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Abstract

The primary aim of the present study was to report longitudinal data on body image across the first year of gym engagement. Second, we aimed to compare body image among those who reported regular use of the fitness club (≥ 2 sessions/week) with those who did not (≤ 1 exercise session/week or no exercise/dropout), as well as between genders and Body Mass Index groups (BMI <25 and BMI ≥ 25) at membership start-up. Novice exercisers (n=250) from 25 fitness clubs in Oslo (Norway) responded to an online questionnaire at start-up, three, six and 12-months follow-up, with a high response rate (100%, 89.6%, 85.2% and 74.8%). The questionnaire covered background/health information and exercise involvement. A modified Multidimensional Body Self Relations Questionnaire Appearance Scales (MBSRQ-AS), comprising five subscales (appearance satisfaction, appearance investment, weight-related attitude, self-classified weight and Body Areas Satisfaction Scale (BASS), was used to gather repeated measures of body image. Data were analysed separately for each subscale and as a body image total score, using a linear mixed model adjusted for baseline, gender and BMI. We found differences in body image total score reported at six months when compared with onset (0.04, 95% CI 0.005 – 0.078, $p = 0.024$), whereas the subscale appearance satisfaction was different at three (0.08, 95% CI 0.015 – 0.164, $p = 0.018$), six (0.11, 95% CI 0.039 – 0.197, $p = 0.003$) and twelve (0.10, 95% CI 0.021 – 0.179, $p = 0.013$) months when compared with onset. Also the subscale BASS was different at three (0.17, 95% CI 0.009 – 0.255, $p < 0.001$), six (0.21, 95% CI 0.127 – 0.301, $p < 0.001$) and twelve (0.26, 95% CI 0.143 – 0.388, $p < 0.001$). Participants adhering to regular exercise (≥ 2 times weekly) had better outcomes on total body image than those who exercised less frequently or irregularly (three: 2.94 vs. 2.83, $p=0.027$ and 12-months: 2.97 vs. 2.85, $p=0.028$). At membership start-up, being male ($p < 0.001$) and having a BMI <25 ($p=0.003$), were the strongest factors associated with reporting a higher score on total body image. In conclusion, we found improved body area and appearance satisfaction in novice exercisers across the first year of fitness club membership.

Key words: body image; body mass index; fitness club; exercise; men; women

Introduction

At present, a negative body image and body weight dissatisfaction are global phenomena, with a large proportion wanting to alter at least some characteristics of their physical appearance (Ginsberg et al., 2016; Runfola et al., 2013; Swami et al., 2016; Vandervoort et al., 2015; Weinberger et al., 2016). Body mass index (BMI) is inversely associated with body image and body dissatisfaction tends to be more common in persons with overweight and obesity compared with normal-weight individuals (Algars et al., 2009; Schwartz & Brownell, 2004; Slevic & Tiggemann, 2011). Also, body dissatisfaction is more prevalent in women than men (Hilbert et al., 2012), and studies report a difference between the genders even among young ages, where girls are more insecure about their appearance compared with boys (Bucchianeri et al., 2013; Shriver et al., 2013). As such, women of all ages seem to value aesthetic ideals rather than the functional importance of their bodies (Abbott & Barber, 2010). This represents a major public health concern, as a negative body image is defined as a major risk factor for depression, anxiety, low self-worth, eating disorders, conditions which cost the society billions of dollars each year (Bucchianeri & Neumark-Sztainer, 2014).

Some research has revealed that a negative body image is associated with participation in regular exercise, when reasons for exercise are appearance based (Campbell & Hausenblas, 2009). In line with this, exercise may be seen as a strategy for weight loss, shaping and toning the body, and these reasons of exercise are associated with increased body dissatisfaction (Prichard & Tiggemann, 2005). On the other hand, intervention studies have shown that compared with controls, participants randomized to exercise have greater improvements in body image (Campbell & Hausenblas, 2009; Carraça et al., 2012; Reel et al., 2007). Hence, body image may be seen as a positive consequence of exercise, since participating in regular activity may pose changes to body-esteem, self-esteem and self-efficacy, all leading to a more positive body image (Martin Ginis et al., 2012). This theory is in accordance with a recent scoping review of 210 studies, concluding that overall, participating in structured or leisure physical activity was linked to less negative and more positive body image (Sabiston et al., 2019). However, it is important to investigate body image attitudes not only between individuals that are active or inactive (randomized to exercise or controls), but also if this differs between activity contexts (organized sports clubs, public spaces and fitness clubs) and exercise involvement (frequency). The existing literature has also largely included cross-sectional data, and prospective studies are therefore needed to further improve our understanding of causality of the established associations (Sabiston et al., 2019).

