

Doctoral thesis

Doctoral theses at NTNU, 2022:249

Liv Riseth

# Long-term fitness center use

**NTNU**  
Norwegian University of Science and Technology  
Thesis for the Degree of  
Philosophiae Doctor  
Faculty of Medicine and Health Sciences  
Department of Public Health and Nursing



Norwegian University of  
Science and Technology



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Trondheim, September 2022

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## Sammendrag

En stor andel av den voksne norske befolkningen er medlem av et treningssenter. Treningssentre er dermed en viktig arena for fysisk aktivitet for mange mennesker. Mange medlemmer bruker likevel treningssenteret lite og uregelmessig og slutter etter kort tid. Selv om helsefordelene med fysisk aktivitet først oppnås ved regelmessig og kontinuerlig fysisk aktivitet, har eksisterende forskning hovedsakelig fokusert på bruk av treningssenter over en kortere tidsperiode. Den overordnede hensikten med denne avhandlingen var derfor å undersøke bruk av treningssenter over tid. Det ble gjennomført tre studier med følgende mål:

- I. Undersøke om tidlig støtte via telefon og e-post til nye medlemmer på treningssenter hadde effekt på antall bookinger hos treningsveileder, antall besøk og medlemskapsvarighet over fire år.
- II. Utforske hva langtidsmedlemmer ( $\geq$ to år) sier de ønsker å oppnå med medlemskapet og faktorer som påvirker dem til å bruke treningssenteret.
- III. Undersøke om langtidsmedlemmer ( $\geq$ to år) sin bruk av treningssenter de foregående 18 måneder er assosiert med senere selvrapportert måloppnåelse.

Studiene ble utført blant medlemmer ved 3T-Treningssenter (3T) i Trondheim, Norge, med bruk av både kvalitative og kvantitative metoder. Den første studien var en randomisert kontrollert studie blant 356 nye medlemmer. Den andre studien var en kvalitativ studie med semi-strukturerte individuelle intervju med 21 langtidsmedlemmer. Den tredje studien var en longitudinell register- og spørreskjemabasert studie blant 2851 langtidsmedlemmer.

Studie I viste at tidlig støtte påvirket bookinger til treningsveiledere, men ikke antall dager med besøk eller medlemstid i løpet av fire år. Det ble også observert at en betydelig andel hadde få besøk, og omtrent 60% og 80% hadde avsluttet medlemskapet etter henholdsvis to og fire år. Alder over 40 år og to dager ( $\geq$ ) med besøk hver måned

de første seks månedene ble prospektivt assosiert med lengre medlemstid. I studie II sa medlemmene at helse og utseende var hovedårsakene til langvarige bruk av treningssenteret. Selv om bruk av treningssenteret ble oppfattet som positivt, var det utfordrende for noen medlemmer å bruke senteret så mye de ville. Studie III fant at medlemmer som hadde flere dager med besøk og gruppetimebookinger, samt de som besøkte senteret regelmessig i løpet av 18 måneder, rapporterte høyere påfølgende måloppnåelse. Antall bookinger hos en trener var ikke konsekvent assosiert med måloppnåelse.

Basert på funnene i denne avhandlingen og tidligere forskning, kan det konkluderes med at det er behov for nye tilnærminger for å oppmuntre nye medlemmer til å bruke treningssenteret og for forskning på effekten av disse intervensjonene. Videre synes det å være verdt innsatsen å øke andelen langsiktige medlemmer som opplever høy måloppnåelse ved å støtte dem til økt bruk av treningssenteret. Slik innsats kan omfatte det å hjelpe medlemmene med å overvinne barrierer som variasjoner i aktiviteter, forplikte seg og det å få støtte fra ansatte.

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Trondheim, October 2021  
Liv Riseth





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## Summary

A large proportion of the adult population are fitness center members. Fitness centers are thus an arena for physical activity for many people. On the other hand, many members have only a few visits and quit shortly after enrollment. Although regular and continuous physical activity is necessary to realize the health benefits of physical activity, existing research has mainly focused on fitness center use over a shorter period. Therefore, the main aim of this thesis was to investigate long-term fitness center use. Three studies were conducted with the following aims:

- I. Investigate if initial support given to new members via telephone and e-mail—compared to self-directed use—had an effect on fitness trainer bookings, days with fitness center visits, and a membership duration of four years.
- II. Explore what long-term members (> two years) aim to achieve with their membership and identify important factors influencing them to use the fitness center.
- III. Investigate if long-term fitness center members' fitness center use over the previous 18 months was associated with subsequent self-reported goal achievement.

The studies were conducted among members at the 3T-Fitness center (3T) in Trondheim, Norway, using qualitative and quantitative methods. The first study was a randomized controlled trial among 356 new members. The second study was a qualitative study using semi-structured individual interviews with 21 long-term members. The third study was a longitudinal registry- and survey-based study of 2851 long-term members.

Study I showed that the initial support influenced fitness trainer bookings but not the number of days with a visit or membership duration during four years. It was also observed that a sizable proportion paid the center few visits and approximately 60% and

80% had terminated their membership after two and four years, respectively. Being older than 40 years and going to the center two or more days each month within the first six months were prospectively associated with longer membership duration. In Study II, the members said that health and appearance were the main reasons for their long-term use of the fitness center. Although using the fitness center was positively perceived, some members found it challenging to visit the center as much as they wanted. Study III found that members who had a greater number of days with a visit and group activity bookings, along with those who visited regularly during the previous 18 months, reported higher subsequent goal achievement. The number of bookings with a fitness trainer was not consistently associated with goal achievement.

Based on the findings in this thesis and previous research, it can be concluded that a need exists both for fresh approaches to encourage new members to use the fitness center and for research on the effect of these interventions. Furthermore, to increase the proportion of long-term members that experience high goal achievement, supporting them to increase both their frequency and regularity of use seems to be worthwhile efforts. Such efforts could include helping them overcoming barriers like variations in activities, making commitments, and getting support from the staff.

## Abbreviations

3T	3T-Treningscenter/Fitness center
BRP	The BRP Systems AB
CI	Confidence interval
HR	Hazard ratio
HAPA	Health Action Process Approach
NTNU	Norwegian University of Science and Technology
PAM	Physical activity Maintenance Theory
RCT	Randomized controlled trial
REK Central	The Regional Committee for Medical and Health Research Ethics in Central Norway
SDT	Self-Determination Theory
SCM	Sport Commitment Model
SD	Standard deviation
STC	Systematic text condensation
Virke	The Federation of Norwegian Enterprise
VAS	Visual analogue scale
WHO	World Health Organization

## List of included papers

The thesis is based on the following three papers:

### Paper I

Liv Riseth, Tom Ivar Lund Nilsen, Øyvind Mittet, Aslak Steinsbekk

*The effect of initial support on fitness center use in new fitness center members. A randomized controlled trial.* Preventive medicine reports (2021). 24:101605 doi: 10.1016/j.pmedr.2021.101605

### Paper II

Liv Riseth, Torunn Hatlen Nøst, Tom Ivar Lund Nilsen, Aslak Steinsbekk

*Long-term members' use of fitness centers: a qualitative study.* BMC Sports Science, Medicine and Rehabilitation (2019). 11: 2. doi: 10.1186/s13102-019-0114-z

### Paper III

Liv Riseth, Tom Ivar Lund Nilsen, Torunn Hatlen Nøst, Aslak Steinsbekk

*Fitness center use and subsequent achievement of exercise goals. A prospective study on long-term fitness center members.* BMC Sports Science, Medicine and Rehabilitation (2022). 14: 9. doi: 10.1186/s13102-022-00400-w

## 1. Background

Given the well-documented positive health effects of long-term physical activity (Ekelund et al., 2016; Lee et al., 2012), increasing the level of physical activity in populations worldwide has become a national and global priority (World Health Organization, 2016, 2018), backed by recommendations for physical activity in numerous countries (Kahlmeier et al., 2015; The Norwegian Directorate of Health, 2021; World Health Organization, 2010). However, many people do not meet these recommendations (Guthold et al., 2018, 2020; Hallal et al., 2012; Kohl et al., 2012; van Sluijs et al., 2008, 2021); thus, increasing the proportion of people who do meet physical activity recommendations can significantly improve public health (Hupin et al., 2015; Wen et al., 2011).

One way to be physical activity, is to be a member of a fitness center (European Commission, 2018) which is the focus population of this thesis.

In the forthcoming sections of this chapter, the background for the thesis is presented. The chapter starts with a short note on published research before a description of the fitness center as an arena for physical activity, as well as its role in and significance for public health. After that, it discusses member characteristics, what members aim to achieve, and how the fitness center is used. Finally, it outlines new member support and long-term fitness center use.

### 1.1 Published research on fitness centers

Fitness center as a separate term in PubMed ([www.pubmed.gov](http://www.pubmed.gov)) ("Fitness Centers"[MeSH Terms]) yielded approximately 600 results when used as a search term in March 2022. By adding ("sports center\*"[Title/Abstract] OR "sports club\*"[Title/Abstract] OR "fitness club\*"[Title/Abstract] OR "fitness trainer\*"[Title/Abstract] OR "personal trainer\*"[Title/Abstract]), the number of hits increased to about 1600. Other specific searches developed for PubMed is given in Appendix. These search concepts were also used as the basis for searches in other data bases such as Scopus, PsycINFO, Web of Science, Sports Discuss, and Google Scholar.

Furthermore, relevant grey literature from governments, World Health Organization (WHO), and the fitness industry was also searched for and included when appropriate and when there was a lack of scientific literature.

The searches revealed that most publications on fitness centers focus on new members or special groups of users, including ones who need rehabilitation or have specific diseases. Thus, even though fitness centers offer a frequently used environment for physical activity, as elaborated below, the scientific literature on the topic of this thesis—that is, long-term fitness center use—remains sparse.

## 1.2 Fitness centers

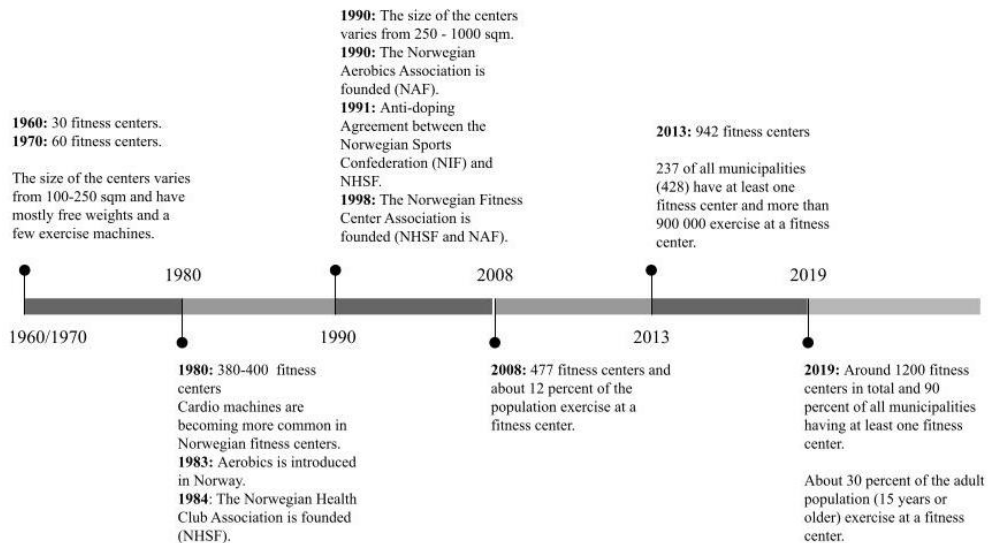
Fitness facilities that exist today are diverse and go by many names, including *gyms*, *health clubs*, *sport centers*, *fitness centers*, and *wellness centers*, and they may cater to exercise, health, and/or wellness. Common to all of these fitness facilities, and in contrast to sports, is the absence of competition, such that both average people and professional athletes of all ages can exercise side by side (Scheerder et al., 2020). Fitness centers are also primarily commercial and professional, and they offer various workouts in group classes, in primary workout areas, and via recreational activities (Scheerder et al., 2020).

Although fitness centers have existed since the 1940s, their number has risen dramatically since 1980, and they have changed from "old-school bodybuilding gyms to trendy health and well-being centers that offer a wide range of physical activities" (Scheerder et al., 2020). Today's fitness industry ranks among the largest providers of opportunities for physical activity (European Commission, 2018) and includes various facilities such as low-cost gyms, fitness clubs that are accessible 24/7, and women-only fitness centers (Scheerder et al., 2020).

Virke, the Federation of Norwegian Enterprise, also reported that the fitness industry in Norway has demonstrated tremendous development, as shown in Figure 1 (Open et al., 2019; Open et al., 2018; Virke Trening, 2016). In the 1960s, Norway only had about 30



small fitness centers, mostly offering free weights and a few exercise machines (Virke Trening, 2016); today, it has approximately 1,200 fitness centers. Most Norwegians have access to a fitness center, and more than 90% of all residents live in a municipality with at least one fitness center (Open et al., 2019; Open et al., 2018).



**Figure 1.** Timeline of the development of fitness centers in Norway (Open et al., 2019; Open et al., 2018; Virke Trening, 2016)

Virke Trening (2013) published a report that divided fitness centers in Norway into full-assortment centers, niche centers, and compact/low-price centers. Full-assortment fitness centers provide a variety of workout options in group classes and recreational activities. They are staffed during opening hours, and some offer free help and guidance to members through the staff. Access to personal trainers at an additional fee is also common in full-assortment centers, and some even offer saunas, childcare facilities, member lounges, and cafés. In contrast, niche fitness centers offer specific activities (e.g., Pilates, yoga, or CrossFit), cater to specific groups (such as women), and/or provide specific services only (e.g., personal training). Lastly, compact and low-price

fitness centers focus on individual exercise without group activities or personal trainers, although such trainers can be hired at an additional fee; such centers have a high degree of self-service and few employees (Virke Trening, 2013). At the time of Virke Trening's report in 2013, full-assortment fitness centers constituted 74% of all fitness centers, niche centers constituted 7%, and compact and low-price centers constituted 19%.

Norwegian fitness centers are often commercial and require membership contracts and a monthly fee, varying from approximately 249 NOK to 929 NOK (Bratland-Sanda et al., 2020). Full-assortment centers, however, require a higher monthly payment than niche, compact, and low-price centers (Virke Trening, 2013).

#### 1.2.1 Fitness centers and public health

A report by the European Commission (2018) on sport and physical activity estimated that 11% of Europe's population attend private fitness centers, and 31% are physically active at work, school, clubs, and/or sports centers. At the time, Sweden had the highest proportion of residents (41%) reporting attendance at a health or fitness center, while Lithuania (3%), France (5%), and Latvia and Slovenia (both 6%) had the lowest proportions (European Commission, 2018). According to a Norwegian report from 2019, approximately 30% of Norway's adult population are members of a fitness center (Open et al., 2019).

Because a sizable proportion of the global population are members of fitness centers (European Commission, 2018), such centers play a role in public health by serving as arenas for physical activity. This trend was acknowledged in the Global Action Plan for Physical Activity by the WHO (2018), which explicitly mentioned fitness and sports facilities in three of the actions, for providing opportunities for more physical activity programs and health promotion (Action 1.4), strengthening the training of professionals within and outside the health sector (Action 2.5), and assuring equitable access to safe places and spaces for physical activity (Action 3.3) (World Health Organization, 2018). In a white paper in 2015, the Norwegian Ministry of Health and Care Services highlighted fitness centers as being important to local public health, as they help

increase the level of physical activity in the population by providing centers that are conveniently located and easily accessible (The Ministry of Health and Care Services (HOD), 2015). Since then, the magnitude of activities and the high degree of competence in physical activity have also been identified as essential contributions to general public health in the Norwegian government's action plan for physical activity (The Ministry of Health and Care Services (HOD), 2020). In the future, the plan suggested increased collaboration around physical activity between fitness centers, municipal health and care services, and other providers (The Ministry of Health and Care Services (HOD), 2020).

#### 1.2.2 Who uses fitness centers?

The European Commission's (2018) report showed that the majority of members of fitness centers are highly educated and younger than 25 years old, with countries differing in terms of whether more are men or women. In addition to already physically active individuals, a relatively large group of new members of fitness centers have been physically inactive or have had irregular levels of physical activity (Kirkegaard, 2009). Fitness center members have also been found to have more favorable health than non-members (Ready et al., 2005; Schroeder et al., 2017).

According to a Norwegian report by Breivik and Rafoss (2017), more women than men had exercised in a fitness center in Norway in 2015. As in other European countries, a high proportion of members in Norway had high levels of education and income. In addition, the proportion of the population using a fitness center seemed to decrease with increasing age, with 68% of the youngest age group (15–24 years) being members compared to 28% of the oldest age group (60 years or more) in 2015 (Breivik & Rafoss, 2017).



Picture from the 1980s at 3T (Photo: 3T)



Picture from the 2020s at 3T (Photo: 3T)

### 1.2.3 Motives for being a member of a fitness center

New members of fitness centers have said that they aim to make regular use of the center (Garon et al., 2015), achieve health-related benefits, improve their well-being (Macintosh & Law, 2015), and enhance their appearance (Mullen & Whaley, 2011).

A study conducted in Norway found that new members' motives for enrolling at a fitness center included increased physical fitness, a healthy body, feeling refreshed after exercising, feeling healthier, and avoiding poor health, as shown in Table 1 (Gjestvang et al., 2019). Another study in Norway found fitness to be the most essential motive for exercising at a fitness center, followed by enjoyment, competence, vitality, and appearance (Larsen et al., 2021). The social motive was rated the lowest for both genders; its importance first decreased with age but then increased beginning at 41 years (Larsen et al., 2021). However, there is a lack of knowledge on what long-term members aim to achieve with their fitness center memberships, because research has been limited to new members.

**Table 1.** Primary motives for fitness club membership and exercise among new members of fitness centers<sup>a</sup>

	n (%) <sup>b</sup>		n (%) <sup>b</sup>
To increase my physical fitness	116 (92.8)	Because it makes me feel good	67 (53.6)
To have a healthy body	83 (66.4)	To increase my endurance	63 (50.4)
Because after exercising I feel refreshed	81 (64.8)	To stay slim	59 (47.2)
To feel healthier	80 (64.0)	To lose weight	57 (45.6)
To avoid poor health	74 (59.2)	To develop my muscles	54 (43.2)
To look more attractive	73 (58.4)	To improve my appearance	52 (41.6)
To prevent health problems	69 (55.2)		

<sup>a</sup> Source: Gjestvang et al. (2019)

<sup>b</sup> Data are presented as n (%)

#### 1.2.4 Members' use of fitness centers

Although members of fitness centers intend to use the centers regularly (Garon et al., 2015), many only seldom use them (Middelkamp et al., 2016). Furthermore, a large proportion of members quit after a short period (Emeterio et al., 2019; Emeterio et al., 2020), thereby resulting in a high turnover rate among fitness center members in general (Emeterio et al., 2019; Emeterio et al., 2020; Middelkamp et al., 2016; Sperandei et al., 2019).

