Lewis (76)	Weight-based stigma: <i>"Doing any physical activity, it's not something to look forward to, it's putting myself out there to be ridiculed again"</i> . <i>"Just walking into a gymnasium is hugely embarrassing. You may as well walk in there naked because everyone turns to you and looks at you and you can just about hear them going 'oh yuc'"</i>	Few participants	1