Body image attitudes has been defined somewhat differently in the literature, but can shortly be described as “the subjective picture of our own body which we form in our mind; that is to say, the way in which the body appears to ourselves” (Schilder, 2007). It has further been conceptualized as a multidimensional construct, comprising a cognitive, affective, perceptual, and a behavioral component (Pruzinsky & Cash, 1990), and where the subjective experience of one’s appearance is more powerful than what could be defined as objectively true or observed by others in a social setting (Cash, 2004). Body image attitudes influences how individuals feel, think, perceive, evaluate, invest and act regarding their physical attributes or certain body parts, and is therefore an important component of a person’s identity, health and quality of life (Avalos et al., 2005; Slater & Tiggemann, 2011; Tylka & Wood-Barcalow, 2015).

As previously described, gender and body size influence body image attitudes, and in sport psychology, exercise has received considerable attention as an important factor related to body image and body dissatisfaction. Additional factors of relevance to body image attitudes are age, personality traits, interactions with significant others (family, friends), as well as culture, media and experiences (Cash, 2004; Holland & Tiggemann, 2016). An individual’s body image attitudes often adapts to reflect new information and people, and it may be sensitive to situations and environment (Holland & Tiggemann, 2016). Research has not yet investigated how exercise relates to body image attitudes among novice exercisers at fitness clubs, a setting often considered to be an appearance orientated milieu (Prichard & Tiggemann, 2005, 2008). Also, studies regarding physical activity and body image has largely focused on women (Bassett-Gunter et al., 2017, Campbell & Hausenblas, 2009), and body image in men is an area that has received little attention (Sklar, 2017). Lastly, there is an important knowledge gap in the causal, directional associations between body image attitudes and exercise. Hence, the primary aim of the present study was to report longitudinal data on body image across the first year of gym engagement. Secondary, we aimed to compare body image among those who reported regular use of the fitness club (≥ 2 sessions/week) with those who did not (≤ 1 exercise session/week or no exercise/dropout), as well as between genders and BMI groups ($BMI < 25$ and $BMI \geq 25$) at membership start-up.

Our hypothesis was that both genders would report a more positive body image across the follow-up period, especially in those attaining regular exercise. Furthermore, we hypothesized that body image dissatisfaction would be higher in women than in men, and among persons with a BMI higher than 25 compared to normal-weight participants.

Materials and Methods

Design and participants

The present study was a secondary analysis of data that were collected as part of a prospective study of contributing factors that influence exercise involvement, attendance and exercise drop-out in a fitness club setting (*Fitness clubs - a venue for public health?* (Gjestvang et al., 2020). The original study was conducted in Oslo (Norway) from October 2015 to October 2018. The eligibility criteria were: healthy, untrained, <four weeks' membership, ≥ 18 years, not pregnant and literate in the Scandinavian language. Being healthy was defined as no severe disease or pathology (such as heart disease or severe hypertension). Untrained was defined as exercising <60 min once a week at moderate or vigorous intensity (Loland, 1998). There were 676 novice exercisers from 25 multipurpose fitness clubs (resistance and cardio exercise rooms, and group exercise classes) who expressed interest to participate in the study, however 148 did not respond after the first email, and 278 did not meet the eligibility criteria. Hence, 250 fitness club members (equal number of men and women) were included and followed for one year. More details of the research project are published elsewhere (Gjestvang et al., 2020; Gjestvang et al., 2019).

Ethical approval

The Regional Committee for Medical and Health Research Ethics, Southern Norway, Oslo, revised the project and complete data collection (REK 2015/1443 A) and concluded that the study did not require full review according to the Act on medical and health research (the Health Research Act 2008). All participants signed an informed consent form, following the Helsinki declaration. The study was approved by the Norwegian Social Science Data Service (NSD 44135) and was financed by a PhD position (CG) at the Norwegian School of Sports Sciences (NSSS). No economic compensation was given to the participants.

Outcome measures

A standardized, multidimensional electronic questionnaire (SurveyXact, www.surveyxact.no) was answered at start-up (52 questions) and after three, six and 12 months (65 questions) of fitness club membership. The questionnaire took about 25 minutes to complete, and was fully answered at the four time points by 250, 224, 213, and 187 participants, respectively. A total of 184 (men, $n=94$ and women, $n=90$) answered at all time points (73.6%). Up to three emails and

one telephone reminder were directed to participants who did not respond. For most participants we do not know the reasons for why they were lost to follow-up (n=43). Other withdrawals included life situation (n = 14), injury/disease (n = 5) and relocation (n = 1).