According to a European study involving former members of the largest fitness center chains in Europe (including both low-price and full-assortment centers), more than 50% of the sample did not visit the fitness center during their first month of membership, and 19.5% never attended the center during a 24-month period (Middelkamp et al., 2016). Visits in the first month were the highest at full-assortment centers, with 5.28 visits (SD 5.4) compared to 3.23 visits (SD 4.1) at low-price centers. The average number of visits among members of both types of centers was 3.63 visits in the first month compared to 0.29 visits in the final (i.e., 24th) month, for an average of 1.1 visits each month for the entire 24-month period. In addition, most members stopped using the fitness center multiple times during the 24-month period, and only 2.3% used their center regularly (i.e., at least four visits per month) without relapsing (Middelkamp et al., 2016).

A Norwegian study of new but inactive members of fitness centers revealed no demographic or socioeconomic differences between members with high or low exercise frequency and members who had not visited their fitness centers during the 12-month study (Gjestvang et al., 2020). After 12 months of membership, 80% of the sample continued to be members; however, being a member for 12 months was not associated with increased levels of physical activity in general, nor with meeting the recommended weekly minimum of 150 minutes of moderate to vigorous physical activity (Gjestvang et al., 2020).

### 1.3 Supporting new members to become long term users

As described above, despite new members' intention to actively use the fitness center, their number of visits is low: some members never start using the centers, and many terminate their memberships. Because more frequent use of a fitness center in the initial phase of membership is associated with more visits later on (Middelkamp et al., 2016; Kaushal & Rhodes, 2015; Rand et al., 2020) and with longer-lasting memberships (Emeterio et al., 2019; Emeterio et al., 2020), the question of how to support members in being more active users in this phase needs to be answered.

The services offered in a fitness facility can be numerous (Freitas & Silva Lacerda, 2019), and fitness centers typically offer several services that can impact members' use of their facilities, including activities, equipment, and staff (Ferrand et al., 2010). It is unsurprising that, faced with such variety, new members have reported several barriers to using fitness centers, including unfamiliarity with fitness center etiquette and a lack of basic knowledge about practical skills for exercising at a fitness center (Nikolajsen et al., 2021).

Behavioral issues are also at play, including the challenges of transitioning to a more physically active lifestyle. There are a range of theories on what goes on during this process (Rhodes et al., 2019). The health action approach (HAPA), as laid out by Schwarzer (2008), differentiates between motivational and volitional phases for behavior change, where the motivational phase, which concerns the startup phase, encompasses three factors: outcome expectancies (beliefs about the behavior will result in desired outcomes), action self-efficacy (belief in the ability to perform the behavior), and risk perceptions (beliefs regarding personal risk) (Schwarzer, 2008; Rhodes et al., 2019; Zhang et al., 2019). Furthermore, and according to the self-determination theory (SDT) internal motivation is a crucial point and posits among else needs for competence (feeling of mastery) to develop internal motivation for physical activity adoption and maintenance (Teixeira et al., 2012; Ryan & Deci, 2000, 2009, 2017). Also social support are by the sport commitment model (SCM) modeled to affect sports participation in the long term (Scanlan et al., 2009). Increased feeling of mastery, self-

efficacy and social support have also been found to be essential for regular use of fitness centers (Jekauc et al., 2015).

One concrete way to help new members at fitness centers increase their feeling of mastery and self-efficacy and provide some social support, is to increase their initial contact with staff. Member–staff interactions have been identified as essential to members' satisfaction at fitness centers, which in turn is associated with members' retention (Ferrand et al., 2010; Gonçalves & Diniz, 2015; León-Quismondo et al., 2020). Therefore, strengthening member–staff relations at fitness centers (Ferrand et al., 2010) and increasing the number of contact points between staff and members (Hurley, 2004) can potentially be helpful to increase long term use.

However, it remains an open question as to how member–staff contact at fitness centers should be facilitated in the initial phase of membership, as does the question of what effect such contact has. Digital technologies (Lewis et al., 2017; Lupton, 2015) and telephone and email are cost-effective approaches to facilitating contact (Thomas & Bond, 2014), and they are also easy to implement with existing resources (Garrett et al., 2011) and can be scaled up to have a broader reach than in-person interaction (Foster et al., 2013; Goode et al., 2012). Among these options, talking on the telephone offers an advantage over digital technologies because it allows for the possibility for feedback and greater individualization (Foster et al., 2013); combined with other modalities, such as email and print, telephone conversations achieve effects similar to those of in-person interaction (Goode et al., 2012). Telephone and email seem to be promising approaches in other areas (Fischer et al., 2019; Goode et al., 2015; Goode et al., 2012; Vandelanotte et al., 2007). However, no studies using those technologies to support new fitness center members early in their memberships were identified in rather extensive searches performed in various databases (see the Appendix, “Search strategies 3 and 4”).

#### 1.4 Maintaining long-term use of fitness centers

The long-term use of fitness centers entails maintaining physical activity over time.

However, physical activity maintenance (Kahlert, 2015; Seymour et al., 2010) and the long-term use of fitness centers are prone to relapse and, thus, the need exists to



reactivate the members (Middelkamp et al., 2016). Although research have underscored that maintaining physical activity requires approaches different from ones needed to initiate physical activity (Stralen et al., 2009; Schwarzer, 2001), studies investigating factors influencing long-term fitness center use have been few and far between.

On the topic of maintaining physical activity, different theories and models to date have contributed relevant perspectives. For instance, the health action approach (HAPA) includes the processes of both pre-intentional motivation and post-intentional volition in relation to self-efficacy and planning (e.g., action and coping) as central factors of maintaining a behavior (Zhang et al., 2019). For another, as its name indicates, Nigg et al.'s. (2008) physical activity maintenance model focuses explicitly on maintaining a physically active lifestyle. The model highlights three psychosocial variables—goal setting (e.g., divided into satisfaction, attainment, and commitment), motivation (e.g., divided into self-motivation and expectations), and self-efficacy (e.g., divided into barriers and relapses)—and two contextual variables—environment and life stress (e.g., as relapse triggers). According to the model, the environment of physical activity and/or life stress can facilitate or impede the maintenance of physical activity either directly or indirectly through psychosocial variables (Nigg et al., 2008).

As modeled by both Nigg et al. (2008) and also Locke and Latham in the goal setting theory (2002, 2013), and shown in literature reviews, satisfaction with personal goal realization seem to be associated with physical activity maintenance (Bauman et al., 2012; Stralen et al., 2009). Swann et al. (2020) found that low goal achievement reduces participation in physical activity. Exercise frequency was found to be associated with the achievement of personal exercise goals among members of fitness centers in Denmark, where regular exercisers reported a higher degree of goal achievement than irregular ones (Kirkegaard, 2009). Thus, goal achievement seems to be a potentially important variable in physical activity maintenance and long-term use of fitness centers.

However, when searching for relevant research on the topic the search-results mostly included studies on academic achievement and achievement goals, with a lack of studies on the likely bidirectional association between the level of physical activity and goal

achievement (see Appendix, Search strategy 5). As seen above, an experience of higher goal achievement can drive more exercise, and more exercise can drive a greater experience of goal achievement. Thus, studies that can start to disentangle this relationship are warranted.

### 1.5 Summary of knowledge gaps

As shown, although fitness centers are widely used for physical activity, research concerning long-term use of fitness centers has been rather limited.

To become long-term users of fitness centers, individuals first have to become members. Research has shown that the startup phase of membership is important in that members who initially demonstrate more intensive use continue to use the centers more frequently and over longer periods. However, studies on the effect of interventions aimed at new members are lacking, as are studies on how interventions in the startup phase affect long-term use.

The studies that have examined fitness center use over some time, usually within the first year after enrollment, have found that a sizable proportion of members terminate their memberships. Still, some stay on as long-term members and they might have had experiences that can be used to better understand long-term use. However, despite some qualitative and quantitative studies investigating why people remain members over time, no qualitative study has explored in depth what long-term members aim to achieve with their memberships or important factors driving their use of fitness centers in the long term.

Both theories and research indicate that achieving exercise goals is pivotal for maintaining physical activity over time. Thus, whether members of fitness centers experience goal achievement can be related to their long-term use. Even so, no studies have examined the prospective relationship between fitness center use and members' reported experiences of goal achievement.

## 2. Aim of the thesis

The overall aim of this thesis was to increase knowledge about long-term fitness center use. To do so, three studies with the following aims were conducted:

### Study I

To investigate if initial support given to new fitness center members via telephone and e-mail to use the fitness center facilities, compared to self-directed use, had an effect on booking with a fitness trainer free of extra charge, the number of visits to the center and membership duration during four years after enrollment.

### Study II

To explore what long-term members (> 2 years) wanted to achieve with their membership and to identify important factors that influenced them to use the fitness center as a means for physical activity.

### Study III

To investigate the prospective association between the use of fitness centers during 18 months and subsequent self-reported goal achievement among people who had been members at a fitness center for two years or more.



### 3. Methods

#### 3.1 Study design

Qualitative and quantitative research methods were used to answer the aims of this thesis.

Study I was a randomized controlled trial performed in a real-life setting, with both the participants and the providers blinded. New members were randomized to receive an intervention during the startup phase of their membership, and their use of the fitness center for the following 4 years was recorded as registry data.

Study II was a qualitative study involving individual semistructured interviews conducted face-to-face using an interview guide with four key questions. Long-term members were invited to be interviewed at home, at work, or at the fitness center.

Study III was a registry- and survey-based longitudinal study. Long-term members were invited to answer a questionnaire. To be included, they had to consent to having their membership data on their previous use of fitness centers be linked to the survey data.

#### 3.2 Setting

The research for this thesis was completed within the Research Council of Norway's Industrial Ph.D. program, which aims to support research in Norwegian companies of the same level of scientific merit as in general doctoral education. In the program, the doctoral work is funded half by a private company and half by the Research Council of Norway.

In the project, I was employed as a doctoral candidate by 3T-Fitness Center (3T). Therefore, the setting of all three studies presented in this thesis was the 3T-Fitness Centers in Trondheim, a city in Central Norway with approximately 205,000 inhabitants (190,000 at the time of data collection).

With its first fitness center established in 1985, 3T is today the largest fitness center chain in Central Norway, with 16 fitness centers and approximately 40,000 members. The number of centers rose from eight to twelve in Trondheim during the data collection period for the three studies. To become members, individuals have to sign a 1-year contract, which commits them to being members for 12 months before the contract can be terminated. The fitness center chain offers various opportunities for exercise, with a primary workout area consisting of free weights, weight machines, rowing machines, stationary exercise bikes, elliptical trainers, and treadmills. In addition, nearly all of the centers offer group classes, personal trainers, a sauna, and a member lounge with simple café services. Some centers also provide squash courts, childcare, physiotherapy, a swimming pool, and a wellness area.

### 3.3 Study population

All participants were recruited from 3T centers in Trondheim.

#### 3.3.1 Study I

The study population consisted of all individuals ( $\geq 16$  years) who during one week in September 2014 signed up for a 12-month ordinary membership contract with continuous monthly automatic membership renewal thereafter. Individuals who enrolled in the same week, but with other contracts were not included. Such contracts included employee contracts, contracts with shorter duration than 12 months and contracts without payment (some athletes or others who for various reasons received free membership for a period).

#### 3.3.2 Study II

To ensure that participants were limited to long-term members, that is, to avoid members who terminated their membership after the obligatory 1-year contract, only adult ( $\geq 18$  years) members who had been on an ordinary contract for  $\geq 2$ -year continuous at any of the eight 3T centers in Trondheim in 2015 were eligible. The study only included paying members and excluded employees and members with free membership contracts. To recruit participants, first a random sample of eligible members were identified from the membership registry and sent an invitation by e-mail.

Thereafter strategic selection was used to ensure a sample diverse in sex, age, frequency of visits, and types of services used. These members were identified in the member register by searching for younger members, and members with few visits or use of services such as personal trainer, physiotherapist, and / or nutrition supervisor. Employees at the fitness center was also asked if they knew about members with such characteristics.

### 3.3.3 Study III

The inclusion criteria for participants in Study III were the same as in Study II, but at the time of recruitment in 2018, 3T had expanded to 12 fitness centers in Trondheim. All eligible participants were invited to participate via an e-mail invitation with a reminder after four days.

Given how often 3T sends advertising emails to members, both regarding its fitness center chains and its online store, it is possible that invited participants did not differentiate the invitation to participate from other emails from 3T and thus disregarded it. It is also possible that some received the email as spam and therefore were unaware that they had received it unless they actively accessed their spam box. Because many of the invited participants may not have seen the invitation for various reasons, 3T registered how many of the participants opened and did not open the email. That measure allowed excluding invitees who had not opened the invitation.

### 3.3.4 Overview of all relevant members in the fitness center chain

To be able to compare participants in the studies to all members meeting the same eligibility criteria, data on these were collected. There were two main groups, new members and long-term members.

Regarding new members (Study I), 3T were asked in March 2022 if they could extract data from the member register for gender and age for all new members. Ideally, this should cover a longer period in 2014 as the recruitment in Study 1 took place in one week in September 2014. However, because 3T had changed their data system for the

membership register this was not possible. It was therefore decided to extract data on new members who enrolled throughout the month of September 2021.

For long term members (Study II and III which had the same eligibility criteria), due to the change of data system, data collected for and presented in the publication from Study II (Riseth et al., 2019), were used. This included gender, age, and number of days with visits for those who had been members continuously in the two-year period November 2014 to November 2016 (regardless of when they enrolled). Number of days of visits was registered over 18 months for Study III, i.e. six months shorter than the 24 months for the comparison group of all relevant members in the publication from Study II. For both groups, the number of visits was categorized into three groups (low, medium and high). However, the cut off used in the categorization differed somewhat. In study III the cut offs were set to have approximately 1/3 in each group, giving categories of 0-57 visits in low, 58-117 in medium and 118-543 in high. The cut offs for the comparison group were from 0-49 visits in low, 50-100 visits in medium and 100 or more visits in high. Due to the difference in length of registration and in categorization, it was expected a higher proportion in the low category for Study III.

### 3.4 The intervention in Study I

Developed by the head office of the fitness center chain 3T, the intervention in Study I consisted of two phone calls made 1–3 and 6–8 weeks after enrollment and one email sent 4 weeks after enrollment. Because the self-directed use of the fitness centers, along with possibilities for support upon request, is standard practice at 3T, the intervention's primary aim was to support members in using the fitness centers' facilities and services, including group activities and face-to-face support from fitness trainers.

Implementing the intervention involved several employees and multiple fitness centers. Fitness trainers made the phone calls to participants and used a template to guide the content, structure, and wording of the call. For each of the two scheduled calls, two attempts to reach the participants were made, and if they did not answer, then a voice message was left on their phone. The message informed the participants about the

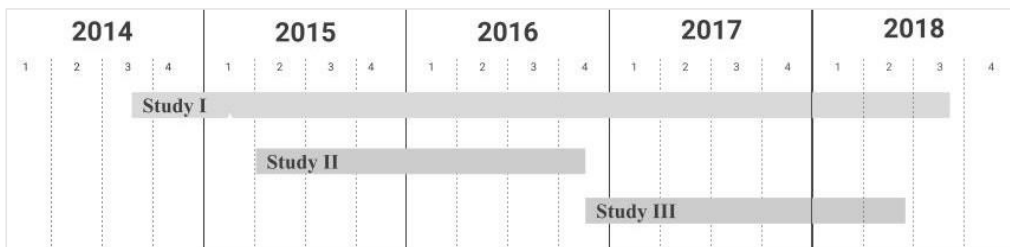


possibility of receiving guidance from fitness trainers and encouraged them to contact the fitness center if they had questions about using the center.

Four weeks after enrollment, the head office of the fitness center chain 3T sent an email to all participants with an email address in the membership register. Similar to the phone calls, the email contained information about the possibility of booking individual guidance with fitness trainers. Beyond that, the email informed participants about strength- and endurance programs and other popular activities at the fitness center, provided advice on reaching their physical activity goals, and gave them the opportunity to make direct contact with the fitness center, along with a link to frequently asked questions and motivational campaigns.

### 3.5 Data collection

Interviews, questionnaire-, and register data was used as data sources. Data generation for all three studies occurred between September 2014 and September 2018, as shown in Figure 2.



**Figure 2.** Timeline for data collection in Studies I–III

#### 3.5.1 Registry data in Studies I and III

3T maintains a membership registry, the BRP Systems AB (BRP), which includes data for all fitness centers in the chain. The system provides not only their demographic information but also timestamps for each visit and bookings for fitness trainers, group activities, and events.

Registry data used in Studies I and III were transferred from BRP to 3T in several steps to ensure privacy, and a de-identified data file with pseudonymized ID numbers was delivered to the first author. The variables used for Studies I and III are presented in Table 2.

**Table 2.** Variables from the membership register, BRP, used in Studies I and III

<b>Characteristic</b>	<b>Study I</b>	<b>Study III</b>
ID number <sup>a</sup>	X	X
Sex	X	X
Age	X	X
Days with visits <sup>b</sup>	X	X
Fitness trainer bookings <sup>b</sup>	X	X
Group activity bookings <sup>b</sup>		X
Membership terminations <sup>b</sup>	X	

<sup>a</sup> Pseudonymized ID numbers, with different ID numbers for Studies II and III

<sup>b</sup> Timestamps

### 3.5.2 Interviews in Study II

The interviews followed a semi-structured interview guide addressing four key questions and topics to be introduced if the participant did not speak spontaneously about them (Table 3). The interviews were conducted by me and lasted from 32 to 62 min (average 48 min).

**Table 3.** Key questions and topics addressed in the interviews

<b>Key questions</b>
1) Can you tell me about your experiences of being a member at the fitness center?
2) What contributes to your use of the fitness center?
3) What do you want to achieve with the membership?
4) Is there anything the fitness center can do to make it easier for you to achieve what you want with the membership?
<b>Topics to be introduced if the participant do not spontaneously talk about them</b>
• Can you describe your physical activity behavior?
• What affects your use of the fitness center (facilities, opening hours, activities available, social interactions, family, friends, and support and presence of staff)?
• Reasons why you achieve/do not achieve what you want with the membership?

### 3.5.3 Survey questions in Study III

The dependent variable was measured with a question using a visual analog scale (VAS): "On a scale from 0 to 100, to what degree do you experience reaching your exercise goals at the fitness center?" (0 = to a very little extent, 100 = to a very large extent). The outcome variable was negatively skewed with a median (median = 71) greater than the mean (M = 68). Therefore, the outcome variable was log-transformed before using a linear regression analyses to compare mean differences. The outcome variable was also dichotomized into "high" and "low", with 80% of participants in the high group (i.e., scoring 51–100 on the VAS) and the other 20% in the low group (i.e., scoring 0–50 on the VAS), for use in the logistic regression analyses to calculate odds ratio.

The survey also included questions that provided descriptive information of the study population, this was sex (male or female), age in years (<20, 20-29, 30-39, 40-49, 50-59, 60-69 or ≥70), highest completed level of education (compulsory, middle, and higher) and employment (full-time work, part-time work, student, or not working due to occupational rehabilitation, unemployment or being laid off, disability benefits, being retired or other).

### 3.6 Data analyses

This section details the data analyses conducted in the three studies, as outlined in Table 4.

