Group-based exercise programs for older adults in Manitoba

By

Mikyung Lee

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Abstract

Group-based exercise programs have been shown to be one means of not only increasing activity levels for older adults but sustaining physical activity. However, research has shown that only a small proportion of older Manitobans participate in exercise classes. The purposes of this study were to determine: 1) what group-based exercise programs exist in Manitoba for older adults (55 years and older), 2) where these programs are delivered, 3) how these programs are designed, 4) who are the instructors of these programs and 5) what elements are included that may encourage older adults to attend and adhere to them. This study was completed using a cross-sectional design and an online survey of instructors who deliver group-based exercise programs to older adults in Manitoba. One hundred twelve instructors who completely filled out the survey, and 158 programs were included in the data analysis. The majority of instructors were relatively older (≥50 years, 69.7%), female (86.6%), employed (85.4%), had exercise-related certifications (86.6%) and over 5 years of experience in delivering exercise programs (54.5%). The majority of programs required a fee for participation (77.8%) and were mixed-gender (84.2%). All of the single-gender programs were female-only programs. The majority of programs had opportunities for social interaction (70.9%). More than half of the programs were performed in Winnipeg (66.9%) and no programs were reported in Northern Manitoba. Regarding rural-urban disparity, there were 19 programs (13.7%) in rural areas and 86.3% were in urban areas. In conclusion, most instructors were considered to be knowledgeable and experienced in leading exercise programs, which are key assets to encourage older adults to attend and adhere to exercise programs. Having a small number of free programs, no male-only programs, and regional disparity could contribute to a lower participation rate in exercise programs in Manitoba.
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# Table of Contents

Abstract .................................................................................................................................................. II

Acknowledgements ............................................................................................................................. III

Table of Contents ................................................................................................................................ IV

List of Tables ........................................................................................................................................ VII

List of Figures ....................................................................................................................................... VIII

1. Introduction ...................................................................................................................................... 1
   1.1. Purpose ...................................................................................................................................... 3

2. Review of Literature ....................................................................................................................... 5
   2.1. Seasonality effects on outdoor walking .................................................................................... 5
   2.2. Effectiveness of exercise interventions and older adults’ preferences in exercising ......... 6
   2.3. Seasonality effects on group-based exercise programs ......................................................... 9
   2.4. High attrition rates in group-based exercise programs ............................................................ 10
   2.5. Factors that could affect adherence to group-based exercise programs ............................ 12
      2.5.1. Instructor characteristics .................................................................................................. 12
      2.5.2. Program design ................................................................................................................ 13
      2.5.3. Social interaction .............................................................................................................. 15
   2.6. Summary of Review of Literature ............................................................................................ 16

3. Methods .......................................................................................................................................... 17
   3.1. Study design ............................................................................................................................ 17
5.3. Social interaction ........................................................................................................ 59
5.4. Regional differences in group-based exercise programs ............................................. 61
5.5. Strengths and implication ............................................................................................. 63
5.6. Limitations .................................................................................................................. 63
6. Recommendations ........................................................................................................... 67
7. Conclusions .................................................................................................................... 68
8. References ....................................................................................................................... 69
Appendix 1. Survey request email ....................................................................................... 85
Appendix 2: Survey .............................................................................................................. 86
List of Tables

Table 1. Instructor characteristics. ................................................................. 25
Table 2. Program description. ........................................................................ 29
Table 3. The number of group-based exercise programs reported in this study, with accompanying information on the health regions where programs were located (total population, population of older adults and the proportion of older adults in each health region). ............... 31
Table 4. Social interaction. ............................................................................. 35
List of Figures

Figure 1. Participant flow chart ................................................................. 23

Figure 2. Group-based exercise programs in Manitoba .................................. 32

Figure 3. Group-based exercise programs in Winnipeg .................................. 33

Figure 4. Instructors’ age group and possession of certifications ........................ 36