Information related to demographic variables and socioeconomic status were obtained from the questionnaire answered at start-up of fitness club membership, including questions about age, body weight and height, smoking, level of education, total household income, occupation, cohabitation and children. At three, six and 12 months follow-up, the participants also reported on exercise involvement. Due to potential recall bias associated with the use of self-report, we asked the participants to report exercise involvement over the last four weeks only (Sallis & Saelens, 2000). The questions and response options were: 1) *"Are you still a fitness club member?"*: "yes" or "no", 2) *"Have you been exercising regularly at the fitness club?"*: "yes" or "no" and 3) *"How often have you exercised per week on average at the fitness club?"*: "once a week", "twice a week", "three times a week", "four times a week", "five times a week", "six times a week" or "seven times a week or more". Based on the latter (question 3), average sessions/week was obtained across all three time-points. In the analysis, the participants were classified with either regular or non-regular exercise frequency. In line with Garber et al. (2011), regular exercise was defined as visiting the fitness club ≥ 2 times a week in the last month (Garber et al., 2011), and non-regular exercise as visiting the fitness club ≤ 1 time a week in the last month, counting exercise relapse, exercise dropouts and membership cancellations.

The Multidimensional Body Self Relations Questionnaire (MBSRQ) consists of separate subscales that can be used jointly or independently, and are together with a manual available for a nominal fee (Cash, 2000; Keeton et al., 1990). In the present study, body image attitudes was collected using a modified version of the MBSRQ-Appearance Scales (MBSRQ-AS), including 21 statements, comprising four sets of subscales (appearance satisfaction, appearance investment, weight-related attitude, self-classified weight), plus the Body Areas Satisfaction Scale (BASS) (Cash, 2000; Keeton et al., 1990). These are described below:

1. Appearance satisfaction: feelings of physical attractiveness or unattractiveness; satisfaction or dissatisfaction with one's looks.
2. Appearance investment: extent of investment in one's appearance. High scorers place more importance on how they look, pay attention to their appearance, and engage in extensive grooming behaviours, whereas low scorers are apathetic about their appearance and looks.
3. Weight-related attitude: reflecting fat anxiety, weight vigilance, dieting, and eating restraint.

4. Self-classified weight: reflecting how one perceives and labels one's weight, from very underweight to very overweight.

The MBSRQ-AS and BASS are developed for adults and adolescents (≥ 15 years), and addresses within each of the subscales, how the participants feel, think, invest or behave regarding each dimension. All separate statements were rated on a five point Likert scale (1 = *definitely disagree*, 5 = *definitely agree*), where higher values represented a more positive body image evaluation (Cash, 2000; Keeton et al., 1990). With respect to one of the statements assessing weight-related attitude (*"I have tried to lose weight by fasting or going on crash diets"*), the response options were slightly different: *"never"*, *"rarely"*, *"sometimes"*, *"often"* and *"very often"*. In addition, for self-classified weight (*"I think I am ..."*), the response options were grouped according to World Health Organization (WHO) BMI classification: *"underweight ($< 18.5 \text{ kg/m}^2$)"*, *"normal weight (18.5 to 24.9 kg/m²)"*, *"overweight (25 to 29.9 kg/m²)"* and *"obese ($\geq 30 \text{ kg/m}^2$)"*.

The supplementary BASS subscale measures participants satisfaction with specific body areas (lower torso, mid torso, upper torso, muscle tone, weight, overall appearance), also using a five point Likert scale (1 = *very dissatisfied*, 5 = *very satisfied*) (Cash, 2000; Giovannelli et al., 2008). For all statements (MBSRQ-AS and BASS), the participants could tick *"I do not want to answer"*, which was treated as missing data in the analysis.

All subscales of the MBSRQ-AS, have been found to have good validity and reliability among both genders and different cultural groups (Cash, 2000; Giovannelli et al., 2008; Jarry et al., 2019; Laus et al., 2019; Roncero et al., 2015; Vossbeck-Elsebusch et al., 2014). In our participants, Cronbach's α for the subscales used ranged from 0.85 to 0.89 (appearance satisfaction), 0.79 to 0.86 (BASS), 0.50 to 0.79 (appearance investment) and 0.60 to 0.72 (weight related attitude). Tests on internal consistency of the modified version of MBSRQ-AS as a whole, gave the following Cronbach's α 0.78, 0.83, 0.81 and 0.78 at start-up, three, six and 12 months of fitness club membership, respectively.