**Table 4.** Overview of the primary types of analyses used in Studies I–III

Characteristic	Study I	Study II	Study III
Systematic text condensation		X	
Linear regression	X		X
Logistic regression	X		X
Kaplan–Meier	X		
Cox regression	X		

#### 3.6.1 Analyses in Study I

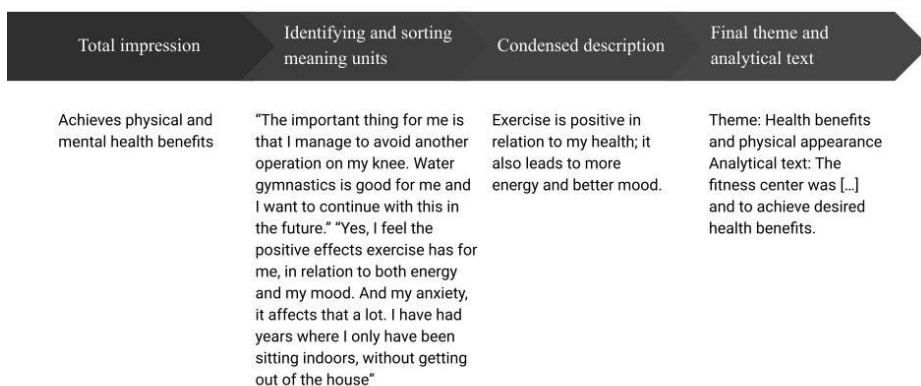
The statistical analyses in Study I were performed using Stata version 16 (StataCorp LLC, College Station, TX, USA) and conducted according to the intention to treat principle, with all participants randomized.

Mean differences in the number of days with visits between the groups were estimated using linear regression; odds ratios for having booked with a fitness trainer were estimated using logistic regression; and differences in membership duration were displayed as a Kaplan–Meier curve with the relative difference between the groups assessed as a hazard ratio (HR) using Cox regression. All models included adjustments for sex and age groups, and the precision of estimated effects was assessed using a 95% confidence interval (CI).

Additional analyses were performed to explore whether participants and characteristics of membership were associated with the duration of membership in the pooled sample, estimated as HRs with 95% CI using Cox regression. All models included adjustments, where age was adjusted for sex (woman, man), and fitness trainer and number of visits were adjusted for five age-groups and sex (woman, man).

### 3.6.2 Analyses in Study II

The interview data in Study II were transcribed and analyzed using systematic text condensation (STC) (Malterud, 2012), which is inspired by Giorgi's psychological phenomenological method. STC involves a stepwise analysis with a four-step process, as illustrated in Figure 3.



**Figure 3.** The four analytical steps followed in Study II (Malterud, 2012)

In the first step of STC, the first author and coauthors read the transcripts for an overall impression and overview of the data. Data were approached with an open mind and with the participants' stories in focus. The authors then identified preliminary themes from the total impression of the data.

In the second step, meaning units (i.e., text segments) relevant to the study's aim were identified by the first author, after which they were coded and sorted into code groups based on the preliminary themes. MindManager software (Mindjet) was used to organize and visualize the data. The step was an iterative process in which the codes were adjusted several times.

In the third step, each code group was divided into three subgroups, after which the contents of the subgroups were summarized into condensed descriptions that were kept close to the participants' own words.

Last, in the fourth step, the condensed descriptions were rephrased into analytical text and final themes. The analysis was validated by checking the findings against the transcripts.

### 3.6.3 Analyses in Study III

The statistical analyses in Study III were performed using Stata version 17 (StataCorp LLC, College Station, TX, USA).

The association between registry data on the long-term (i.e., 18 months) use of fitness centers and subsequent self-reported goal achievement was investigated using linear regression to estimate differences in geometric means as the ratio of two means, as well as using logistic regression to estimate odds ratios for reporting low goal achievement. All analyses were adjusted for sex (male, female), age group (<30, 30-39, 40-49, 50-59, 60-69 and  $\geq 70$  years), and higher education (i.e., yes or no). A 95% CI was used to assess the precision of all estimated effects.

### 3.7 Ethical considerations

The studies were conducted in compliance with the Declaration of Helsinki and submitted to the Regional Committee for Medical and Health Research Ethics in Central Norway (2014/1870 REK Central). REK Central assessed the study as not constituting health research and therefore not needing its approval. Study I did not need approval from the Norwegian Centre for Research Data (NSD), whereas Studies II and III were approved by the NSD (NSD 40604/3/SSA).

## 4. Results

This chapter presents the participants in the three studies and a summary of the primary results, all of which are described in detail in the three papers (Papers I–III).

### 4.1 Participants

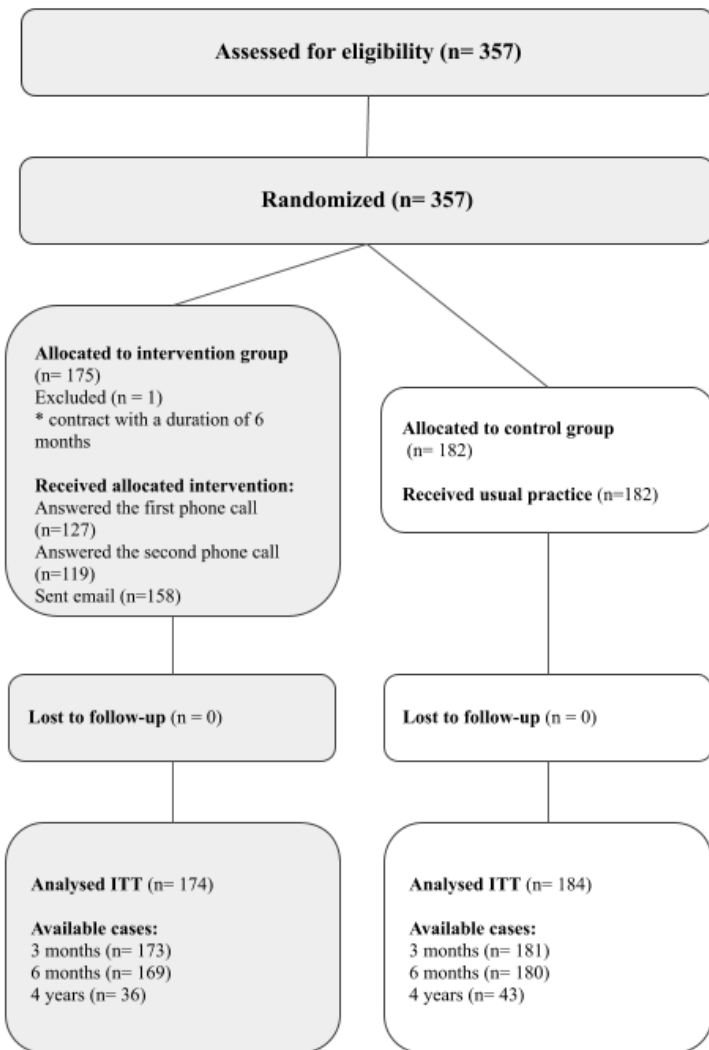
All participants were recruited among members of the 3T fitness center chain in the period 2014 to 2018 (Table 5)

**Table 5.** Year of recruitment, number of centers, membership numbers and number of eligible members and included participants for each study

Characteristics	Study I	Study II	Study III
Year of recruitment	2014	2015/2016	2018
Number of 3T centers in Trondheim <sup>a</sup>	8	9	12
Number of 3T centers in the chain <sup>b</sup>	11	12	16
Number of members at 3T (Trondheim) <sup>c</sup>	28181	30123	33570
Number of members at 3T (all centers in the chain) <sup>c</sup>	32742	34948	39493
Eligible members	356	<sup>d</sup>	15471
Included participants	356	21	2851

- a. All centers in the Trondheim September 1th 2014 (Study I), March 1th 2015 (Study II) and June 1th 2018 (Study III)
- b. All centers in the chain September 1th 2014 (Study I), March 1th 2015 (Study II) and June 1th 2018 (Study III)
- c. The dates when the number of members where counted was September 1th 2014 (Study I), March 1th 2015 (Study II) and June 1th 2018 (Study III)
- d. The exact number is not available due to change of membership register. It is likely to be in the area of 13500.

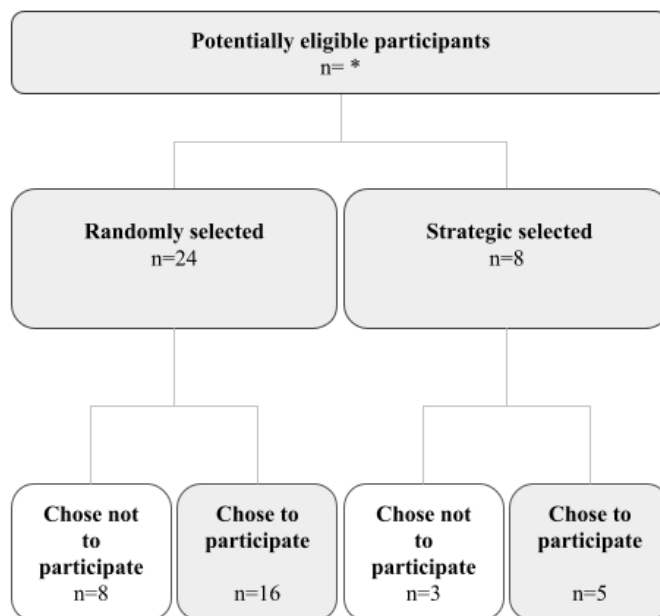
Figures 4-6 shows the flow chart of all three studies. In study 1, a total of 356 persons who enrolled as a new member in one week in 2014 met the inclusion criteria and 174 was randomized to the intervention group and 182 to the control group.



**Figure 4.** Flow chart Study I

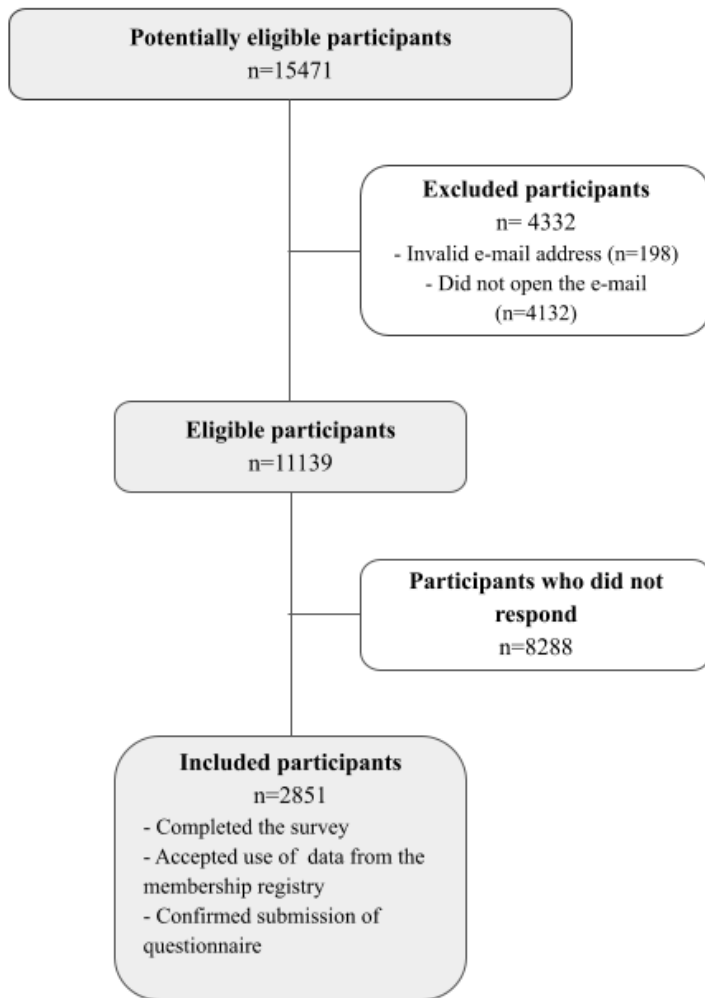


In the last two studies, 21 (Study II) and 2851 (Study III) long-term members ( $\geq 2$  years) participated. In study II, 16 were recruited among 24 persons randomly drawn from the membership registry and 5 were recruited among the 8 strategically selected. In Study III, 11139 of the 15471 invited long-term members opened the invitation email and the included participants constituted 26% of those who opened the email.



**Figure 5.** Flow chart Study II

\* The exact number is not available due to change of membership register. It is likely to be in the area of 13500.



**Figure 6.** Flow chart Study III

#### 4.1.1 Description of participants

In Study II, women and men were almost equally distributed with 53% being women, whereas more women (63% and 62%) than men (37% and 38%) were included in Studies I and III (Table 6). The age of most participants was 30-59 years (70%) in study III. The mean age was 43 years in Study II and approximately 30 years in Study I. The participants in Studies II and III were predominantly well-educated people who were either studying or working.

**Table 6.** Characteristics of participant's in Studies I–III and of relevant members in the fitness center chain where the participants were recruited from

Characteristic	New members <sup>c</sup>		Long-term members <sup>d</sup>		
	Study I	Relevant 3T members in Trondheim	Study II	Study III	Relevant 3T members in the whole chain
Enrolment period (new members) or time of data extraction (long-term members)	One week September 2014 (n = 354)	One month September 2021 (n=1333)	March 2015 to November 2016 (n = 21)	May 2018 (n = 2851)	November 2016 <sup>d</sup> e
Sex					
- Woman	63%	57%	53%	62%	59%
- Man	37%	43%	47%	38%	41%
Age, in years					
- ≤ 29	66%	54%	29%	11%	26%
- 30–49	24%	26%	43%	46%	45%
- ≥ 50	10%	20%	29%	45%	22%
Education <sup>a</sup>					
- Compulsory	-		5%	1%	
- Middle	-		24%	21%	
- Higher	-		71%	78%	
Employment					
- Full time work	-		43%	74%	
- Part time work	-		19%	7%	
- Student	-		24%	3%	
- Not working <sup>b</sup>	-		14%	15%	
- Other	-		-	1%	
Number of days visited <sup>c</sup>					
- Low			43%	35%	44%
- Medium			38%	32%	24%
- High			19%	33%	32%

- Education: Compulsory=primary school and middle school graduation or lower, Middle= high school graduation (duration 1–2 years), high school graduation (duration 3 years) and certificate of apprenticeship (duration 4 years), Higher=college/university graduation
- Not working: in occupational rehabilitation, unemployed or laid off, on disability benefits, or retired
- Days with visits was categorized in low, medium and high:
  - Low: Study III 0-57 visits, Study II and the relevant members 0-49 visits
  - Medium: Study III 58-117 visits, Study II and the relevant members 50-100 visits
  - High: Study III 118-543 visits, Study II and the relevant members ≥100 visits
- The distribution of the characteristics of members are taken from Study II (Riseth et al., 2019)
- The exact number is not available due to change of membership register. It is likely to be in the area of 14600, which is slightly higher than the approximate number of eligible members in Study II (Table 5) due to covering the whole chain.

#### 4.1.2 Comparison of study participants with members at 3T

To investigate whether the study samples were representative of all members in 3T using the same eligibility criteria, Table 6 also provides data on the characteristics of relevant members of the 3T chain.

For gender, all the study samples were relatively similar to all relevant members in 3T with approximately 60% women and 40% men. When it comes to age, there were some differences (Table 6). According to 3T, the pandemic still affected the enrollments in September 2021 with more younger and fewer adult individuals. Even so, the new members in Study I was somewhat younger than new members enrolling in September 2021. The long term members Study III were older than the comparison group.

There were also differences in number of days with visits for the long term members in Study III compared to the comparison group. Although there were differences in length of registration and the cut off used for categorization (see section 3.3.4), the participants in Study III visited the fitness center on more days.

#### 4.2 Study I: Effect of initial support on the use of fitness centers among new members

Study I investigated whether initial support to use the fitness center facilities given to new members of fitness centers via telephone and email, compared with self-directed use, affected bookings with a fitness trainer free of charge, the number of visits to the center, and the duration of membership for 4 years after enrollment.

The data collected to monitor the implementation of the intervention showed that not all participants were reached as planned (Table 7).

**Table 7.** Implementation of the intervention

<b>Intervention</b>	<b>Reach in the intervention group</b>
First phone call	127 out of the 174 (73%) participants
Second phone call	119 out of the 174 (68%) participants
E-mail	Sent to the 158 (91%) participants with an e-mail address registered at the fitness center, where 93 chose to open the e-mail.

Although initial support was associated with increased fitness trainer bookings, it did not influence days with visits or the proportion of members terminating their membership during the 4-year follow-up period. Moreover, Study I revealed factors associated with duration of membership during the 4-year period, including positive associations with duration for members older than 25 years and more than 2 visits per month in the first 6 months. Fitness trainer bookings and sex were not associated with duration of membership.

#### 4.3 Study I: Long-term members' use of fitness centers

Study II explored what long-term members (i.e.,  $\geq 2$  years) wanted to achieve with their fitness center memberships and identified important factors of their use of the centers as a means for physical activity. Above all, long-term members wanted to achieve health benefits with their membership. Although not as pronounced, appearance-related reasons were also a crucial factor of being a member of a fitness center. The members primarily described their use of fitness centers as positive and the centers as being easily accessible, offering a comfortable place for physical activity, and providing a feeling of increased safety compared with outdoor activities. Variation in activities, personal commitments made, and receiving support from staff and other members were other factors acknowledged as being positive for the use of fitness centers. However, even though the activities were experienced as being enjoyable and using certain facilities helped them overcome some of their barriers, some members experienced difficulties with using their fitness centers as much as they wanted.

#### 4.4 Study III: The use of fitness centers in relation to the subsequent achievement of exercise goals

Study III investigated the association between members' registry-derived long-term (i.e., 18-month) use of fitness centers and their subsequent self-reported goal achievement. Positive associations between the use of fitness centers and self-reported goal achievement were found for days with visits, the number of group activity bookings, and visiting the fitness center at least once every third month. The number of bookings with a fitness trainer was not consistently associated with goal achievement.

## 5. Methodological considerations

This chapter presents some considerations of the research methods used in the three studies in this thesis to elaborate upon the methodological discussions in the papers. There are many pitfalls in scientific research that can threaten the validity of studies, and although quantitative methods involve counts and qualitative methods involve narratives, similar considerations of validity need to be made for both types (Malterud, 2001; Portney & Watkins, 2009).

### 5.1 Reflexivity

Reflexivity can be understood as the effect of the researcher on the research and should be thoroughly considered and mitigated by the researcher and the research team (Malterud, 2001). Although the term reflexivity is a term primarily used in relation to qualitative methods (Malterud, 2001), I experience it is at least as essential in quantitative methods.

I started the work with this thesis as an industrial doctoral candidate employed in the administration of 3T. I thus had extensive experience-based knowledge from the fitness center industry after having worked in different roles in the company for 12 years. I have also worked in public health in two municipalities for 6 years. My motivation for the doctoral work was to explore the members of fitness centers who go on to become long-term members and to learn more about what characterizes their use and what drive them to continue using fitness centers.