Figure 5. Instructors’ age group and training/education .................................. 37

Figure 6. Possession of certifications and social interaction .............................. 38

Figure 7. Training/education and social interaction ........................................ 39

Figure 8. Program cost and number of participants ........................................ 40
1. Introduction

Physical activity, which is defined as “any bodily movement produced by skeletal muscles that require energy expenditure” (Caspersen et al. 1985; World Health Organization 2018), is strongly associated with improving overall health and preventing premature death, chronic disease and disability (Warburton et al. 2006; Paterson and Warburton 2010; Health Canada 2011). Especially for older adults, health benefits of regular physical activity such as maintaining and improving overall health, functional independence and quality of life have been well documented (Paterson and Warburton 2010; Health Canada 2011). However, the majority of older adults remain sedentary, and withdrawal from exercise programs often occurs before such health benefits have been realized (Prohaska et al. 2000; Schmidt et al. 2000; Jancey et al. 2007; Statistics Canada 2015a). “Exercise programs” in this study are defined as physical activity programs that contain the features of exercise (e.g., planning, structuring, and aiming to improve or maintain one or more components of physical fitness) (Caspersen et al. 1985; World Health Organization 2018).

In 2011, Canadian Physical Activity Guidelines recommended that adults, including those aged 65 years and older, perform at least 150 minutes of moderate to vigorous intensity aerobic physical activity per week, and muscle and bone strengthening activities at least 2 days per week to achieve various health benefits and improve functional abilities. Performing physical activities that could improve balance was also recommended especially to older adults with mobility issues (Tremblay et al. 2011).

Based on statistics, however, average daily minutes of moderate-to-vigorous physical activity (MVPA) for Canadian older adults (aged 60 to 79 years) is only 14 minutes, 98 minutes per week (Statistics Canada 2015a). Moreover, only 12% of them achieve a sufficient amount of
physical activity (Statistics Canada 2015a) recommended by the World Health Organization (WHO; World Health Organization 2011) and Canadian Physical Activity Guidelines (Tremblay et al. 2011). In the case of Manitoba, Statistics Canada has shown that the proportion of active or moderately active older adults (aged 65 years and older) is lower than the national average by 4.8% (48.4% for older Canadians and 43.6% for older Manitobans) (Statistics Canada 2015b). In contrast, 59.5% and 70.6% of older Manitobans, aged between 65-74 years and 75 years and older respectively, believed that the most important behaviour change to improve health is “to exercise more” (Centre On Aging 2019).

A number of previous studies and the most recent epidemiological studies have pointed to the fact that individuals could benefit from even small volumes of physical activity (Wen et al. 2011; Lee et al. 2014; Arem et al. 2015; Warburton and Bredin 2016). That being said, a large body of evidence on the dose-response relationship between increased physical activity and various health outcomes has clearly demonstrated more and regular long-term physical activity has a greater effect on people’s health (e.g., reducing functional limitations and the onset of disability, compression of morbidity, etc.) (Spirduso and Cronin 2001; Haskell et al. 2007; Paterson and Warburton 2010; World Health Organization 2010; Tremblay et al. 2011; Bezerra et al. 2018). Therefore, it is important to encourage older adults to participate in physical activity regularly and for a long term.

In this context, group-based exercise programs have been shown to be one means of not only increasing activity levels for older adults but sustaining physical activity (Van Der Bij et al. 2002; Farrance et al. 2016). Furthermore, the programs have the potential to optimize psychological wellbeing and generally be considered the preferred mode of exercise amongst older adults (Van Der Bij et al. 2002; Beauchamp et al. 2007; Holt-Lunstad et al. 2010; Steptoe
et al. 2013; Farrance et al. 2016). Amongst older Manitobans (aged 65 years and older), however, only 7.8% of them responded that they participate in exercise classes (Centre On Aging 2019). It is unclear why the participation rate is so low.