To achieve high cross-language validation when translating the English version of MBSRQ-AS into Norwegian language, we used a forward-backward translation technique, involving three members of the research group. A bilingual Australian Associate Professor with English as mother tongue finally assured the quality by comparing the "new" English version" with the original version. Based on this, some adjustments were made. A pilot test of the whole electronic questionnaire, where four volunteers were asked to provide feedback, led to minor

changes in format, layout and wording. A full questionnaire list in Norwegian may be provided upon request.

Data processing

The MBSRQ-AS manual provides gender specific adult norms for all subscales (Cash, 2000). In the present study, the results were analysed separately for each subscale and as a body image total score. Mean scores for the subscales were calculated by adding scores from each statement, divided by the number of statements.

For some subscales items, the statements had a negatively worded query, where lower score (Likert scale agreement) was considered positive for body image attitudes. In the final dataset, negatively framed statements were therefore reversed so that the sum score reflected a more positive body image.

A priory power calculations

Sample size considerations were based on a previous study assessing body image among Norwegian adults (Loland, 1998), as well as what the research group hypothesized to be relevant changes in body image attitudes in novice exercisers in a fitness club setting. When an individual joins a gym, it may be that small changes occur in body image evaluation throughout the first year of membership. Hence, all equations were based on detecting 10% changes in all MBSRQ subscales and body image total score using univariate and bivariate analyses. We used the following equation $(N = \frac{\sigma^2(z_{1-\beta} + z_{1-\alpha/2})^2}{(\mu_0 - \mu_1)^2})$, where μ_0 = population mean and σ = variance of population in the study of Loland (1998), and μ_1 = anticipated mean for our participants. With a power of 80% at the 0.05 level, we would be able to detect a 10% change in, for example, body image total score and “appearance satisfaction” with 87 and 182 participants, respectively. To allow adjustment for other factors and losses to follow-up, an additional 30% to 40% were needed (Suresh & Chandrashekara, 2012). Hence, 250 participants were considered as an appropriate sample size and we aimed to recruit all new fitness club members who fulfilled the eligibility criteria.”

Statistical analysis

All statistics were conducted with SPSS Software V. 24 for Windows or STATA SE version 16.0 (StataCorpStataCorp LP). Not all participants answered every question, as such individual questions may have varying response rate.

Descriptive data were screened for normality and outliers, including a comparison of the overall curve of the bars of the histograms, and the usage of parametric statistics (Kolmogorow-Smirnov Test for Normality).

Changes in body image (body image total score and subscales) across four time-points: start-up of membership, three months, six months and 12 months, were calculated using a linear mixed model adjusted for baseline, gender and BMI. The model included a random intercept, thereby ascribing all differences at baseline to the individual level. The results from the mixed model were expressed as estimated mean difference in change with 95% confidence interval (CI) for comparison, representing mean differences in change from onset to the respective follow-ups (Table 4). However, as few reported regular exercise at all follow-ups (n=31 out of 250), we also decided to do additional subgroup analyses, using a two-sided independent sample t-test to compare body image attitudes between those who reported regular exercise (≥ 2 exercise session/week) at three measurements points (three, six and 12 months of gym membership), with those who did not (≤ 1 exercise session/week, or no exercise).

To address if body image dissatisfaction was higher in women than in men, and among persons with a BMI higher than 25 compared with normal-weight participants, we used independent sample t-tests for means. As these analyses revealed differences between BMI groups (≥ 25 and < 25) and age, as well as differences between men and women and BMI in some of the MBSRQ subscales and body image total score, we decided to use a standard multiple regression to explore the impact of age, gender and BMI on body image total score.

Results are presented as numbers with percentages or means with standard deviation (SD), as well as group differences with 95% Confidence Intervals (CIs) and p-values.

Results

The majority of the participants (78.4%) were of Norwegian descent, with a mean age of 36.4 (± 11.3) years. Mean BMI (kg/m^2) was 25.6 (± 4.4), 48.4% had a BMI ≥ 25 , and 14.4% had a BMI ≥ 30 . Only one participants had a BMI < 18 (underweight). General background characteristics of all participants at start-up of fitness club membership, with grouping into BMI ≥ 25 and BMI < 25 , are shown in Table 1. Mean BMI values were 29.0 (± 3.9) and 22.5 (± 1.7)

in the two groups, respectively. Otherwise, we observed two differences: participants with a high BMI were older (5.4 years, 95% CI 2.7 to 8.1, $p < 0.01$) and a higher proportion were men (20.0%, 95% CI 7.6 to 31.6, $p < 0.01$).