From the very beginning of the project, I expected and considered that my preconceptions could influence the work for this thesis. My chief preconception when starting the work was that many long-term members of fitness centers want to achieve goals related to their appearance (e.g., weight loss) but struggle to achieve them, despite visiting the fitness center quite regularly. I thought this because appearance-related goals such as weight loss are demanding to achieve and maintain and are also related to

the members' diets. I also assumed that the use of the fitness centers would vary across members and that many new members felt unsecure around how to get started in using the fitness center. Drawing on my experience working in 3T, I believed that the initial support offered in the RCT could help new members feel more confident about using their fitness centers for physical activity and thus stimulate their earlier use, which I expected would increase their use and extend their membership periods.

To ensure reflexivity in my work and to make sure that my preconceptions did not unconsciously lead me to find what suited my beliefs or what I might have set out to find, I continuously presented the work to others, including my supervisors, the coauthors of the three papers, other researchers and practitioners, and the Patient Education and Participation Research Group at the Norwegian University of Science and Technology (NTNU).

Although I remained aware of my preconceptions and knew that fitness centers are used by many people, I was surprised by the strong opinions of others commenting on the work. Consequently, I also had to face other people's preconceptions. This both challenged my own preconceptions and led to deep and broad discussions of my work, which was valuable input to the three studies in this thesis.

## 5.2 Transferability

The transferability, or generalizability, of a study's findings indicates how well they can provide meaning beyond the study's context (Malterud, 2001). If the findings can be applied to or give meaning for only a narrow population or a specific setting, they have poor transferability (Malterud, 2001; Rothwell, 2005).

One central aspect when considering transferability is whether there is selection bias. Selection bias concerns whether the sample in a study is representative of the relevant population (Graham, 2009). If there were no selection bias in the studies in this thesis, the participants would be similar to all members who met the same eligibility criteria.



Therefore, such data was collected and the data are presented in the result section (Table 6).

Study II was a qualitative study, where it is common to do what is called strategic or purposeful sampling. This means that the selection of participants based on the researchers' judgement about which potential participants that will be most informative. The selection process in Study II, which was both random and strategic, aimed to ensure diversity in the sample in terms of experiences and the aim was thus not to have a sample that was equal to all eligible members when it comes to characteristics like gender, age, frequency of visits and services used. Still, it is relevant to make comparisons as large deviations between the sample and the study population are not intended. Even though the sample in Study II included only two participants around 20 years and the rest in the age group of 20-29 years were 27 years or older, the characteristics of the long-term members in Study II seem to fit well with gender, age, and visits of all similar long-term members at the fitness center chain in November 2016 (Table 6).

For study I and III, which were quantitative, the aim was to get a sample that was representative in terms of proportions with the same characteristics. As described in the result section, the inclusion of approximately 60% women and 40% men in these studies were in line with the sex distribution at 3T, and it also aligns with what is found in Europe, where more women than men report a health or fitness center membership (European Commission, 2018).

There were however some differences in the age between the participants in studies I and III compared to similar members at 3T. The participants in Study I (new members) were somewhat younger, and as all eligible new members in the week 2014 was included, it does not influence the results, but it points to possible changes in the characteristics of new members. Those in Study III (long term members) were clearly older than the similar members at 3T. Other studies reporting on member characteristics have not used the same eligibility criteria as in Study III and a comparison can thus only be made with studies reporting on members in general. In Study III the proportion

younger than 30 years were 11% while in another Norwegian study including members with more than six months membership 52% were younger than 31 years (Larsen et al., 2021). Compared to the situation in Europe where 10% of all who reported a health or fitness center membership were older than 55 years (European Commission, 2018), 45% were older than 50 years in Study III. Thus, although it can be expected that the participants in Study III is somewhat older due to the eligibility criterium of having been member for two years or longer, the participants in Study III still seem to include more older members than the distribution in fitness centers in general.

The participants in studies II and III were predominantly well-educated people who worked full-time. Similarly, other studies have also shown higher participation among individuals with higher social status and better health (Enzenbach, 2019; Nohr & Liew, 2018).

The data on number of visits showed that the participants in Study III were more high-frequent users compared to similar users at 3T. As those with more visits scored higher on goal achievement, this association could be inflated as a consequence.

In summary, the main challenge with selection bias concerns Study III. The likely reason is that one out five of all potential eligible members chose to participate. When there is low proportion responding and clear indications of selection bias, the questions becomes how the sample differs from the eligible population. This can be answered as done above for the variables that there are data on and measures like adjustments in multivariable analysis conducted. However, for characteristics where data is not collected, no answer can be given. Examples of variables that could be of interest are social and health status as it has been shown in previous studies that participation are associated with higher social status and better health than non-participation (Enzenbach, 2019; Nohr & Liew, 2018). Still, given that it is likely that the participants in study III were older, had a large proportion with higher education and who visited the center more frequently, caution must be made when applying the findings to other settings.

But also other factors need to be considered when assessing the transferability of the results of a study. The studies included in this thesis were conducted in a real-life setting but included only members of one fitness center chain, which places some limitations on their generalizability to centers with a different profile and especially to those that are not full-assortment centers. The cost of a membership at the 3T centers at the time of the studies was 350–550 NOK (approx. 40–60 EUR) per month, which was similar to the cost at other full-assortment centers in the city. The exercise opportunities available at 3T fitness centers were also similar to other full-assortment centers, which account for 74% of all fitness centers in Norway (Virke Trening, 2013).

The fact that the findings in the three studies align with findings from other research (Macintosh & Law, 2015; Middelkamp et al., 2016; Nikolajsen et al., 2021) strengthens their transferability to similar settings.

#### 5.4 Study designs

Given the aims in this thesis, different study designs were needed. Having research questions that required different research methods is a strength, in that long-term fitness center use could be investigated from different perspectives.

Choosing an RCT to answer a research question about effect was an obvious choice, as RCTs are known for minimizing potential biases and having high internal validity (Spieth et al., 2016). Using a design with a registry-based RCT enabled a double-blinded investigation of the intervention in the real-world setting of the fitness center. However, a challenge of the study design in our RCT was involving several employees and multiple fitness centers in implementing the intervention, increasing the possibility of misinformation and misunderstanding, which could then influence how the intervention was delivered. One consequence was a lack of reporting on the total number of participants in the intervention group who received all, part, or none of the intervention. Although the blinding was a strength, it also meant that the participants' experiences were not collected as outcomes. Such information could have extended the

registry-derived information and given information about the participants experiences with the intervention, and use of the fitness center.

Although the blinding in Study I was a strength, it also meant that the participants' experiences were not collected as outcomes. Such information could have extended the registry-derived information and given information about the participants experiences with the intervention, and use of the fitness center.

Study II was designed to explore in depth the experiences of long-term members. Therefore, qualitative, semi-structured, face-to-face individual interviews were identified as the best-suited research method. The individual interviews enabled each participant to speak freely and enabled me, as the interviewer, to dig deeper into each of their stories without limiting the discussion to superficial narratives. Group interviews could have provided additional variety, as the group's dynamic can point participants in new directions and thus yield other reflections (Malterud, 2011).

The registry- and survey-based prospective study design in Study III was chosen to enable distinguishing measures of fitness center use from members' assessments of their self-reported goal achievement over time. However, the possibility for reverse causation, in which the member's goal achievement at the study's initiation might have promoted their use of the fitness center instead of the other way around, cannot be ruled out.

## 5.5 Data sources and data collection

### 5.5.1 Registry data in Studies I and III

The registry data in Studies I and III were collected from the membership registry, which includes data for all members of the fitness center chain. To visit a center at 3T, members have to swipe their membership card, which creates an electronic timestamp in the registry for each visit. The same holds true for booking through the system to join a group activity or receive help and instructions from a fitness trainer.

The system records each swipe of the membership card; thus, if a member passes the entrance several times during the same visit (e.g., to get something from their car), this is recorded as multiple visits. Therefore, we used the measure 'days with visits', as this was judged to be a better representation of actual visits, even though this excluded situations where a member had several distinct visits on the same day. Furthermore, although 3T has strict procedures for registering all visits and activities in the system, it is possible for employees to admit members without registering them through the system. Thus, the possibility of missing values is present but considered negligible.

#### 5.5.2 Semi-structured individual interviews in Study II

The validity of the data used in Study II was dependent on the quality of the interviews. In an interview, the interviewer is the research instrument. My previous experience as an interviewer was in my master thesis, so I had some experience. I followed an interview guide which helped keep focus during the interviews. In addition, my main supervisor who is experienced in and teaches qualitative methods, listened to parts of the initial interviews to assess their quality and to guide me for the next interviews. To ensure the quality of the interviews, it was focused on getting the participants' to speak freely and spontaneously to get variation in experiences. It was also a focus not to ask leading questions, keep the questions short, but still manage to get the participants to dig deeper into their stories and experiences.

Before the interviews, I gave the participants information about my employment at 3T, explained that what was said in the interview was confidential, and assured them that the results were to be used for research and not by 3T. Still, my employment status may have influenced what the participants brought up, and they might have spoken more freely and answered differently with an interviewer who was independent of 3T.

However, reviewing the transcripts showed that the participants seemed to speak freely and without reservation about the fitness center and about how they used it for physical activity. An advantage of my in-depth knowledge of 3T was that it made it easier to ask relevant questions to dig deeper into the participants' stories and experiences.

### 5.5.3 Questionnaire data in Study III

The outcome variable in Study III was expected to measure whether the participants perceived that they had reached their exercise goals at the fitness centers. Although the achievement of goals has been measured in terms of steps taken daily (Chevance, 2021; Moon, 2016) and minutes of physical activity per week (Conroy, 2011), such measures exclude the achievement of other goals thought to be relevant to participants. Thus, the chosen outcome variable aimed to measure a more overall perception of goal achievement.

A limitation was that there was no formal testing of its reliability or validity in advance. Nevertheless, the variable was developed based on a question about goal achievement used in research on satisfaction with fitness centers—namely, whether participants have achieved all that they hoped to achieve at the centers (Gonçalves et al., 2016).

To assess the participants' perceived level of goal achievement, a continuous 0–100 visual analog scale (VAS) was chosen (Brokelman et al., 2012). The advantage of a VAS is that respondents can choose more precisely, differentiated values (Funke & Reips, 2012). Kuhlmann (2016) has also observed less dropout from studies conducted online when using VASs. An alternative was to use a Likert scale, but the results between VAS and Likert scales seem to correlate (Hasson & Arnetz, 2005; Kuhlmann et al., 2017), and both types pose certain advantages and disadvantages for participants (Hasson & Arnetz, 2005). Furthermore, although dichotomizing the VAS scores into low and high arguably negated the advantages of using the VAS in the first place, it remained a good choice because it was also used as a continuous variable to compare the mean goal achievement.

Some of the participants who did not visit the fitness center at all during the 18-month study period nevertheless reported 50 or higher on the 0–100 VAS. Reasons could be a general satisfaction with the fitness center as an arena for physical activity despite lack of use in the past 18 months and therefore reporting on the achievement of personal exercise goals to some extent. Another explanation is that they were satisfied with their

total activity and did not differentiate activity at the fitness centers from activity elsewhere.

## 5.6 Data analyses

### 5.6.1 Statistical analyses in Study I

The analyses in Study I included all participants initially randomized to the intervention group or control group, and it used the intention to treat (ITT) principle. The use of registry data from the membership registry ensured that outcome measures were available for all participants and provided complete follow-up. The variation in the number of visits was larger than expected and resulted in imprecise estimates of differences between the groups.

We used survival analyses to measure differences in membership duration. Time to membership termination was displayed using a Kaplan-Meier curve, and hazard ratio (HR) using Cox regression was used to measure the relative difference between the groups. These are commonly used analyses and were considered to be valid choices in this study.

### 5.6.2 Text analyses in Study II

STC by Malterud (Malterud, 2011) was chosen as the analytical method for the qualitative interviews in Study II. The STC method, inspired by Giorgi's psychological phenomenological method, was chosen because it is well-suited to explore participants' experiences instead of underlying opinions of what was told. As an analytical method, STC is also easy for novice researchers to interpret, given its iterative four-step process (Malterud, 2012). Due to my limited experience with qualitative methods prior to this study, I considered STC to be a good choice that ensured the quality of the analysis (Malterud, 2012).

The data analysis was conducted in parallel with the data collection, which ensured that findings in the early analysis could be investigated further in later interviews. The analysis was carried out in cooperation with the co-authors and discussed twice in the Patient Education and Participation Research Group at NTNU.

### 5.6.3 Statistical analyses in Study III

Most datasets have missing values that can weaken the estimates of the parameters (Mehmetoglu & Jakobsen, 2017). However, in Study III, the use of registry data from the membership registry ensured that outcome variables for fitness center use were available for all participants, with minimal probability of missing data. Furthermore, in the electronic survey, all participants had to answer the question addressing the outcome variable in order to submit the questionnaire, which ensured that no data were missing for that variable.

Linear and logistic regression analyses were conducted to investigate the association between the use of the fitness center and subsequent self-reported goal achievement. The choice to use both methods was considered as good for providing both continuous output (using the whole VAS scale) and discrete output (measuring low or high goal achievement).



## 6. Discussion of main findings

### 6.1 Summary of findings

Study I showed that the initial support influenced fitness trainer bookings but not the number of days with a visit or membership duration during four years. It was also observed that a sizable proportion paid the center few visits and approximately 60% and 80% had terminated their membership after two and four years, respectively. Being older than 40 years and going to the center two or more days each month within the first six months were prospectively associated with longer membership duration. In Study II, the members said that health and appearance were the main reasons for their long-term use of the fitness center. Although using the fitness center was positively perceived, some members found it challenging to visit the center as much as they wanted. Study III found that members who had a greater number of days with a visit and group activity bookings, along with those who visited regularly during the previous 18 months, reported higher subsequent goal achievement. The number of bookings with a fitness trainer was not consistently associated with goal achievement.



Picture from 3T (Photo: 3T)

## 6.2 Low use and high numbers of membership termination

Responding to a registry- and survey-based study, new members from 14 clubs in Canada, answered that they intended to use the fitness center regularly when enrolling, estimating three or more visits a week (Garon et al., 2015). However, the actual number of visits they paid to the center was one-and-a-half per week (Garon et al., 2015), showing a discrepancy between members' intentions and their actual behavior in the startup phase. The numbers observed in the study by Garon et al. (2015) were similar to the number of visits observed in Study I, where an average of about 18 visits were made during the first three months. However, this average covers a large variation, as the members' number of days with visits over the first three membership months ranged from 0 to once every day (56 visits). A large proportion of new members at fitness centers also chose to terminate their membership during the first year in a registry study from Spain including 14522 members (Emeterio et al., 2019). In Study I, there were no terminations in the first year due to the 12-month obligatory contract, which subsequently ran until the member terminated it. However, in the following year, which had no binding contract, about 60% also ended their membership in this study, and 78% had terminated their membership by the end of the four-year study period (Study I).

According to a recent review, the reasons for this might be several barriers for the use of a fitness center (Nikolajsen et al., 2021). Thus, overcoming those barriers are found to be essential for the regular use of fitness centers in a registry- and survey-based study including 101 college students (Jekauc et al., 2015).

## 6.3 Supporting new members

Garon et al. in Canada (2015) and a registry study including about 1700 new members from a UK city by Rand et al. (2020) found that members' exercise behavior early in their membership is related to later use. Members early exercise behavior are also associated with exercise habits (Kaushal & Rhodes, 2015), and membership duration (Emeterio et al., 2019; Emeterio et al., 2020). This was in line with the findings in Study I, where at least two visits per month during the first six months were associated with a

longer membership duration. This indicates that the member start-up phase is significant for membership duration.

Despite this knowledge, interventions to investigate the effects of what fitness centers do to support new members to use their services are lacking. Study I, which examines the effect of initial support via telephone and e-mail to new members, is the first study to be conducted in this area. The intention of the intervention was to help new members become active users of the fitness center from the start. The intervention had an effect on the number of members with a fitness trainer booking but no effect on frequency of days with visits or membership duration. Using telephone and e-mail as a method for support has been investigated in other settings with different content, contact points, and duration than in the present study (Fischer et al., 2019; Goode et al., 2012; Habla & Muller, 2021; Vandelanotte et al., 2007). Thus, previous findings are not directly comparable to Study I. However, as some of these studies found an effect, and the use of telephone and e-mail is a common way to contact members, more research utilizing these communication channels in the start-up phase is warranted.

#### 6.4 What characterizes long-term fitness center use?

Although many members terminate their memberships early on (Emeterio et al., 2019; Emeterio et al., 2020), there is still a group that goes on to become long-term members. In this thesis, long-term members are defined as those who continue for two consecutive years or more. In Study I, it was observed that 40% continued their membership after two years. Of these long-term members, one-sixth continued for at least four years (Study I). This means that a fairly large proportion continues membership for a longer period. According to a Norwegian report, about 30% of Norwegian adults use a fitness center for physical activity (Open et al., 2019).

Even though a large portion of the adult population report to be members of fitness centers (European Commission, 2018), and fitness centers are acknowledged for stimulating lifelong physical activity participation (The Ministry of Health and Care Services (HOD), 2015; World Health Organization, 2018), the proportion of members is

reduced with increasing age. Only 10% of the European population older than 55 report a fitness center membership (European Commission, 2018). In Study I which included all new members during one month, only 3% was 60 years or older. However, once enrolled, older members continue longer as members compared to younger age groups (Rand et al., 2020), a result also found in Study I. Studies have shown that fear of falling, inertia, negative affect, physical ailments (Lees et al., 2005), and lack of company, interest, and opportunities (Moschny et al., 2011) are barriers to participating in physical activity for older adults. Designing exercise programs especially for older adults (Mathews et al., 2010), with activities that aim to maintain or increase their flexibility and strengthen muscles and balance to reduce the risk of falls (Nelson et al., 2007) might also be a solution for fitness centers to attract more of the older adults to get started.

Study III found a large variation in the number of days with visits among the long-term members during the 18-month study period, ranging from zero days to about once a day (543 days), with an average of 97 visits (5.4 per month). In a registry study from Portugal, the average number of weekly visits among fitness center members was almost one visit a week (Sobreiro et al., 2021). A study from two European fitness center chains on former fitness center members found that they averaged 1.1 visits a month. Most of the former members also stopped using the fitness centers multiple times during the 24-month period, with only 2.3% using it regularly (i.e., at least four visits per month) without relapsing (Middelkamp et al., 2016). Among the long-term members in Study III, almost 75% visited the fitness center at least once every third month during the whole period. Still, even if long-term members use the fitness centers as their main arena for physical activity, on average they may not be reaching the Norwegian recommended levels of at least 150–300 minutes weekly of moderate to vigorous physical activity (The Norwegian Directorate of Health, 2021).



Picture from 3T (Photo: 3T)

In accordance with another Norwegian cross-sectional fitness center study (Gjestvang et al., 2019), the long-term members in Study II told that their goals in having fitness center memberships included achieving health- and appearance-related benefits, preventing the deterioration of their health, and supporting pain management.

Study III was undertaken to investigate long-term members' fitness center use and its association with their goal achievement. Previous research has also found an association between physical activity maintenance and goal achievement (Bauman et al., 2012; Stralen et al., 2009). However, as noted earlier, the association might be bidirectional, where the experience of higher goal achievement can drive more fitness center use, and more fitness center use can drive a higher experience of goal achievement. Nevertheless, long-term fitness center use is an important variable for members' goal achievement.