There are several factors that could affect attendance and adherence to group-based exercise programs amongst older adults which are 1) person-level factors including current/previous physical activity levels, educational attainment, health status, personal motivators and lack of discipline (Stiggelbout et al. 2006; Seguin et al. 2010; Hawley-Hague et al. 2014; Hawley-Hague et al. 2016; Killingback et al. 2017), 2) instructors’ characteristics including personality, professionalism and previous experience (Seguin et al. 2010; Hawley-Hague et al. 2014; Killingback et al. 2017), 3) program design including location, affordability and variety of exercise classes (Hawley 2009; Hartley and Yeowell 2015; Killingback et al. 2017) and 4) social interaction (Garmendia et al. 2013; Hawley-Hague et al. 2014; Hartley and Yeowell 2015; Killingback et al. 2017). In this study, however, we focused on factors that are related to exercise programs and instructors which are instructors’ characteristics, program design and social interaction in accordance with the purpose of our study.

1.1. Purpose

The purposes of this study were to determine 1) what group-based exercise programs exist in Manitoba for older adults, 2) where these programs are delivered 3) how these programs are designed, 4) who are the instructors of these programs and 5) what elements are included that might encourage older adults to attend and adhere to them. Several exploratory hypotheses were also developed to examine relationships between the characteristics of the instructors and the
programs they lead. Detailed information on the exploratory hypotheses is presented in the methods section.
2. Review of Literature

2.1. Seasonality effects on outdoor walking

The most prevalent form of physical activity amongst Canadians including older adults (aged 65 years and older) is walking (Statistics Canada 2015c). However, it seems many cannot adhere to walking as it is highly susceptible to seasonal issues.

The correlation between seasonality and walking has been investigated internationally. In an observational study, Tudor-Locke et al. assessed the number of steps per day using pedometers amongst 23 adults (Mean age= 38±9.9 years) in South Carolina and Tennessee, and indicated that the participants took significantly fewer steps in winter compared to summer (p=0.001) (Tudor-Locke et al. 2004). Similarly, Yasunaga et al. measured the number of steps and metabolic equivalent values (METs) using electronic pedometers/accelerometers throughout a year amongst 95 older adults aged between 65-83 years old in Japan, and noted that the monthly-averaged number of steps, monthly-averaged duration of low intensity physical activity (<3 METs) and high intensity physical activity (>3 METs) were lower in winter than any other seasons (Yasunaga et al. 2008). In a study that explored motivators and barriers to walking amongst 14 older adults (aged 65 years or older) who resided in the City of Mississauga, Ontario, using in-depth interviews, Mitra, Siva and Kehler identified that severe climatic condition is one of the most frequently mentioned barriers to walking, which discouraged these older adults from being physically active (Mitra et al. 2015).

The abovementioned studies have shown consistent outcomes that adverse climatic conditions, especially cold weather, have negatively impacted the level of physical activity amongst all populations including older adults. The studies that were mentioned above, assessed walking which is known as the most prevalent and accessible form of physical activity for older
adults (Clark 1999; Walsh et al. 2001; Dafna et al. 2012; Kerr et al. 2012). However, given the results of previous studies, it seems outdoor walking might not be the most effective exercise strategy for older adults to sustain physical activity for the long term, since outdoor walking is highly susceptible to poor weather. In this context, several studies pointed out a strong need for indoor physical activity facilities in order to give opportunities to participate in physical activity all year round (Pivarnik et al. 2003; Merrill et al. 2005; Tucker and Gilliland 2007).

Which indoor facilities would be the most preferred and suitable for older adults to be physically active for the long term? In order to answer the question, the following sections covered the following topics: effectiveness of exercise interventions for older adults and older adults’ preference in exercising.