Body image across the first year of gym membership

Table 2 shows the adjusted mean with 95% confidence interval of MBSRQ subscales across the four timepoints. We found significant differences in body image total score reported at six months when compared with onset (mean difference 0.04, 95% CI 0.005 – 0.078, $p = 0.024$). When examining the subscale appearance satisfaction, we found significant differences at three (mean difference 0.08, 95% CI 0.015 – 0.164, $p = 0.018$), six (mean difference 0.11, 95% CI 0.039 – 0.197, $p = 0.003$) and twelve (mean difference 0.10, 95% CI 0.021 – 0.179, $p = 0.013$) months when compared with onset. Also for the subscale BASS, there were significant differences at three (mean difference 0.17, 95% CI 0.009 – 0.255, $p < 0.001$), six (mean difference 0.21, 95% CI 0.127 – 0.301, $p < 0.001$) and twelve (mean difference 0.26, 95% CI 0.143 – 0.388, $p < 0.001$), whereas appearance investment was lower at three months (mean difference -0.06, 95% CI -0.124 – 0.002, $p = 0.041$) compared with start-up of fitness club membership.

There was a large drop in participants reporting regular exercise at the fitness club (≥ 2 exercise sessions) from three (51.8%) to six (37.6%) and 12 (37.4%) months ($p = 0.003$). A comparison of body image attitudes between those who reported this level of regular exercise (≥ 2 exercise sessions) with those who did not (≤ 1 exercise session/week, or no exercise) are shown in Table 3. At three and 12 months, regular exercise was associated with a more positive score on three out of five MBSRQ subscales, as well as higher body image total score. The latter remained the same when analyzing those who ($n = 31, 16.8\%$) reported regular exercise at all follow-ups.

Body image between genders and BMI groups (BMI < 25 and BMI \geq 25)

At start-up of fitness club membership, women reported lower values on overall body image, weight related attitude and BASS than men (Table 4). Persons with overweight or obesity (BMI ≥ 25) had lower appearance satisfaction, self-classified weight and BASS compared with normal weight participants (BMI < 25) (Table 4). In the linear regression models, being male ($p < 0.001$) and having a BMI < 25 ($p = 0.003$), were the strongest factors associated with reporting a higher score on total body image.

To evaluate if the participants were representative of our initial study population, a comparison analysis was performed with the 66 participants lost to follow-up across the year. No differences were found concerning total body image evaluation at start-up (all: 2.88 ± 0.4 and lost to follow-up: 2.86 ± 0.4), nor demographic and socioeconomic variables (data not shown).

Discussion

To our knowledge, we are the first to investigate longitudinal changes in body image attitudes among novice exercisers in a fitness club setting. The findings in this study were in line with our hypotheses, that both genders would report a more positive body image across the follow-up period, especially in those attaining regular exercise. This indicates that among new members, exercise has the potential to influence body image in a positive way, in that body image attitudes increases with exercise participation. Furthermore, we also confirmed our secondary hypotheses, that body image dissatisfaction would be higher in women than in men, and among persons with overweight/obesity compared with normal-weight participants.

The association between body image attitudes and exercise is not well understood, and findings have shown that a negative body image may serve as both a motivator and barrier to exercise participation (Brudzynski & Ebben, 2010). Studies with an experimental design have, however, concluded that sustained exercise may have a positive effect on body image (Campbell & Hausenblas, 2009; Carraça et al., 2012; Reel et al., 2007). In the present longitudinal study, for the whole group, we found a positive change in the subscales BASS and appearance satisfaction from membership start-up to three, six and 12-months. This suggests that regardless of gender and BMI, participants generally felt more satisfied with specific body areas and improved their feelings of physical attractiveness throughout the follow-up period. Also, body image total score was rated higher at six months compared with start-up. A potential key moderator is, of course, the individual's motivation for regular exercise. According to a systematic review by Panão & Carraça (2020), the reasons underlying one's engagement in exercise might influence the association between exercise and body image evaluation. For example, exercising to improve appearance or control weight has been found to be related to lower body image, whereas exercising for intrinsic motives (joy and interest for the activity) have been associated with several positive body image markers (Panão & Carraça, 2020).