### 6.5 Influencing factors for long-term fitness center use

A factor related to long-term fitness center use is enjoyment (Kopp et al., 2020). Kopp et.al. found in their longitudinal prospective study from Germany that continuous and regular fitness center use was more likely among individuals who reported to enjoy using the fitness center and consider it to be personally meaningful (Kopp et al., 2020). Similar connections were also reported by the participants in the Norwegian survey by Gjestvang et al. (2019) and in Study II. Some long-term members discussed how enjoyment helped them commit and be motivated to continue to use the fitness center (Study II). Enjoyment are also a central factor in the Sport Commitment Model (SCM), where it is conceived to increase commitment to the activity (Scanlan et al., 1993; Scanlan et al., 2016).

According to the Physical Activity Maintenance (PAM) theory, one's physical activity environment and stress in life are contextual influences that can facilitate or impede the maintenance of physical activity (Nigg et al., 2008). This can be either direct or indirect via the psychosocial variables of goal setting, motivation, and self-efficacy (Nigg et al., 2008). Life stressors, according to Nigg et al. (2008), can impact physical activity maintenance negatively because they increase the vulnerability for relapse, decrease motivation, and undermine the setting of and achievement of long-term goals. One example is time constraints and lack of childcare which can be significant stress-inducing factors that affect a parent's ability to use fitness centers, as reported by some participants in Study II. In fact, one participant in another interview study said that it would be impossible to exercise without access to daycare or youth fitness activities at their center: "It gives me a window of time" (Macintosh & Law, 2015).

In addition, skills and strategies that prevent relapse into inactivity are essential for sustained participation in physical activity (Schwarzer, 2001). The Health Action Process Approach (HAPA), address action (where, when and how) and coping (appropriate strategies to handle barriers) planning as important to maintain the behavior and recover from relapse (Rhodes et al., 2019; Zhang et al., 2019). The long-term members in Study II used commitments such as making appointments with others, prebooked activities, or payment of no-show fees as strategies to overcome challenges

regarding low motivation and energy to use the fitness center (Study II). Commitments are also highlighted as significant for maintaining physical activity by The Sport Commitment Model (SCM) (Gabriele et al., 2011; Scanlan et al., 1993, 2009, 2013, 2016).





## 7. Conclusions

Based on the findings in this thesis and previous research, it can be concluded that a need exists both for fresh approaches to encourage new members to use the fitness center and for research on the effect of these interventions. Furthermore, to increase the proportion of long-term members that experience high goal achievement, supporting them to increase both their frequency and regularity of use seems to be worthwhile efforts. Such efforts could include helping them overcoming barriers like variations in activities, making commitments, and getting support from the staff.



## 8. Implications for future research and practice

As a large part of the population are members of fitness centers, what happens there can affect the level of physical activity in a large part of the population and, consequently, public health. The fitness centers' role in stimulating lifelong physical activity is acknowledged by the WHO and in a white paper issued by the Norwegian government (The Ministry of Health and Care Services (HOD), 2015; World Health Organization, 2018). Yet, despite these acknowledgments and the growth of the fitness industry, there has been little scientific research attention on fitness centers as an arena for physical activity.

Based on the work with this thesis, it can be suggested that both future research and practice should explore new practices to support new and existing members to establish regular and continuous fitness center use and investigate the effect of these efforts. The need also exists for research to further investigate the effects of the use of telephone and e-mail to support new members of a fitness center in the start-up phase and assess goal achievement both before and after measuring fitness center use.



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# Paper I







## The effect of initial support on fitness center use in new fitness center members. A randomized controlled trial

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### ABSTRACT

This provider and participant blinded parallel-group randomized controlled trial aimed to investigate if initial support given to new members via telephone and e-mail, compared to self-directed use, had an effect on booking with a fitness trainer, number of visits to the center, and membership duration. Participants included 356 new members, 174 randomized to the intervention group, and 182 to the control group. The intervention group received support to use the fitness center facilities through two phone calls and one e-mail over the first eight weeks of their membership. The control group got usual practice, which is self-directed use.

Participants in the intervention group were more likely to book at least one session with a fitness trainer during the first six months (odds ratio 1.6, 95% confidence interval (CI) 1.0–2.5). However, the intervention did not influence the number of visits (mean difference after four years –11.7 days, 95% CI –34.8 to 11.3) or time to membership termination during the follow-up period (hazard ratio 1.1, 95% CI 0.8–1.3).

In conclusion, initial support to use the fitness center facilities given to new fitness center members via telephone and e-mail increased the proportion of bookings with a fitness trainer during the first months of the membership, but it did not have an effect on the number of visits or membership termination during four years.

### 1. Introduction

Public reports show that in 2017, 11% of citizens within the European Union reported a fitness center membership (Commission and Eurobarometer, 2017). In Norway, the number of fitness centers has more than doubled during the past decade, from 477 in 2008 to 1228 in 2019 (Open et al., 2018, 2019), and 30% of Norwegians aged 15 years or more had a fitness center membership in 2018 (Open et al., 2018). Thus, fitness- and sports centers where members pay to exercise constitute an essential arena for physical activity.

Although fitness center members report an intention of regular fitness center use at the time of enrollment (Garon et al., 2015), many have few visits, and some never visit the fitness center during the first membership month (Middelkamp et al., 2016; Gjestvang et al., 2020). One study found that 50 percent did not visit the fitness center the first membership month and 20 percent never attended the center during 24 months (Middelkamp et al., 2016) while another found that 37 percent were classified as regular exercisers throughout the first year of the membership (Gjestvang et al., 2020). Moreover, around 50 percent are

reported to terminate their membership during the first year (Clavel San Emeterio et al., 2019; MacIntosh and Law, 2015; Emeterio et al., 2020). This mismatch between the intention at enrollment and the subsequent use of the fitness center suggests an unfulfilled potential to help members increase their fitness center use.

We have not identified any research describing what fitness centers do to support new members to start using their services, and consequently not any studies investigating the effect of such interventions. However, as the frequency of visits, particularly during the start-up phase, has been positively associated with later use of the exercise facilities (Middelkamp et al., 2016) and longer membership duration (Clavel San Emeterio et al., 2019; Emeterio et al., 2020), getting new members to start using the fitness center in the initial phase of the membership seems worthwhile. One approach is to contact members by telephone and mail to offer initial support to start using the fitness center. Although this approach has been investigated in other settings (Goode et al., 2015; Goode et al., 2012; Fischer et al., 2019; Vandellotte et al., 2007), it has not been investigated in a fitness center setting.

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Therefore, this randomized controlled trial aimed to investigate if initial support given to new fitness center members via telephone and e-mail to use the fitness center facilities, compared to self-directed use, had an effect on booking with a fitness trainer free of extra charge, the number of visits to the center and membership duration during four years after enrollment.

## 2. Materials and methods

This was a participant and provider-blinded, parallel-group, randomized controlled trial. The inclusion was done in the first week of September 2014, and follow-up data from the membership register covered September 2014 to September 2018. The Consolidated Standards of Reporting Trials (Schulz et al., 2010) and The Template for Intervention Description and Replication (Hoffmann et al., 2014) were consulted for the reporting. There were no changes to the methods after trial commencement.

### 2.1. Setting

The study was conducted at the 3T-Fitness Center chain (www.3t.no) in Trondheim, Norway. The fitness chain had eight centers and approximately 34,000 members in 2014, and the number of inhabitants aged  $\geq 16$  years in Trondheim was around 165,000. The centers in this chain have a diversity of training facilities with a main workout area that consists of various exercise equipment, and all centers are staffed. In addition, seven out of eight centers offer group activities. The monthly cost for a membership in this fitness center chain was approximately 350–500 NOK (35–50 EUR) and most new members subscribe to a 12-month binding contract, which subsequently runs until terminated by the member. The front staff at each center consists of receptionists, as well as fitness trainers with minimum a bachelor's degree in physiotherapy, movement science or similar. The fitness trainers are present in the main workout area and are available for questions and guidance in relation to activities and exercises.

At the time of enrollment, all members receive information about the benefits of the membership and practical use of the fitness center by the receptionist. The usual practice at the centers is self-directed use with possibilities for help and guidance from front staff upon request. In addition, members can book a free-of-charge session with a fitness trainer and get a personalized exercise program. Members can also choose to pay for a personal trainer for closer follow-up and guidance.

### 2.2. Recruitment and inclusion criteria

The study included all persons 16 years or older that signed up for a 12-month ordinary contract with continuous monthly automatic membership renewal afterwards, who started their membership at one of the eight 3T-Fitness Centers in the City of Trondheim between September 1st and September 9th, 2014.

### 2.3. Intervention

The intervention was developed by the fitness center chain head office and delivered as planned with no changes after trial commencement. The idea was to give new members initial support via two phone calls 1–3 and 6–8 weeks after enrollment as a member and an e-mail after four weeks (Table 1), aiming to support members to use the fitness center facilities, including group activities and face-to-face support from a fitness trainer. Fitness trainers are in this fitness center chain a free service, giving the members a possibility to get a tour at the fitness center, guidance concerning exercise, a personal exercise plan, and information about group activities and use of other services.

Each fitness center organized the calls for its members by using available fitness trainers, typically from one to eight at the different centers. The fitness trainers used a template to guide the content,

**Table 1**  
Timing, implementation, and content of the intervention to support members to start to use the facilities.

Timing and implementation	Summary of the template content
Week 1–3: Phone call from a fitness trainer	<p>Ask if the member has started to use the fitness center and if there are any questions related to the use.</p> <ul style="list-style-type: none"> <li>- If started to use, further questions about their use in general and group activities in particular.</li> <li>- If not started to use, questions whether the member has used a fitness center before and if there is anything the staff could do to make it easier to get started.</li> </ul> <p>Inform the member about the possibility to get guidance from a fitness trainer free of extra charge and ask if the member has had guidance with a fitness trainer.</p> <ul style="list-style-type: none"> <li>- If yes, further questions about experiences with the guidance from the fitness trainer, goals set during the guidance and use of the exercise program.</li> <li>- If no, the value of guidance with a fitness trainer should be emphasized, highlighting the opportunity to get help, which will make it easier to reach own goals for the membership.</li> </ul> <p>Explore if the member has questions and what is needed to be more satisfied with the membership. Inform about the possibility for help and support from the front staff.</p>
Week 4: E-mail sent from head office to members registered with an e-mail address	<p>Information about guidance from a fitness trainer, how to reach physical activity goals, link to information about some examples of strength- and cardiovascular programs and popular activities at the fitness center.</p> <p>Furthermore, link to frequently asked questions and motivational campaigns and information about the possibility for help and support from the front staff.</p>
Week 6–8: Second phone call from a fitness trainer	<p>Same procedure and content as the first phone call but adjusted to the members use or not of the fitness center and guidance from a fitness trainer.</p>

structure, and wording during the call and received no other instructions or training. The intention was that all participants should get two calls, and therefore, two attempts to reach the members were made for each of the two phone calls, and if they did not answer, a voice message was left on the participant's phone. In the voice message, the participants were informed about the possibility of guidance with a fitness trainer and encouraged to contact the fitness center if they had questions about use of the fitness center.

The control group received usual practice, which is self-directed use with possibilities for help and guidance from staff upon request.

### 2.4. Ethical considerations

The study was conducted in accordance with the World Medical Association Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects. Data were anonymized and only available to the authors after anonymization. According to Norwegian law, only health research, which this study is not, is assessed by The Regional Committee for Medical and Health Research Ethics. A request was sent to the Norwegian Centre for Research Data, which assesses privacy and data protection. They replied that registration was not required as no identifying or sensitive information was used. The study was considered to have low or no risk for the participants due to the

nature of the intervention (phone calls and e-mail), and there was no collection of sensitive data.

### 2.5. Outcome measures

To obtain outcome data, the head office of the fitness center chain sent a list with the membership ID numbers for those meeting the inclusion criteria to the provider of the membership register, who returned a file with membership and activity data. To ensure the quality of the data, an employee in the head office of the fitness center chain did random checks of the data file. Finally, de-identified data on age, sex, and timestamps for each visit, date of membership termination and date for appointment for individual guidance with a fitness trainer was delivered to the first author.

The outcomes were number of days the participants had been registered with one or more visits, having made a booking with a fitness trainer free of extra charge at three months, six months and four years after enrollment, and membership duration measured as proportion who terminated their membership during four years as well as time to membership termination. There were no changes to trial outcomes after the trial commenced.

### 2.6. Sample size

The Sampsi procedure in STATA for comparison of two means was used for sample size calculations. This suggested that 143 persons in each group was sufficient to detect a mean difference at three months of two visits between the groups using an assumed standard deviation of 6 visits (i.e. standard deviation three times larger than the mean difference), alpha level of 0.05 and a power of 80%. Based on the enrollment history from previous years, it was expected that approximately 350 new members meeting the inclusion criteria would enroll during the first week of September 2014.

### 2.7. Randomization and allocation

A list with random numbers generated in Excel was delivered to an employee in the head office not affiliated with the study, who consecutively added the name and contact information of new members as they enrolled in the one-week recruitment period. Then the list was sorted on the random number and the 175 participants with the smallest numbers (first in the list) were assigned to the intervention group, and the remainder were assigned to the control group. Each center then received a list of the new members in the intervention group enrolled at their center, which was used to conduct the phone calls. Another employee in the head office used the list to send out the e-mail.

### 2.8. Blinding

Neither the participants nor the staff who performed the intervention were informed that the phone calls and e-mail were part of a research study. All new members of the fitness center signed a membership contract upon enrollment where they acknowledge that the fitness center could contact them with information about the membership and use of the fitness center. Furthermore, the staff at the fitness centers were not told that the phone calls and e-mail constituted the intervention in a study, but that this was a test of new routines and a possible solution to help members to get started in the initial phase of their membership. This is common practice for new initiatives within this fitness center chain. The outcome data were automatically registered in the membership registry and could not be influenced by anyone in the research group.

### 2.9. Statistical methods

All analyses were done according to the intention to treat principle and included all participants initially randomized to the intervention or

control group. Mean differences in number of days with visits between the groups were estimated using linear regression. Odds ratios (OR) for having booked with a fitness trainer was estimated using logistic regression. Differences in membership duration was displayed as a Kaplan-Meier curve, and the relative difference between the groups was assessed as a hazard ratio (HR) using Cox regression. Due to former research reporting sex and age differences in membership duration (Emeterio et al., 2020), all models included adjustments for sex (woman, man) and five age groups categorized to have approximately same number in each group, which gave groups from 16 to 19, 20–24, 25–29, 30–39, and 40–76 years. The precision of estimated effects was assessed by a 95% confidence interval (95% CI).

Additional analyses were conducted to explore whether sex, age, frequency of visits, and having booked with a fitness trainer during the first six months were associated with membership duration in the whole sample. The first six months' average number of visits were categorized into four groups with an approximately equal number of participants (quartiles), ranging from 0 to 12 visits in the first category, 13–24 visits in the second, 25–48 visits in category three, and the last included 49–105 visits. Differences in membership duration were estimated as HRs with 95% CI using Cox regression. In addition, associations with age were adjusted for sex (woman, man), and fitness trainer and number of visits were adjusted for the five age-groups shown above and sex (woman, man).

## 3. Results

A total of 357 new members were initially included in the trial (Fig. 1). One participant with a six-month instead of a 12-month contract was wrongly included, but was excluded after randomization and not included in the analysis. This left 356 participants for the analyses (174 in the intervention group and 182 in the control group). The groups were similar at baseline with respect to sex and age (Table 2).

### 3.1. Implementation of the intervention

The first phone call reached 127 out of the 174 (73%) participants in the intervention group and the second phone call reached 119 (68%). The e-mail was sent to the 158 (91%) participants who had registered their e-mail address at the fitness center.

### 3.2. Fitness trainer bookings

The intervention had an effect on the proportion of participants who booked a fitness trainer during the first three (OR 1.8, 95% CI 1.1–2.7) and six (OR 1.6, 95% CI 1.0–2.5) months (Table 3).

### 3.3. Number of visits

The intervention did not increase the number of visits to the fitness center (Table 4). The mean number of days with visits from baseline to six months was 29 days in the intervention group and 32 days in the control group (mean difference  $-2.3$  days, 95% CI  $-7$  to  $2.5$ ), while it was 98 compared to 109 days after four years (mean difference after 4 years  $-11.7$  days, 95% CI  $-34.8$  to  $11.3$ ).

### 3.4. Membership duration

The proportion of persons terminating their membership during the four-year follow-up period was also similar between the intervention (79%) and control (76%) group. Furthermore, there was no difference in time to membership termination between the groups during the four years (HR 1.1, 95% CI 0.8–1.3) (Fig. 2).

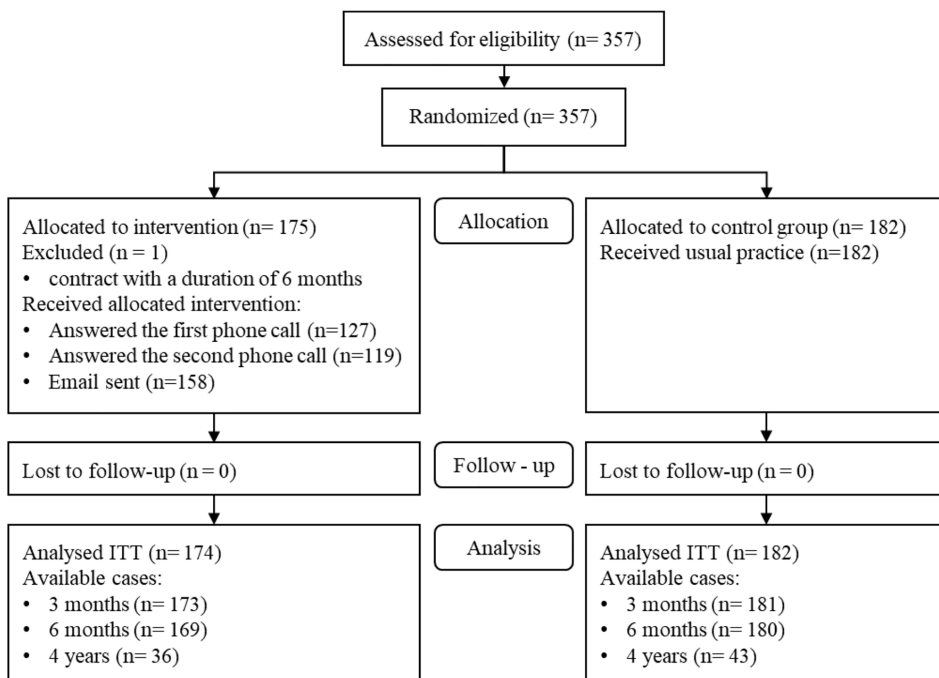


Fig. 1. Participant flow diagram through the study.

**Table 2**  
Participant characteristics at baseline for the intervention and control group (N = 356).

Characteristic	Intervention group (n = 174)	Control group (n = 182)
Sex, n (%)		
Female	111 (63%)	113 (62%)
Male	63 (37%)	69 (38%)
Mean age, years (SD)	30 ()	29 ()
Age groups, n (%)		
16 to 19	27 (15%)	32 (18%)
20 to 24	48(28%)	62 (34%)
25 to 29	35 (20%)	31(17%)
30 to 39	30 (17%)	27 (15%)
40 to 76	34 (20%)	30 (17%)

**Table 3**  
Effect of the intervention on booking with a free fitness trainer during three and six months after baseline.

Period	Booked with a fitness trainer		Crude OR	Adjusted OR(95% CI) <sup>a</sup>
	Yes, n (%)	No, n (%)		
3 months				
Control	59 (32%)	123 (68%)	1.0	1.0 (Reference)
Intervention	78 (45%)	96 (55%)	1.7	1.8 (1.1–2.7)
6 months				
Control	67 (37%)	115 (63%)	1.0	1.0 (Reference)
Intervention	83 (48%)	91 (52%)	1.6	1.6 (1.0–2.5)

Abbreviations: OR = odds ratio. CI = confidence interval  
<sup>a</sup> Adjusted for age (16–19, 20–24, 25–29, 30–39 and ≥ 40 years) and sex (man, woman)

3.5. Additional analyses

There was no evidence that booking with a fitness trainer or sex was associated with membership duration during four years in the whole

**Table 4**  
Mean number of days with visits and mean difference between intervention and control group.

Time from baseline	Mean number of days with visits (SD)		Mean difference between groups	
	Intervention	Control	Crude difference	Adjusted difference (95% CI) <sup>a</sup>
3 months	16.8 (12.4)	18.3 (13.4)	- 1.4	-1.0 (-3.7 to 1.6)
6 months	29.2 (23.1)	32.0 (23.2)	- 2.8	-2.3 (-7 to 2.5)
4 years	98.1 (107.1)	108.9 (114.2)	- 10.8	- 11.7 (-34.8 to 11.3)

Abbreviations: SD = standard deviation; CI = confidence interval  
<sup>a</sup> Adjusted for age (16–19, 20–24, 25–29, 30–39 and ≥ 40 years) and sex (man, woman)

sample (Table 5). However, age was inversely associated with time to membership termination, where members aged ≥ 40 years had a HR of 0.3 (95% CI 0.2–0.4) compared to those aged 20–24 years. Also, number of visits the first six months showed an inverse association with membership termination, where participants with ≥ 49 visits during four years (at least two visits each week) had a HR of 0.6 (95% CI 0.4–0.9) compared to members with 12 visits or less.

3.6. Harms

No harms or unintended effects was observed or reported during the study

4. Discussion

New fitness center members who received initial support to use the fitness center, delivered through telephone and e-mail contact, were

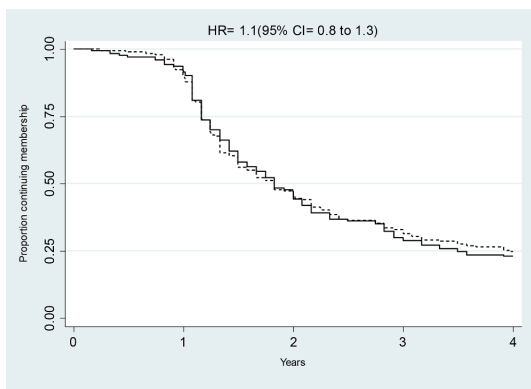


Fig. 2. Kaplan-Meier survival curve and hazard ratio for membership termination during four years.

**Table 5**  
Additional analyses of factors associated with membership terminations during four years.

Variables	Number at baseline	Number and proportion terminating membership during four years	Crude hazard ratio	Adjusted hazard ratio (95% CI) <sup>a</sup>
Sex				
Female	224	168 (75%)	1.0 (Reference)	
Men	132	103 (78%)	1.0 (0.8–1.4)	
Age				
16–19 years	59	47 (80%)	0.7	0.7 (0.5–0.9)
20–24 years	110	86 (78%)	1.0	1.0 (Reference)
25–29 years	67	41 (61%)	0.6	0.6 (0.4–0.9)
30–39 years	57	37 (65%)	0.5	0.5 (0.4–0.8)
40–76 years	64	27 (42%)	0.3	0.3 (0.2–0.4)
Booking with fitness trainer				
No	206	138 (67%)	1.0	1.0 (Reference)
Yes	150	100 (67%)	1.1	1.1 (0.9–1.4)
Number of visits				
0–12 visits	91	78 (86%)	1.0	1.0 (Reference)
13–24 visits	84	58 (69%)	0.7	0.7 (0.5–1.0)
25–48 visits	104	75 (72%)	0.7	0.7 (0.5–1.0)
49–105 visits	78	61 (78%)	0.7	0.6 (0.4–0.9)

Abbreviations: CI = confidence interval

<sup>a</sup> Associations with age are adjusted for sex (man, woman); fitness trainer bookings and visits are adjusted for age (16–19, 20–24, 25–29, 30–39 and  $\geq$  40 years) and sex (man, woman)

more likely to book appointments with a fitness trainer during six months of follow-up compared to the control group who received usual practice. The intervention had no effect on number of days with visits to the fitness center or on membership duration during the four-year follow-up period.

Since the intervention increased the proportion who booked with a fitness trainer, it is likely that the content of the initial support influenced the start-up behavior and made members aware that this service was available. However, even though the intervention increased the likelihood to book with a fitness trainer, there was no effect on the number of visits in the same time period or membership duration during four years. The latter was also supported by additional analyzes, where booking with a fitness trainer was not associated with membership duration.

The lack of effect of the intervention should be viewed in light of the limited possibility to individualize the communication with the members within the standardized template for content, structure and wording in the phone calls. However, individualized interventions applying different behavior change techniques, such as goal setting, have been found to increase physical activity (Fischer et al., 2019; Nigg

et al., 2008; Volume; Howlett et al., 2019). Therefore, the effect of a more individualized approach that includes behavior change techniques could be worth examining also for new members of fitness centers.

The delivery method included one e-mail and two phone calls and no face-to-face support. Previous research has shown that support through e-mail (Plotnikoff et al., 2010), telephone (Goode et al., 2012), or face-to-face (Richards et al., 2013) can change behavior, but differences between and combinations of these methods have been less explored. An intervention study indicates telephone support to be as effective in increasing physical activity as face-to-face support (Opdenacker and Boen, 2008). However, a review concluded that there was insufficient evidence to assess whether it is effect differences between face-to-face interventions or remote and web 2.0 approaches at promoting physical activity (Richards et al., 2013). Second, the quantity of the intervention was limited to two phone calls and one e-mail. A previous study found that a telephone delivered intervention with three calls increased the participant's attention towards the printed material in the study, but had no effect on the targeted physical activity (walking) (Humpel et al., 2004). However, a randomized trial with up to 12 calls found higher physical activity levels than a minimal intervention with written phys-

ical activity recommendations (Fischer et al., 2019). Frequent and focused follow-up through remote or web interventions has effectively encouraged the uptake of physical activity (Foster et al., 2013; CD010395.), as have other interventions with varying modes and frequency of contact (Goode et al., 2012; Vandelanotte et al., 2007). Thus, the optimal delivery mode and number of contact points need further investigation.

Another aspect is how the intervention was experienced. Since the intervention was blinded to the participants, the fitness center members who received the intervention (i.e., phone calls and e-mail) were not informed about this contact in advance. This type of contact was probably not expected when signing up for a membership, and one could speculate that some could receive this as an intrusion or sale, not support. In a randomized trial showing effect, the participants were aware that they could be contacted by telephone when they signed up for the study (Fischer et al., 2019). It was not collected data on how the phone calls were perceived, but some of the fitness trainers performing the phone calls said they experienced that a few members reacted negatively to the calls. Privacy, personal freedom and not wanting to be bothered at home are some attitudes toward telephone surveys reported (Kolar and

Kolar, 2008). To avoid such reactions, the fitness centers could ask new members if they want to be contacted or not.

After 12 months when the compulsory part of the membership contract ended, there was a steady decline in membership retention and more than half had terminated their membership after two years, similar to other studies (Clavel San Emeterio et al., 2019; Emeterio et al., 2020). The additional analysis showed that time to membership termination was shortest for members with fewest visits during the first six months (less than one day with visit every other week). In a study from Spain, more than eight visits a month was associated with the lowest odds for termination (Clavel San Emeterio et al., 2019). This supports the assumption that increased visits in the start-up phase of a membership would lead to longer membership duration. Even though many members terminated their membership, more than 20% continued as a member over four years in the present study. This group of long-term members could give valuable insight into factors that influence membership use and duration in future studies.

#### 4.1. Strengths and limitations

This is the first randomized controlled trial investigating the effects of initial support given to new members via telephone and e-mail on use of the fitness center facilities. Considering the Revised Cochrane risk-of-bias tool for randomized trials (Higgins et al., 2019), the study results are evaluated to be at low risk of bias. A main strength of this study was the randomized controlled design, blinding of participants and those delivering the intervention, and inclusion of the number of participants indicated by the sample size calculation. However, the variation in number of visits was larger than expected, resulting in unprecise estimates of differences between the groups.

The outcome variables and the period analyzed were pre-planned. There were no baseline differences between the groups, indicating a successful randomization process. Use of register data ensured that outcome measures were available for all participants and provided a complete follow-up. The study was conducted in a real-life setting and thus likely to be generalizable to similar fitness centers. Unfortunately, this study did not measure the member's physical activity behavior, and their physical activity levels are therefore unclear.

#### 5. Conclusion

This study reports data from a randomized controlled trial showing that new fitness center members who receive two initial phone calls and one e-mail to support them to use the fitness center were more likely to book one or more fitness trainer appointments during the first six membership months. However, initial telephone and e-mail support had no effect on number of days with visits to the fitness center or on membership duration during the four-year follow-up period.

There is a clear need for future high-quality studies building upon this study. Future research could focus on investigating whether other delivery modes and number of contact points are more effective.

#### 6. Availability of data and material

The anonymized datafiles and trial protocol are available from the corresponding author on reasonable request. The trial protocol was not published before trial commencement.

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#### CRediT authorship contribution statement

**Liv Riseth:** Conceptualization, Methodology, Formal analysis, Visualization, Investigation, Funding acquisition, Project administration, Writing – original draft, Writing – review & editing. **Tom Ivar Lund Nilssen:** Conceptualization, Methodology, Formal analysis, Supervision, Visualization, Writing – original draft, Writing – review & editing. **Øyvind Mittet:** Conceptualization, Methodology, Investigation, Project administration, Writing – review & editing. **Aslak Steinsbekk:** Conceptualization, Methodology, Formal analysis, Project administration, Funding acquisition, Supervision, Visualization, Writing – original draft, Writing – review & editing.

#### Declaration of Competing Interest

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

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# Paper II



RESEARCH ARTICLE

Open Access

# Long-term members' use of fitness centers: a qualitative study



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## Abstract

**Background:** Although the health benefits of physical activity are well documented, a large proportion of the population remains less active than recommended by current guidelines. Commercial fitness centers provide an opportunity to perform physical activity and exercise, but there has been little research focusing on ordinary members at commercial fitness centers. The aim of this study was therefore to explore what long-term members (> 2 years) wanted to achieve with their membership and to identify important factors that influenced them to use the fitness center as a means for physical activity.

**Method:** This was a qualitative study with 21 semi-structured individual interviews of adult long-term fitness center members in Trondheim, a city in Central Norway with approximately 190,000 inhabitants. The participants had been continuous fitness center members for more than two years and were asked about their experiences using a fitness center and what they wanted to achieve with the membership. The data was analyzed thematically with the method of systematic text condensation.

**Results:** The results were categorized into three main themes: "Health benefits and physical appearance"; "Accessible, safe, and comfortable to use"; and "Variety, flexibility, and support." The participants stated that they wanted to achieve health benefits, but they also talked about physical appearance. The fitness center was mainly described as easily accessible and a comfortable place for physical activity. Some female participants emphasized the feeling of safety compared to outdoor activity. Variation in activities, making commitments, and getting support from staff and other members were factors contributing to use of the fitness center for physical activity.

**Conclusion:** Achieving desired health benefits and improving physical appearance were the main drivers for long-term members' use of the fitness center. The fitness center was preferred due to the comfort of the facilities and the possibility to commit to specific exercise times and activities.

**Keywords:** Fitness center, Physical activity, Long-term members, Qualitative methods

## Background

The effects of physical activity to improve or maintain good health are well documented [1]. Despite public health recommendations and encouraging advice to stay physically active [2, 3], approximately 30% of adults worldwide are physically inactive [4]. Physical activity behavior depends on a multitude of barriers and facilitators [5], such as accessibility [6–8], weather [9], and social support [10, 11]. In addition, it includes many different psychological components, such as habits [12, 13], planning [14–16], perceived

behavioral control [17], motivation [18], physical activity identity [17], personality [19], and self-efficacy [16, 17]. Due to the high prevalence of physical inactivity, increased levels of physical activity are a global public health priority [20].

Commercial fitness centers represent one opportunity to be physically active. The majority of fitness centers offer both group and individual activities [21, 22]. In recent years, there has been an increase in the proportion of people who attend commercial fitness centers, with 15% of the European adult population doing so in 2013 [23]. This number is higher in some countries; for instance, it is 19.4% in Norway [24]. Statistics show a steady increase in attendance at private fitness centers in European countries; the number of members was 56.4

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million at the end of 2016, which was an increase of 4.4% from the previous year [24]. Thus, fitness centers are an important arena for physical activity. However, it has been found that members would like to exercise more regularly than they do [25].

Former studies among fitness center members have focused on reasons to become and remain a member [25, 26] and have highlighted motivational differences between fitness center and sports club members, e.g., sports club members are reported to be more motivated by competition, pleasure, and social factors and less concerned with appearance than fitness center members [21, 27, 28]. It has also been found that women report a slightly higher desire for wellness, a well-trained body, and weight loss than men do, while men report a desire for improved physical fitness [22, 25, 27, 29, 30].

Although a large proportion of the population are fitness center members, research on exercise behavior of members in fitness centers is limited in quantity and quality [31]. Therefore, it is important to gain in-depth knowledge of ordinary members (those who pay regular membership fees). Long-term members are an especially interesting group as they might have found a way to use the fitness center to achieve their goals for physical activity over time. However, we have not found any studies focusing exclusively on long-term members.

The aim of this study was therefore to explore what long-term members (> 2 years) wanted to achieve with their membership and to identify important factors that influenced them to use the fitness center as a means for physical activity.

## Methods

This was a qualitative study with semi-structured face-to-face individual interviews conducted between March 2015 and November 2016.

### Setting

In Norway, with 5.2 million inhabitants, it is estimated that there are 1079 fitness centers [24]. Within physical activity, there is also a strong tradition for participating in voluntary organizations in Norway, where sports clubs constitute the largest proportion [32].

This study took place among members of different fitness centers in Trondheim, a city in Central Norway with approximately 190,000 inhabitants, within the 3 T-Fitness Center chain ([www.3t.no](http://www.3t.no)). 3 T established its first fitness center in 1985, and the chain is now the largest fitness center chain in Central Norway, with 16 fitness centers and approximately 40,000 members. During data collection, the fitness center chain had a total of 12 fitness centers, with eight of them located in Trondheim. A membership in this fitness center chain has a cost of 350–550 NOK (approximately 40–60 EUR)

per month. To become a member, one has to sign a one-year contract; thereafter, one can terminate the contract one month after giving notice. The centers in this chain have a diversity of training opportunities, with a main workout area that primarily consists of free weights, weight machines, rowing machines, stationary exercise bikes, elliptical trainers, and treadmills. Nearly all centers offer group classes, personal trainers, saunas, and member lounges with simple café services. Some centers offer squash, childcare, and physical therapy. The largest center also has a swimming pool and a wellness area.

### Participants

The inclusion criteria for this study required that each participant was older than 18 years and had been a paying member for more than two years continuously (to avoid the large proportion terminating their membership after the obligatory one-year contract) at one of the eight 3T fitness centers in Trondheim. We sought a sample with diversity in gender, age, frequency of visits, and types of services used, ranging from those included in the membership to services with extra cost such as hiring a personal trainer.

The first step in recruiting participants consisted of randomly selecting from the membership register 24 members who met the inclusion criteria. Each of these prospects received a letter or an email with information about the study and a request to participate. The message also stated that they would be contacted by phone after two weeks if they did not respond before that time. Of these 24, 16 responded positively and were interviewed. However, none of these participants were under the age of 27, nor had they used additional services with extra cost. Therefore, eight additional prospects were identified in the member register or by employees at the fitness center. They were contacted as described above, resulting in two more participants who were in their early 20s and three participants (age range 30–57 years) who had used services with extra cost (personal trainer, physiotherapist, and / or nutrition supervisor).

### Data collection

The interviews were conducted by the first author at a place chosen by the participants and lasted from 32 to 62 min (average 48 min). The interviews were audiotaped and transcribed verbatim.

An interview guide with open-ended questions was developed by the first author, based on former literature about fitness center use, goal achievement, motivation, and the patient experiences questionnaire (PEQ) [26, 29, 31, 33–35], as well as discussions among the authors and a research group three of the authors belong to. The four main questions were: “Can you tell me about your

experiences of being a member at the fitness center?”, “What contributes to your use of the fitness center?”, “What do you want to achieve with the membership?”, and “Is there anything the fitness center can do to make it easier for you to achieve what you want with the membership?”. The following topics were introduced if the participant did not spontaneously talk about them: description of your own physical activity behavior; what affects your use of the fitness center (facilities, opening hours, activities available, social interactions, family, friends, and support and presence of staff); and reasons why you achieve / do not achieve what you want with the membership.

### Data analysis

The data was analyzed thematically with the method of systematic text condensation (STC) by Malterud, which is inspired by Giorgi’s psychological phenomenological method [36]. An illustration of the STC process and how the participant responses were coded and categorized is given in Table 1. The STC process is an iterative four-step method suitable for descriptive cross-case analysis of qualitative data. The method was chosen because it is well suited to present participants’ experiences, rather than the possible underlying opinions of what was told [36]. All interviews were held in Norwegian and the material was kept in its original language throughout the analysis. The data analysis was conducted by the first author in cooperation with the co-authors and discussed twice in an established research group.

In the first step of the analysis, the first author and the co-authors read the transcripts from a bird’s-eye perspective to identify preliminary themes. In the second step, meaning units (text segments) relevant to the aim of the study were identified by the first author, then coded and sorted into code groups based on the preliminary themes. The second step was done repeatedly, with several meetings and discussions among co-authors and the research group. MindManager [37] was used as a systematization tool in this part of the analysis. In the third step, a condensed description of the citations in each code group was made using the participants’ original phrases. Finally,

in the fourth step, the descriptions were rephrased into analytical text.

The first sequence of analysis included the first thirteen interviews and was performed to identify areas that needed to be explored in more detail in further interviews. This was done because analyzing the data stepwise may contribute to systematic improvement of data collection, facilitate reflection, and reduce the number of participants needed [36, 38]. The four steps of the STC were performed repeatedly in both the preliminary stages and the final analysis, leading to several changes and modifications before the final themes were agreed upon.

The analysis was validated by continuously checking the findings against the transcripts, especially after the final analysis. The first author identified illustrative citations and discussed them with the co-authors to choose the ones that best illustrated the themes. These were translated from Norwegian to English by the first author and checked by the other authors.