In line with other results among fitness club members (Annesi, 2003; Middelkamp et al., 2017), we confirmed low exercise adherence at all measurement points, and highlight that more than 60% did not manage to visit the fitness club regularly within the first 6-12 months of fitness

club membership. Nevertheless, among those using the gym regularly, our additional subgroup analyses showed that those exercising (pre-defined cut-off value ≥ 2 sessions/week), had higher scores on overall body image, as well as on three out of five MBSRQ subscales (three months: appearance satisfaction, self-classified weight and BASS and 12 months: appearance satisfaction, appearance investment and weight-related attitude) compared with those who did not.

In a recent systematic review (Jarry et al., 2019), higher appearance investment was found to be associated with poorer psychological outcomes, such as body image disturbance, depression and eating pathology. Our results show that appearance investment may be amenable to change, given that those exercising ≥ 2 sessions/week had lower scores on the subscale appearance investment than those exercising ≤ 1 exercise session/week. The difference between was statistically significant at 12 months, and borderline significant at three months. Hence, this lends further credibility to the hypothesis that exercise has the potential to influence body image in a positive way.

Ginis et al. (2012) have summarized mechanisms that might explain the effects of exercise on body image evaluation, reporting that while objective changes in body composition played a relatively small role, self-perceived changes in body composition, and specifically changes in self-efficacy were likely to have a profound effect (Ginis et al., 2012). Due to few participants exercising regularly throughout all measurements, we had limited statistical power to estimate possible underlying mechanisms with respect to body image attitudes and exercise.

Up to recent years, body image attitudes in men is an area that has received little attention and are less spoken about (Bassett-Gunter et al., 2017; Campbell & Hausenblas, 2009; Sklar, 2017). The inclusion of both genders in the present study (with a low drop-out rate and non-response bias), add to the literature, and allows for a better understanding of body image evaluation in men starting a gym membership (Bassett-Gunter et al., 2017; Campbell & Hausenblas, 2009). Among our participants, nearly 50% had a BMI ≥ 25 . There is evidence that persons with obesity report lower body image (Schwartz & Brownell, 2004; Weinberger et al., 2016). Within this study, our results showed that participants with a high BMI were less satisfied with their body image at membership start-up compared with healthy weight participants.

Strength and limitations

This is the first longitudinal study exploring body image attitudes in a group of new fitness club members, all considered untrained by inclusion. Hence, our prospective observational

design allowed us to study causality of exercise and body image evaluation. We had a high response-rate, and nearly 74% answered the questionnaire at all time-points. It is well known that the higher the response rate, the lower the risk of non-response bias (Sedgwick, 2014). In the present study, we also included a non-response analysis, and found no differences in demographic and socioeconomic variables, nor total body image evaluation at start-up between responders and non-responders, which further strengthen the external validity and confidence in the study results (Sedgwick, 2014). Further, subgroup analyses among those who reported regular use of the fitness club with those who did not, allowed us to investigate the influence of exercise adherence on body image attitudes.

Another strength of the present study is the multidimensional measure of body image, including the dimension appearance investment. The MBSRQ-AS used in the present study is a well-validated instrument, with good validity and reliability among both genders and different cultural groups (Cash, 2000; Giovannelli et al., 2008; Jarry et al., 2019; Laus et al., 2019; Roncero et al., 2015; Vossbeck-Elsebusch et al., 2014). Also, the use of an electronic questionnaire gathered responses quickly and eliminated the costs associated with printing and distributing paper-based questionnaires. Finally, body image evaluation in men are an area that has received little attention, and a another aspect of the present study was that our participants included an age diverse group of both genders. Still, there is need for some methodological considerations. Since, body image attitudes depends on the individuals own perception of their physical appearance, self-report may be an appropriate measurement method. Different key terms in the questionnaire, such as body image, appearance, and exercise can have different meaning for the participants, including how they interpret the wording of questions. As such, we recommend future studies in this area to add information about gym statistics (such as membership card swipes). Also, as body image covers multidimensional aspects, including how individuals feel, think, perceive, evaluate, invest and act regarding our physical attributes or certain body parts (Hosseini & Padhy, 2020), our quantitative design may not be robust enough to capture body image attitudes. There is therefore a need for future qualitative studies and high quality randomized controlled trials, investigating this in more depth, allowing for a further understanding on how exercise may alter body image attitudes.