### Results

A total of 21 long-term members (11 females and 10 males) from eight different fitness centers were interviewed (Table 2). They had been members for 2–20 years and their average age was 43 years (range 20–71 years).

What long-term members wanted to achieve with their membership is described in the theme “Health benefits and physical appearance.” Their experiences with factors affecting their use of the fitness center as a means for physical activity were categorized into the themes “Accessible, safe, and comfortable to use” and “Variety, flexibility, and support.”

#### Health benefits and physical appearance

The long-term members said that they used the fitness center to achieve desired health benefits. The main examples of health benefits were more energy, improved mood and sleep, reduced stress, better well-being, or feeling happier after the workout. Some participants with health complaints said that use of the fitness center was a necessity for their daily function, e.g., to prevent deterioration of their health complaint, and as an aid in pain management.

**Table 1** Illustration of the steps in STC

Step 1: Preliminary theme	Step 2: Meaning units (direct citation from informant)	Step 3: Condensed description	Step 4: Final theme and analytical text
Achieves physical and mental health benefits	“The important thing for me is that I manage to avoid another operation on my knee. Water gymnastics is good for me and I want to continue with this in the future.” “Yes, I feel the positive effects exercise has for me, in relation to both energy and my mood. And my anxiety, it affects that a lot. I have had years where I only have been sitting indoors, without getting out of the house”	Exercise is positive in relation to my health; it also leads to more energy and better mood.	Theme: Health benefits and physical appearance Analytical text: The fitness center was [...] and to achieve desired health benefits.

**Table 2** Demographic characteristics of Participants and members at the fitness centers who have been continuous members for at least two years

Characteristics	Participants N (%)	All similar members at fitness center chain %*
Gender		
- Female	11/53%	59%
- Male	10/47%	41%
Age		
- 20–29	6/28.5%	26%
- 30–49	9/43%	45%
- 50–71	6/28.5%	22%
Duration of membership		
- 2–5 years	9/43%	Median: 2–5 years
- 6–10 years	8/38%	
- > 10 years	4/19%	
Number of visits last two years		
- < 9 visits	1/5%	9%
- 10–49 visits	8/38%	35%
- 50–100 visits	8/38%	24%
- > 100 visits	4/18%	32%
Highest level of education		
- Primary school / Lower secondary school	1	
- Upper secondary school	5	
- Some college / university courses	4	
- Bachelor's degree	11	
- Graduate degree or Advanced degree	2	
Employment status		
- Student (university) full time	1	
- Student and working part time	4	
- Working part time	4	
- Working full time	8	
- Receiving disability benefits or other auxiliary benefits	2	
- Retirement pension	1	

\* All paying members from November 2014 to November 2016 at 3 T-Fitness Center

*Yes, I feel the positive effects exercise have for me, in relation to both energy and my mood. And my anxiety, it affects that a lot. I have had years where I only have been sitting indoors, without getting out of the house. (Female, 30–49 years, member for 8 years).*

However, during the interviews some long-term members mentioned that they wanted to achieve a better look. Physical appearance was seldom directly talked about as a reason. The participants rather mentioned it in passing, e.g., adding it after having talked about another reason, followed by a joke or laughter. The things they said that concerned physical appearance included a fear of becoming overweight, wanting to get into the clothes they had worn before, reducing abdominal size, and becoming more

muscular.

*I have never been concerned about how I look and exercise solely in order to be able to continue to work and avoid a new knee replacement. But I should perhaps have reduced this slightly [laughs and pats the stomach]. (Male, 50–71 years, member for 4 years).*

Male participants, in particular younger males, talked more about wanting to achieve a muscular body and becoming stronger, while female participants talked more about weight loss. When asked about the reason for their focus on physical appearance in relation to the use of the fitness center, some female participants talked about increased emphasis in society on being thinner

and fit.

*It feels like we should have been a little leaner, yes actually a little better at everything. If you do not exercise and stay healthy and slim, you are almost a bit questionable. According to everything that is communicated from the fitness center and health authorities (short pause). I do not like that it affects me so much. (Female, 30–49 years, member for 6 years).*

#### **Accessible, safe, and comfortable to use**

The fitness center was primarily described as a comfortable place to be physically active. It was common to talk about physical activity in the fitness center as easier than being active outdoors. Due to the indoor comfort, avoiding bad weather and winter darkness, they said the fitness center made it easier to motivate themselves to be physically active. Living or working near the fitness center, ample opportunities for parking, and public transport were also given as reasons. Some female participants emphasized the importance of increased security when using the fitness center for physical activity compared to exercising outdoors on their own.

*I feel safe when I visit the fitness center and it is cozy getting inside to the reception area with those flames from the fireplace and the friendly staff in the reception. I am afraid of the dark and yes, I am a little afraid of being assaulted by someone when running outside. (Female, 20–29 years, member for 3 years).*

Even though some participants talked about how they enjoyed using the fitness center for physical activity, they described different challenges and barriers that hindered them in using the fitness center as much as they wanted, e.g., too little time, no childcare, and low motivation to get out of the house. Participants with children living at home especially expressed difficulties finding time and energy. It was said that having commitments such as appointments with others, pre-booked activities, or payment of no-show fees could help them to prioritize physical activity at the fitness center.

*It is a bit odd because I like it when I am at the fitness center, but sometimes or actually quite often, it is hard to get out of the door at home. It is very positive that one must pay if one does not meet for (pre-booked) group classes, because then I have to go. (Female 20–29 years, member for 2 years).*

Payment of membership fees and fees for working with personal trainers were said to affect use of the fitness

center for some long-term members; typically, they wanted to use the services they had paid for. However, most participants stated that the fee was not something they thought of. One participant who was receiving disability benefits talked about the fitness center as an affordable option for exercise and as the only possibility to be regularly physically active.

*It is cheap for me to be a member of the fitness center and it means a lot to me, since I have limited money available. I do not have much money to spend when all expenses are paid, but it is working fine for me to pay a small amount each month [to be a member of the fitness center]. (Female, 50–71 years, member for 4 years).*

Some of the long-term members said that they valued the fitness center as a social meeting place where they could spend time with friends, family, and colleagues and make new acquaintances. This was facilitated by a friendly atmosphere at the fitness center and services like the opportunity to buy a cup of coffee and sit down for a chat.

*I appreciate having the opportunity to socialize with my friend and that we can sit down, relax, and have a chat after the workout. In fact, I always work out with someone. It's social. (Male, 50–71 years, member for 9 years).*

#### **Variety, flexibility, and support**

Variety, with both group classes and various possibilities for self-training, was said by some long-term members to be important with regard to regular use of the fitness center for physical activity. Those using mainly group classes or self-training had different explanations for their use of the fitness center facilities as a means for physical activity.

A typical argument given for participating in group classes was as a help to exercise more vigorously compared to self-training. Some also said that they preferred group classes because they were time limited and followed a fixed structure. Furthermore, some spoke about the boost they got from the atmosphere and enthusiasm in the group classes. This was also mentioned as a reason for going to the fitness center in general, since it required less self-motivation. Other things mentioned were enjoyable experiences, being in a group with others, mastering a new step in a choreography, or a pleasant conversation.

*As an example, if I had chosen a fitness center without classes, instructors, or those types of facilities, I would have needed the inner motivation for exercising, and*

*to be honest — that is not strong enough. I need something and someone to motivate me.  
(Male, 30–49 years, member for 5 years).*

The reasons for preferring self-training were described somewhat differently from group classes. The arguments given for self-training were flexibility, an all-in-one-place access to equipment, exercise at their own pace, and opportunities for targeted exercise in both strength and endurance. On the other hand, participants who did not perform self-training regularly spoke about challenges to implement it, e.g., because they found it boring, a duty, and not enjoyable.

*I have got an exercise program; everything else is too hard, group classes and such. I take my program at my own pace and it strengthens me. It is a bit similar to what I do with the physiotherapist, but here I do not have to see so many sick people.  
(Female, 50–71 years, member for 4 years).*

Some long-term members spoke positively about the help and the individual instructions they received from staff in the main workout area. It had helped them to understand what to do and how to do it when they used the fitness center. The staff were generally described as friendly, helpful, and knowledgeable if the members made appointments, but some perceived them as not very available for questions and help during workouts. Some participants had also used personal trainers and found it helpful for recognizing and understanding their physical capacity and getting a more efficient workout. Personal training was also described by some as helpful when implementing more regular use of the fitness center.

*Yes, I thought I was exercising. However, I realized with guidance from a personal trainer that I previously had been far from being able to call it exercise. So, everyone should try a personal trainer to really understand what one should do and how.  
(Female, 30–49 years, member for 15 years).*

## Discussion

The participants stated that they wanted to achieve health benefits, but they also talked about physical appearance. The fitness center was mainly described as easily accessible and a comfortable place for physical activity. Some female participants emphasized the feeling of safety compared to outdoor activity. Variation in activities, making commitments, and getting support from staff and other members were factors contributing to using the fitness center for physical activity.

There was a duality in what the long-term members wanted to achieve, between health benefits and appearance. The participants talked about the health benefits of physical activity as a main reason to use the fitness center. A survey has also found that members of fitness centers in Norway report they exercise to become fit rather than to gain a better-looking body [27], and the author suggested that it might feel better to say they exercise for fitness rather than for appearance. Similarly, in our study, appearance was mentioned as an additional reason after talking about health benefits. However, findings in another survey among fitness club members showed that seeing physical change as “becoming stronger” or “being able to see improvement in the way I look” were the main reasons for being physically active across age and gender [29].

This raises a question on whether long-term members of fitness centers are more occupied with their appearance than others doing physical activity in other settings. One study found this to be the case, with members of sports clubs being less concerned with appearance than fitness center members [27]. Similarly, a study on college students reported that those who engaged in exercise (e.g., aerobics, cycling, weight training) were more focused on appearance than those engaging in sports (e.g., tennis, basketball, soccer) [28]. It may be positive for fitness center members to focus on looks if it leads to a physically active lifestyle. However, for some, the focus on appearance might lead to a negative attitude towards oneself and make one exercise excessively [39–41]. It is therefore reasonable to question whether fitness centers should focus on appearance when marketing and promoting activities at the centers. In Norway, the main enterprise federation for fitness centers encourages them to be aware of the risk of excessive exercise in relation to disordered eating among their members.

Some of the participants said that they did not visit the fitness center as often as they wanted. A Danish report also found that most members of fitness centers would have liked to work out more frequently than they did [25]. An interesting finding in our study was that having committed to exercise through actions like pre-booking an activity, making a binding agreement with others, or making a payment was said to be the pressure they needed to visit the fitness center. This has not previously been reported, although it has been shown that making personal commitments using commitment devices with rewards or punishments for success or failure has been beneficial for behavioral changes [42, 43]. This can indicate that binding agreements such as pre-booking of activities, no-show fees, appointments, and even payments can be tested by the fitness centers to see if they promote increased use and consequently more regular physical activity among the members.



According to some participants in the present study, an important motivational factor for using the fitness center was the opportunity for social interaction. Participants reported benefits from social support from employees, group classes, and other members, but also from the possibility to be in a social setting. A review also concluded social support to be positively associated with levels of physical activity among adolescents [10], and another review on qualitative studies also found that development and maintenance of social support networks were important for participation in sport and physical activity [11]. Even if these reviews focus on physical activity in general, together with this study it is reasonable to hypothesize that fitness centers can help members to increase their motivation to use the fitness center if they facilitate more opportunities for social interaction. Moreover, a conscientious use of both social interaction and binding agreements might be even more helpful and motivating for some members.

As expected, all participants appreciated that the fitness center was easily accessible, safe, and a comfortable place to be, especially during the fall and winter months. It has also been suggested in a review that levels of physical activity vary with seasons [9]. On the other hand, one study found that weather showed a weaker relationship with physical activity than did accessibility [6]. Similarly, another study found that weather had modest effects on physical activity [44]. In general, easily accessible opportunities for physical activity are positively correlated with the level of activity [6–8]. Thus, in a public health perspective it is important to emphasize that having safe and easily accessible fitness centers might be a driver for more regularly physical activity in the population.

The factors identified in this study are based on experiences from long-term members who have chosen to continue as members for an extended period and naturally are quite satisfied with the fitness center as an arena for physical activity. However, the factors identified are most likely quite similar for all members, regardless of membership duration [26]. It is also possible that the identified factors are important factors generally to maintain physical activity over time.

### Strengths and limitations

A strength in the study is that it is the first to investigate what long-term members want to achieve with their membership and factors affecting their use of the fitness center as a means for physical activity. Another strength lies in the diversity of the sample. A limitation was that the study was done in a restricted geographical area and in only one fitness center chain. It also focused on long-term members and thus not those who for various reasons have terminated their membership. Moreover, it

is possible that invited members who did not want to participate in the study are different from those who enrolled. Furthermore, younger participants were few in number. Younger participants might have had different experiences due to having other motives for participation in physical activity [45]. Given the similarity with findings in other studies on maintaining physical activity [26], it is not likely that the lack of younger participants has influenced the findings in the current study.

We consider it as a strength that the authors, who all took part in the analysis, have different backgrounds and experiences. Having researchers with other backgrounds, using a theory-driven approach, or doing member checking by inviting the participants to comment on the results could have produced other understandings and explanations.

At the time of the completion of the study, the first author worked in the administration of the fitness center chain, which might have influenced the research process. This was duly handled by having the co-authors participate in all steps of the research process, paying attention to the possibility of biases.

### Conclusion

This study indicates that the main drivers for long-term members' use of a fitness center is to achieve desired health benefits and improve physical appearance. The prominent factors for using the fitness center were the comforts of the facilities and the ability to commit to exercise through fixed times for group activities, bookings, payments, and training agreements. Female members also valued the fitness center as a safe place for physical activity. Still, being physically active to the degree one wants is challenging, even for some long-term members.

From a public health perspective, the findings in this study point to commitment and having access to safe and easily accessible arenas for physical activity as being possible drivers for physical activity maintenance.

Further research is required to quantify the knowledge from this study. Doing a questionnaire-based survey with a randomly selected sample of fitness center users is recommended.

### Abbreviation

STC: Systematic text condensation

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### Availability of data and materials

In the anonymized transcripts it is possible to identify the participants, and restrictions therefore apply to the availability of these data. Due to regulations of The Regional Committee for Medical and Health Research Ethics, we have to secure the anonymity of the participants. Parts of the anonymized transcripts are available from the corresponding author on reasonable request.

### Authors' contributions

LR and AS designed and planned the project. LR collected data, performed data analysis, and drafted and completed the manuscript. AS participated in every part of the data analysis. AS, TILN, and THN participated in analysis meetings and commented on the manuscript. All authors read and approved the final version to be published.

### Ethics approval and consent to participate

The study was submitted to The Regional Committee for Medical and Health Research Ethics in Central Norway (2014/1870 REK Midt) and they assessed it as not being health research and therefore not needing their approval. The study was approved by NSD — Norwegian Centre for Research Data (NSD 40604/3/SSA).

The study was conducted in accordance with the Declaration of Helsinki. Participants received written and oral information about the project before the consent form was signed. The interviewer informed the participants of their right to withdraw from the study at any time. The project was considered to have low or no risk for the participants. Confidentiality was ensured by keeping transcripts anonymized and audio files locked in a filing cabinet. Data was only available to the authors.

### Consent for publication

Not applicable.

### Competing interests

First author is an Industrial Ph.D. candidate and was employed in the administration of 3 T-Fitness Center at the time of data collection and writing of this article. The authors declare that there is no competing interests.

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# Paper III



RESEARCH

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# Fitness center use and subsequent achievement of exercise goals. A prospective study on long-term fitness center members

Liv Riseth<sup>1,2\*</sup>, Tom Ivar Lund Nilsen<sup>1,3</sup>, Torunn Hatlen Nøst<sup>5,6</sup> and Aslak Steinsbekk<sup>1,4</sup>

## Abstract

**Background:** Knowledge on the relationship between fitness center use and long-term members' subsequent goal achievement is limited. Therefore, the aim was to investigate the prospective association between the use of fitness centers during 18 months and subsequent self-reported goal achievement among long-term members.

**Methods:** This was a registry- and survey-based longitudinal study of 2851 people who had been members at a Norwegian fitness center chain for more than two years. Fitness center use from December 2016 to June 2018 was obtained from registry data. Subsequent goal achievement was measured in a survey in June 2018, assessed by a 1–100 visual analogue scale, and a score between 0 and 50 was defined as low goal achievement.

**Results:** Visiting the fitness center frequently and regularly, and having frequent group activity bookings were associated with higher subsequent self-reported goal achievement. Participants with fewest visits (1–57 days) during 18 months were more likely to report low goal achievement than participants with most visits (118–543 days) (OR = 8.5; 95% CI 6.3–11.4). Fitness trainer bookings was not clearly associated with subsequent goal achievement.

**Conclusions:** Frequent and regular long-term fitness center use were associated with higher subsequent self-reported goal achievement.

**Keywords:** Fitness center, Goal achievement, Visits, Fitness trainer, Group activity and fitness center use

## Background

Despite overwhelming evidence of physical activity's beneficial effect on health and well-being [1], the proportion of the adult population who reaches WHO's [2] recommended level of at least 150 min of moderate or 75 min of vigorous physical activity throughout the week is low [3]. The same contradiction is also reflected in the use of fitness centers. Although members of fitness centers intend to use the centers regularly [3, 4], a substantial proportion of members has infrequent and irregular use

of the facilities [5]. A large proportion also terminates the membership after a short period [6].

Increasing physical activity and reducing the proportion of people who are physically inactive are significant public health priorities in many countries [8]. To achieve this, knowledge of factors that can motivate people to become and maintain physically active as recommended is therefore warranted [9]. Studies have reported that satisfaction with own goal realization can motivate people to maintain physically active over time [9, 10]. On the other hand, low goal achievement has been associated with negative emotions, reduced self-efficacy, and perceptions of failure that may reduce participation in physical activity [11]. Preventing low motivation and poor goal achievement could therefore be key factors to promote regular and sustained physical activity.

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Fitness centers are essential arenas for physical activity in many countries [12]. They offer various exercise options in a safe environment, they facilitate social interaction, and the members often have access to qualified exercise guidance and coaching [13, 14]. Thus, use of such exercise facilities could motivate members to regular and sustained physical activity and aid people to reach their exercise goals.

Therefore, the aim was to investigate the prospective association between the use of fitness centers during 18 months and subsequent self-reported goal achievement among people who had been members at a fitness center for two years or more.

## Methods

This was a registry- and survey-based longitudinal study with membership registry data from December 1st 2016 to May 31st 2018, and survey data collected in June 2018. The "Strengthening the Reporting of Observational Studies in Epidemiology" guidelines were consulted for the reporting of the study [15].

The study was conducted within the setting of a fitness center chain ([www.3T.no](http://www.3T.no)) in Central Norway. Twelve of 3T's fitness centers are located in the city of Trondheim, which had approximately 205,000 inhabitants in 2020, and these centers had around 40,000 members at the time of data collection. All centers have a primary workout area, and most of the centers have group classes, fitness trainers, personal trainers, saunas, and member lounges with simple café services. Members can book a free-of-charge session with a fitness trainer to get help and guidance and a personalized exercise program, or choose to pay for a personal trainer for closer follow-up and guidance. Group activities in this chain are also numerous and various, including yoga, stretching, water gymnastics, spinning, strength training and aerobics, lasting from 20 to 90 min.

## Participants and procedures

The inclusion criteria were all adult members, aged 18 years or older at the time of survey distribution, who were registered with an e-mail address, been a paying ordinary member for a minimum of the two previous years and who allowed linkage to their membership data on use of the fitness center. Members with free or employee contracts, who were younger than 18 years of age, or whose memberships had not lasted 2 years were excluded.

3 T's head office sent an email to all 15,273 eligible members with information about the study and a link to the survey. The landing page for the survey included additional information about the study. Members who were willing to participate could tick two boxes: one

confirming that they agreed to participate, the other confirming that they consented to having their membership data on the use of fitness centers be linked to their survey record. A reminder was sent to those who had not answered four days after the first request.

## Data collection

### *Fitness center use*

Data on the use of fitness centers was collected from the membership registry, including timestamps for visits, bookings of group activity, and fitness trainer bookings. The number of days with visits during 18 months were categorized into thirds (low (1–57), medium (58–117), and high (118–543)), as well as a separate category for those with zero visits. Similarly, participants were categorized into thirds based on number of group activity bookings (low (1–26), medium (27–80), and high (81–550)), as well as a fourth category with zero bookings. Fitness trainer bookings were categorized into none, one, and two or more bookings. To measure regularity in fitness center visits during the 18-month period, members were classified into three groups based on the number of three-month periods in which they had visited the fitness center at least once: ((1) all six periods, (2) four and five periods, and (3) less than four periods).

### *Self-reported goal achievement*

Self-reported goal achievement was measured on a visual analogue scale (VAS) using the question "On a scale from 0 to 100, to what degree do you experience reaching your exercise goals at the fitness center?" (0 [zero]=to a very little extent, 100=to a very large extent). The distribution of score values was left-skewed, with most people reporting high goal achievement values (median=71, interquartile range 57–80). For the purpose of the linear regression analyses that compared mean score values between categories of the use of fitness centers, the goal achievement variable was log-transformed after inverting the measurement scale (i.e., higher score value on the inverted VAS indicates lower goal achievement), so that a VAS score of 80 was inverted to 20. To avoid missing data when log-transforming zero, 1 (one) was added to all score values. For logistic regression analyses, we constructed a binary variable where the participants were classified into low and high goal achievement based on the 20th percentile of the distribution of score values. Participants below the 20th percentile (i.e., VAS 0–50) were classified as having low goal achievement, and those on the 20th percentile and above (i.e., VAS 51–100) were classified as having high goal achievement.



### Demographic data

The survey provided information on sex (male or female), age in years (<20, 20–29, 30–39, 40–49, 50–59, 60–69 or ≥70), highest completed level of education (compulsory, middle, and higher) and employment (full-time work, part-time work, student, or not working due to occupational rehabilitation, unemployment or being laid off, disability benefits, being retired or other).

### Statistical analyses

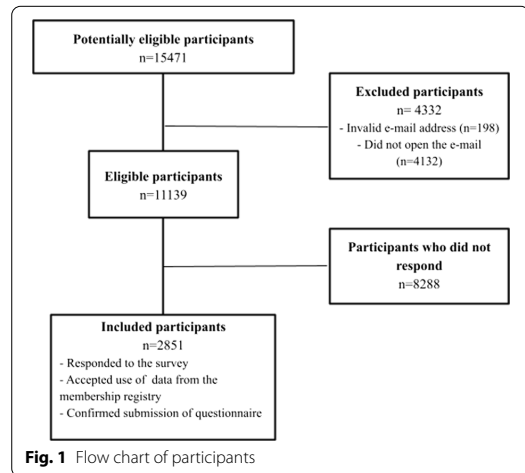
Descriptive characteristics of the study population are presented as proportions within the four categories of days with visits. To obtain inferential statistics, we first used linear regression to compare mean goal achievement score between categories of the four variables representing long-term use of the fitness center (i.e., days with visits, three-month periods with visits, group activity bookings, and fitness trainer bookings). For all comparisons, participants with most frequent visits/bookings constituted the reference group. As described above, the scores for goal achievement were first inverted and then log-transformed. The results of the linear regression analyses are therefore presented as the ratio of geometric means with 95% confidence interval (CI) for each category, relative to the reference group. Secondly, we used logistic regression to estimate odds ratio (OR) with 95% CI of poor goal achievement. Similar to the linear regression analyses, participants with most frequent visits/bookings constituted the reference group for all comparisons. All associations were adjusted for age (<30, 30–39, 40–49, 50–59, 60–69 and ≥70 years), higher education (yes or no), and sex (male, female). We used Stata version 17 (StataCorp LLC, College Station, TX, USA) for all analyses.

### Results

Of the 11,139 eligible members, 2851 (26%) opened the email, accepted the invitation, completed the survey, consented to the linkage to the membership registry, and were available for statistical analyses (Fig. 1). Descriptive statistics of the study population appear in Table 1.

The number of days with visits to the fitness center during the 18 months before answering the survey ranged from 0 to 543 (mean of 97 (SD 73), with a median of 82 days (interquartile range 43 to 135)). Ranging from 0 to 100, goal achievement had a mean of 68 (SD=20) and a median of 71 (interquartile range=57–80).

Overall, less use of the fitness center was associated with poorer goal achievement (Table 2). Participants in the lowest third category of number of days with visits to a center had a geometric mean of 36 on the inverted goal achievement scale (i.e., higher values correspond to lower goal achievement), whereas those in the highest



**Fig. 1** Flow chart of participants

third (reference group) had a geometric mean of 19 (ratio of geometric means = 1.9; 95% CI 1.8–2.1). Similarly, the ratio of geometric means comparing members with less than four 3-month periods of visits (geometric mean of 38) to the reference group with visits in all six 3-month periods (geometric mean of 24) was 1.6 (95% CI 1.5–1.8). The number of group activity bookings showed similar associations, with lower goal achievement in those with fewer bookings. There was no association between the number of bookings with a fitness trainer and mean goal achievement score.

Correspondingly, the use of fitness centers was inversely associated with the proportion who reported low goal achievement on the binary outcome variable (Table 3). Participants in the lowest category of days with visits (OR = 8.5; 95% CI 6.3–11.4) and visits in less than four 3-month periods (OR = 4.7; 95% CI 3.6–6.2) were more likely to report low goal achievement than those in the categories with the highest number of days with visits and visits during all 3-month periods (reference groups), respectively. Members in the lowest third of group activity bookings were more likely to report low goal achievement than those in the upper third (OR = 5.1; 95% CI 3.7–7.1). There was some evidence that participants who reported two or more bookings with a fitness trainer were less likely to report low goal achievement than those without such bookings (OR = 0.6; 95% CI 0.4–1.0).

### Discussion

In this registry- and survey-based longitudinal study among long-term members of fitness centers, a higher number of days with fitness center visits and regular use of fitness centers during and 18 month period were

**Table 1** Characteristics of the 2851 long-term members in the study population at the time of survey participation in June 2018

Variable	Proportion of participants according to number of days with visits				Total (n = 2851)
	0 (n = 70)	1–57 (n = 924)	58–117 (n = 923)	118–543 (n = 934)	
Sex					
Female	60	65	63	59	62
Male	40	35	37	41	38
Age					
< 20 years	0	0	0	1	1
20–29 years	1	7	9	13	10
30–39 years	16	25	17	19	20
40–49 years	31	29	24	24	26
50–59 years	27	22	26	24	24
60–69 years	20	12	14	11	13
≥ 70 years	4	5	10	8	8
Education <sup>a</sup>					
Compulsory	0	1	2	1	1
Middle	21	18	19	25	21
Higher	79	81	79	73	78
Employment					
Full time work	81	79	71	70	74
Part time work	4	7	7	8	7
Student	1	2	3	4	3
Not in work <sup>b</sup>	13	11	19	17	15
Other	0	1	1	1	1

<sup>a</sup> Education: Compulsory (primary school and middle school graduation or lower), middle (high school graduation (duration 1–2 years), high school graduation (duration three years), certificate of apprenticeship (duration four years)), and higher (college/university graduation)

<sup>b</sup> Not in work: occupational rehabilitation, unemployed or laid off, disability benefits or retired

associated with higher subsequent self-reported achievement of exercise goals. Regarding the use of services within the fitness centers, the number of group activity bookings had associations similar to those observed for number of visits, whereas number of bookings with a fitness trainer was not consistently associated with goal achievement.

This study provides new knowledge on the association between the use of fitness centers and goal achievement. Goal achievement has typically been measured on whether concrete goals, such as number of daily steps [16, 17], minutes of physical activity per week, and changes in body weight [18], are met. However, such concrete measures omits the overall experiences of own goal achievement. Thus, the use of a single question to measure overall goal achievement could be used in other studies either alone or in addition to measures of concrete goals.

Visiting a fitness center at least once every third month was associated with higher goal achievement. Research has shown that few members use fitness centers regularly without periods of relapse [6]. Thus, measuring the

regularity of visits, as done in this study, adds important knowledge about the maintenance of physical activity over time, which also is relevant for public health [19]. We have not found any other studies measuring regularity in this manner. Other studies tend to be cross sectional without clearly distinguishing frequency from regularity [20, 21].

It was also found that frequent fitness center visits were associated with higher goal achievement. A Danish report using cross-sectional questionnaire data asked about "regular exercise several times a week" and found that a higher proportion of members who answered yes to this also reported to achieve their exercise goals than members reporting irregular exercise (18% vs. 5%) [20]. In a published cross-sectional survey from Portugal measuring the association between self-reported weekly frequency of fitness center use and satisfaction, found no association [21].

Given the longitudinal design of our study, it seems fair to state that current available evidence points to frequent and regular fitness center visits is associated with higher goal achievement among long-term members. However,

**Table 2** Fitness center use during 18 months associated with subsequent mean goal achievement score among 2851 long-term fitness members

Fitness center useduring 18 months	No. of persons (%)	Mean goal achievement score <sup>a</sup>	Crude ratio <sup>b</sup>	Adjusted <sup>c</sup> ratio <sup>b</sup>	95% CI <sup>d</sup>
Number of days with visits (thirds)					
None	70 (3)	30	1.6	1.6	1.3–1.9
Low (1–57)	923 (32)	36	1.9	1.9	1.8–2.1
Medium (58–117)	924 (32)	25	1.3	1.3	1.2–1.4
High (118–543)	934 (33)	19	1.0	1.0	Ref
Number of three-month periods with visits					
< 4	268 (9)	38	1.6	1.6	1.5–1.8
4–5	441 (16)	31	1.3	1.3	1.2–1.4
6	2142 (75)	24	1.0	1.0	Ref
Number of group activity bookings (thirds)					
None	638 (22)	29	1.5	1.5	1.4–1.7
Low (1–26)	744 (26)	31	1.7	1.7	1.5–1.8
Medium (27–80)	729 (26)	27	1.5	1.5	1.3–1.6
High (81–550)	740 (26)	19	1.0	1.0	Ref
Number of fitness trainer bookings					
None	2391 (84)	26	1.0	1.0	Ref
1	273 (10)	25	0.9	0.9	0.8–1.0
≥ 2	187 (7)	24	0.9	0.9	0.8–1.0

CI = confidence interval

<sup>a</sup> Geometric mean from an inverted VAS (0–100). Higher score indicates lower self-reported goal achievement<sup>b</sup> Ratio between geometric means<sup>c</sup> Adjusted for age < 30, 30–39, 40–49, 50–59, 60–69 and ≥ 70 years), higher education (yes, no), and sex (man, woman)<sup>d</sup> 95% CI for adjusted ratio

the bi-directional nature of goal achievement and the use of fitness centers needs to be kept in mind. Since we do not know the initial goal achievement status, the members' perceived goal achievement level at the study's start might have caused the members' fitness center use, instead of the other way around.

Thus, future longitudinal studies should assess goal achievement both before and after measuring the use of fitness centers.

In addition to visits, we also measured the use of fitness center services, group activity and fitness trainer bookings to further understand which aspects of the use of fitness centers were associated with goal achievement. Among our results, a higher number of group activity bookings was associated with higher self-reported goal achievement.

In a qualitative study among long-term members, joining group activities was told to demand less self-motivation, help to commit more to exercise, and induce more vigorous exercise than self-training [13]. Other studies have found that participating in group activities can improve health-related quality of life [22], enhance aerobic capacity [23], and affect physical activity behavior

[24], which might help to explain why members using that specific service reported higher goal achievement.

Previous research has revealed that one-to-one support can contribute to regular fitness center use [25]. In addition, help and instructions given by fitness trainers have been described positively by long-term members in a qualitative study and said to increase their understanding of using the fitness center as a means for physical activity [13]. However, in the current study fitness trainer bookings were not consistently associated with members' subsequent goal achievement. One reason may be that very few members used that specific service and that most had only one booking during the 18-month period.

#### Strengths and limitations

The longitudinal data and large number of participants are considerable strengths of the current study. In contrast to self-reported activity, registry data provides objectively measured activities and avoids measurement errors [26]. However, this only provided data on number of activities and not the length of or type of activity. Furthermore, the study only focused on activities related to the fitness center, and did not measure

**Table 3** Fitness center use during 18 months associated with subsequent goal achievement among 2851 long-term fitness members. Crude and adjusted odds ratio for reporting low goal achievement<sup>a</sup>

Fitness center use during 18 months	No. of persons	No. of cases	Crude odds ratio	Adjusted odds ratio <sup>b</sup>	95% CI <sup>c</sup>
Number of days with visits (thirds)					
None	70	22	6.7	6.9	3.9–12.2
Low (1–57)	923	339	8.4	8.5	6.3–11.4
Medium (58–117)	924	121	2.2	2.2	1.6–3.1
High (118–543)	934	60	1.0	1.0	Ref
Number of three-month periods with visits					
< 4	268	117	4.7	4.7	3.6–6.2
4–5	441	124	2.4	2.4	1.9–3.0
6	2142	301	1.0	1.0	Ref
Number of group activity bookings (thirds)					
None	638	165	4.5	5.5	3.9–7.8
Low (1–26)	744	199	4.7	5.1	3.7–7.1
Medium (27–80)	729	125	2.7	2.8	2.0–3.9
High (81–550)	740	53	1.0	1.0	Ref
Number of fitness trainer bookings					
None	2391	464	1.0	1.0	Ref
1	273	54	1.0	1.0	0.8–1.5
≥ 2	187	24	0.6	0.6	0.4–1.0

CI: Confidence interval

<sup>a</sup> Low goal achievement was defined as scores between 0 and 50 on the VAS-scale<sup>b</sup> Adjusted for age (< 30, 30–39, 40–49, 50–59, 60–69 and ≥ 70 years), higher education (yes, no), and sex (man, woman)<sup>c</sup> 95% CI for adjusted ratio

the influence of daily life, other physical activities, diet or other external factors.

The reliability or validity of the dependent variable, goal achievement, was not assessed in advance of the study [27]. Some members with no visits during the 18-month study period reported high goal achievement (i.e., ≥ 50 on the 0–100 VAS scale). A possible explanation is that members who scored high on goal achievement without any visits were satisfied with their total activity level and did not differentiate activity inside and outside the fitness center. It is also possible that members were satisfied with the fitness center as an arena for physical activity but without using it during the last 18 months and thus reported high goal achievement. However, the dependent variable was measured with a single question, and the findings were in the expected direction, which indicates that the variable measured what was intended.

Another limitation was that only 26% of eligible members who opened the invitation email chose to participate. Low response rates can increase the risk of selection bias and reduce external validity. Furthermore, the participants were all members at one fitness center chain. Caution should therefore be used when generalizing the findings to other fitness center members.

## Conclusion

In this longitudinal study on long-term fitness center members, more days with fitness center visits and regular use of the fitness centers during an 18-month period were associated with higher subsequent self-reported exercise goal achievement.

## Abbreviations

VAS: Visual analogue scale; OR: Odds ratio; CI: Confidence interval; SD: Standard deviation.

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## Authors' contributions

LR and AS designed and planned the project. LR collected data, performed data analysis, and drafted and completed the manuscript. AS, TILN, and THN participated in every part of the data analysis and commented on the manuscript. All authors read and approved the final version to be published.

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### Availability of data and materials

The anonymized data files are available from the corresponding author on reasonable request.

### Declarations

#### Ethics approval and consent to participate

The study was conducted in accordance with the World Medical Association (WMA) Declaration of Helsinki—Ethical Principles for Medical Research Involving Human Subjects. A request was sent to The Regional Committee for Medical and Health Research Ethics in Central Norway and there was no need for approval (2014/1870 REK Midt). This because the study did not include health research. The study was approved by NSD—Norwegian Centre for Research Data (NSD 40604/3/SSA). The Informants received information about the project, including contact information which was signed and accepted online before participation. The informed consent ensured that the participation was voluntarily and gave information about their right to at any time withdraw from the study. This study was considered to have low or no risk for the participants due to the nature of the intervention (questionnaire) and no collection of sensitive data.

#### Consent for publication

Not applicable.

#### Competing interests

The authors declare that they have no competing interests.

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## Appendix





## Appendix

**1.** (Motivation OR goal\* OR behavior OR use OR frequency OR attitude OR adherence OR aspiration OR commitment OR performance OR achievement OR "follow up" OR "long term" OR visit\* OR maintenance OR attendance OR participation OR (MESH): Motivation OR Exercise/psychology\* OR Behavior\* OR "Physical Fitness/psychology" ) AND (physical activity[MeSH Terms])

Filters: in the last 1/5 years, Humans, English, Adult: 19+ years, Adult: 19-44 years, Middle Aged + Aged: 45+ years, Middle Aged: 45-64 years, Aged: 65+ years, Young Adult: 19-24 years

**2.** Motivation[Mesh] AND (Exercise/psychology[Mesh] OR Physical Fitness/psychology[Mesh])

**3.** ("Cell phone"[MeSH Terms] OR "electronic mail"[MeSH Terms] OR "telephone\*" [Title/Abstract] OR "phone call\*" [Title/Abstract] OR "e-mail" [Title/Abstract]) AND "exercise"[MeSH Terms]

**4.** ("Cell phone"[MeSH Terms] OR "electronic mail"[MeSH Terms] OR "telephone\*" [Title/Abstract] OR "phone call\*" [Title/Abstract] OR "e mail" [Title/Abstract]) AND ("Fitness Centers"[MeSH Terms] OR "sports center\*" [Title/Abstract] OR "sports club\*" [Title/Abstract] OR "fitness club\*" [Title/Abstract] OR "fitness trainer\*" [Title/Abstract] OR "personal trainer\*" [Title/Abstract] OR "fitness club\*" [Title/Abstract])

**5.** (Goal[MeSH Terms]) AND (fulfillment[Title/Abstract]) OR (achievement[Title/Abstract]) OR (realization[Title/Abstract]) OR (attainment[Title/Abstract]) OR (accomplishment[Title/Abstract]) AND (activity, physical[MeSH Terms]) AND (y\_10[Filter])

**Figure 1.** Search strategies for Studies I-III and thesis

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