Based on a former study among Norwegian adults (Loland, 1998) and that the research group wanted to detect small changes (such as going from 3.00 to 3.50 on the Body image total score), we assumed that a 10% change in body image evaluation was a relevant change for our participants. However, measures of MBSRQ-AS across four time points revealed smaller changes

in the subscales. We observed a positive change in BASS (6.6% to 9.9%) and appearance satisfaction (3.1% to 4.1%) from start-up to three, six and 12 months. In the three other subscales (appearance investment, weight-related attitude, self-classified weight), decreases from 0.7% to 4.7% were revealed. Also, only minor differences were found for body image total score (0.4% to 1.4%). Therefore, our study had insufficient sample size to detect smaller changes in body image attitudes. In addition, we pre-defined regular exercise as a minimum of two sessions/week, which do not reflect if the participants met the current activity recommendations for adults regarding intensity, duration and mode of activity (endurance and resistance exercise). Yet, very few (n=31, 16.8%) reported exercise twice weekly at all follow-ups, and this limit our statistical power regarding the sub-group analyses. It should be noted that data were obtained from one fitness club chain, with middle to high monthly costs. Enrollment of other clubs (such as low-cost gyms and CrossFit centers) might have given other results.

Conclusions

We provide an update to the current literature, focusing on body image attitudes and exercise in an age diverse group of untrained, new fitness club members, with an equitable ratio of men and women. Throughout the initial year, we found improved body area evaluation and a more positive rating of appearance satisfaction. Adhering to regular exercise was associated with a higher body image total score, appearance and body area satisfaction. As exercise and body image evaluation may be influenced by other variables such as psychological and social aspects, we need additional research examining these moderators in a fitness club setting with a larger sample size.

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Table 1

General Characteristics at Onset of Fitness Club Membership, Given for All Participants and Divided into Two BMI (kg/m²) Groups (BMI \geq 25 and BMI<25).

Variable	All (n=250)	BMI\geq25 (n = 121)	BMI<25 (n = 129)	p-value
Mean (SD*)				
BMI**	25.6 (4.4)	29.0 (3.9)	22.5 (1.7)	<0.001
Age in years	36.4 (11.3)	39.2 (11.2)	33.8 (10.7)	<0.001
n (%)				
Gender				0.002
- Men	125 (50.0)	73 (60.3)	52 (40.3)	
- Women	125 (50.0)	48 (39.7)	77 (59.7)	
Daily smoker***	19 (7.6)	7 (5.8)	12 (9.3)	0.294
Cohabitation/married***	153 (61.2)	78 (64.5)	75 (58.1)	0.305
Children***	80 (32.0)	43 (35.5)	37 (28.7)	0.246
University/college education \geq 4 years	102 (40.8)	44 (36.4)	58 (45.0)	0.167
Occupation				
- 100%	159 (63.6)	79 (65.3)	80 (62.0)	0.591
- Sick leave	30 (12.0)	11 (9.1)	19 (14.7)	0.170
High household income (>87500 USD)	92 (36.8)	48 (39.7)	44 (34.1)	0.362

*SD, Standard Deviation

**BMI; Body Mass Index

*** Answers to yes–no questions

Table 2

MBSRQ Subscales and Participants Body Image Evaluation across Four Time-points: at Onset (n=250), Three (n=224), Six (n=213) and 12 (n=187) Months of Fitness Club Membership, Adjusted for Gender and BMI.

Outcomes [mean (95%CI)*]	Onset (men, n=125 women, n=125)	Three months (men, n=108 women, n=116)	Six months (men, n=106 women, n=107)	12 months (men, n=96 women, n=91)
<u>Body image total score</u>	2.87 (2.83 – 2.91)	2.89 (2.84 – 2.94)	2.91 (2.87 – 2.96)**	2.88 (2.83 – 2.93)
- Appearance satisfaction	2.93 (2.83 – 3.03)	3.02 (2.91 – 3.13)**	3.05 (2.94 – 3.15)**	3.03 (2.93 – 3.13)**
- Appearance investment	2.69 (2.63 – 2.74)	2.62 (2.57 – 2.67)**	2.67 (2.61 – 2.72)	2.64 (2.59 – 2.70)
- Weight-related attitude	3.48 (3.37 – 3.60)	3.48 (3.37 – 3.60)	3.43 (3.31 – 3.55)	3.42 (3.29 – 3.55)
- Self-classified weight	2.53 (2.46 – 2.59)	2.43 (2.37 – 2.49)	2.46 (2.39 – 2.53)	2.41 (2.36 – 2.47)
- Body Areas Satisfaction Scale (BASS)	2.74 (2.66 – 2.83)	2.92 (2.82 – 3.02)**	2.96 (2.86 – 3.06)**	3.01 (2.89 – 3.13)**

* 95% Confidence interval (CI)

**Indicates significant differences when compared with data at onset

Table 3

Comparison of Adherence to Regular Exercise (≥ 2 sessions/week) and Body Image Evaluation at Three, Six and 12 Months of Fitness Club Membership.

Outcomes	Regular exercise		p-value
	Yes	No	
Three months (Mean (SD))	Yes (n=116)	No (n=108)	
<u>Body image total score (three months)</u>	2.94 (0.4)	2.83 (0.4)	0.027
- Appearance satisfaction	3.16 (0.9)	2.87 (0.9)	0.020
- Appearance investment	2.58 (0.4)	2.67 (0.4)	0.070
- Weight-related attitude	3.58 (0.9)	3.37 (1.0)	0.101
- Self-classified weight	2.36 (0.6)	2.52 (0.7)	0.049
- Body Areas Satisfaction Scale (BASS)	3.06 (0.8)	2.75 (0.9)	0.008
Six months (Mean (SD))	Yes (n=80)	No (n=133)	p-value
<u>Body image total score (six months)</u>	2.91 (0.4)	2.93 (0.4)	0.812
- Appearance satisfaction	3.14 (0.9)	3.03 (0.8)	0.357
- Appearance investment	2.61 (0.4)	2.70 (0.4)	0.100
- Weight-related attitude	3.39 (1.0)	3.49 (1.0)	0.507
- Self-classified weight	2.44 (0.6)	2.48 (0.7)	0.590
- Body Areas Satisfaction Scale (BASS)	2.97 (0.9)	2.95 (0.8)	0.879
12 months (Mean (SD))	Yes (n=70)	No (n=117)	p-value
<u>Body image total score (12 months)</u>	2.97 (0.4)	2.85 (0.4)	0.028
- Appearance satisfaction	3.26 (0.8)	2.92 (0.8)	0.004

- Appearance investment	2.54 (0.4)	2.71 (0.4)	0.005
- Weight-related attitude	3.60 (1.0)	3.27 (1.1)	0.042
- Self-classified weight	2.39 (0.6)	2.46 (0.6)	0.401
- Body Areas Satisfaction Scale (BASS)	3.15 (0.7)	2.94 (0.9)	0.089
Exercise at all follow-ups (Mean (SD))	Yes (n=31)	No (n=153)	p-value
<u>Body image total score (12 months)</u>	3.02 (0.3)	2.86 (0.4)	0.018
- Appearance satisfaction	3.38 (0.7)	2.98 (0.8)	0.009
- Appearance investment	2.51 (0.4)	2.67 (0.4)	0.061
- Weight-related attitude	3.70 (1.1)	3.32 (1.1)	0.085
- Self-classified weight	2.42 (0.6)	2.44 (0.6)	0.832
- Body Areas Satisfaction Scale (BASS)	3.24 (0.9)	2.96 (0.9)	0.103

Table 4

MBSRQ Subscales and Participants Body Image Evaluation at Start-up of Fitness Club Membership, Divided into Gender and Two BMI (kg/m²) Groups (BMI \geq 25 and BMI<25).

Outcomes	All (n=232)	Men (n=118)	Women (n=114)	p-value	BMI\geq25 (n=113)	BMI<25 (n=119)	p-value
Mean (SD*)							
<u>Body image total score</u>	2.88 (0.4)	2.99 (0.4)	2.76 (0.3)	<0.001	2.83 (0.3)	2.91 (0.4)	0.065
- Appearance satisfaction	2.93 (0.9)	3.00 (0.9)	2.86 (0.9)	0.227	2.67 (0.9)	3.19 (0.8)	<0.001
- Appearance investment	2.68 (0.4)	2.73 (0.5)	2.64 (0.4)	0.123	2.73 (0.5)	2.65 (0.4)	0.179
- Weight-related attitude	3.49 (1.0)	3.85 (0.9)	3.13 (1.1)	<0.001	3.38 (0.9)	3.59 (1.1)	0.102
- Self-classified weight	2.53 (0.7)	2.50 (0.6)	2.55 (0.7)	0.566	2.89 (0.6)	2.19 (0.5)	<0.001
- Body Areas Satisfaction Scale (BASS)	2.75 (0.8)	2.88 (0.7)	2.62 (0.8)	0.007	2.51 (0.8)	2.98 (0.7)	<0.001
Missing*	18 (7.2)						

*SD, Standard Deviation

**Participants that did not answer to the all the statements, comprising four sets of subscales and 21 queries (appearance satisfaction, appearance investment, weight related attitude, self-classified weight), plus the Body Areas Satisfaction Scale (BASS), were counted as missing data in the calculation of body image total score