2.2. Effectiveness of exercise interventions and older adults’ preferences in exercising

There are a range of indoor exercise interventions for older adults which include indoor walking programs using gym, tracks, shopping mall, etc., indoor cycling, dancing, aquatic programs, yoga, pilates, etc. All these indoor exercise interventions could be categorized into two groups which are individual-based exercise settings whereby participants exercise individually with/without an exercise prescription provided by health professionals and group-based exercise settings where participants engage in supervised group exercise programs.

According to a systematic review which considered 38 studies published from 1985 through 2000 and included 47 individual-based (n=9) and group-based (n=38) exercise interventions, both individual and group-based exercise interventions have demonstrated to be effective strategies related to short term participation rates. Specifically, individual-based exercise programs (n=4) achieved an overall mean participation rate of 90%, and group-based exercise
programs achieved 84% (n=28) in short-term interventions (<1 year). However, regarding long-term interventions (≥1 year), group-based exercise programs seem to achieve a higher participation rate than individual-based exercise programs. The results have shown an overall mean of adherence rate of 75% (n=10) for group-based exercise programs and an adherence rate of 54% (n=3) for individual-based exercise programs. In sum, this study indicated that group-based exercise programs are more effective than individual-based exercise programs when it comes to adherence for a long term (Van Der Bij et al. 2002). Similarly, in a more recent review paper which included 10 studies published from 2000 to 2013, Farrance et al. investigated adherence of older adults attending group-based exercise programs (≥6 months) and the result indicated a mean adherence rate of 69.1% which is relatively higher than the individual-based exercise programs (≥1 year) shown in Van Der Bij et al.’s study (Farrance et al. 2016).

There are other benefits of group-based exercise programs which individual-based exercise programs cannot provide: knowledgeable instructors within exercise settings and social interaction amongst exercise participants.

Older adults from previous qualitative studies have stated that having knowledgeable instructors in an exercise setting facilitated them to attend and adhere to exercise, and reduced fear of injury, which is a commonly cited barrier to exercise amongst older adults (van Stralen et al. 2009; Baert et al. 2011; Costello et al. 2011; Bethancourt et al. 2014). In addition, it is noted that older adults tend to view exercise as a sociable activity. Accordingly, a lack of company/companionship is a predominant barrier to becoming more physically active for older adults (Caserta and Gillett 1998; Dergance et al. 2003; Moschny et al. 2011). According to Moschny et al.’s study, when older adults were asked to respond to a statement regarding lack of companionship (“I don’t have any company. I would be more active with a partner or in a
group”), 43% of them responded “yes”. In their study, this was the second major barrier to initiate and maintain exercise followed by poor health (Moschny et al. 2011). In a qualitative study which explored perspectives on physical activity amongst ethnically diverse older adults, the findings noted that despite ethnic diversity, the participants thought the social benefits of exercise were a strong motivator to be physically active (Belza et al. 2004). Similarly, Costello et al. researched the viewpoint on exercise among physically active and inactive older adults, and active older adults mentioned that social interaction along with group activities helps them to be active more regularly (Costello et al. 2011). Not only for active older adults but also for those who are relatively inactive due to lack of self-discipline or motivation to exercise, the social aspect of exercise seems to be an important factor to encourage them to exercise (Bethancourt et al. 2014).

Furthermore, exercise programs which can provide social support and networks for older adults have been demonstrated to optimize psychological benefits which could positively affect older adults’ mental health, morbidity and mortality (Holt-Lunstad et al. 2010; Steptoe et al. 2013).

All in all, the abovementioned studies showed the potential and importance of group-based exercise programs in supporting older adults in sustaining participation in exercise and psychological well-being through social interaction amongst exercise participants.

In terms of older adults’ preference in exercising, it seems that older adults prefer group-based exercise settings rather than individual exercise settings when the exercise class is comprised of others with a similar age. In Beauchamp et al.’s study which conducted interviews amongst 947 UK adults aged between 30 and 91 years to examine the exercise preferences for involvement in exercise classes, older adults did not show a greater preference to exercising
alone as opposed to exercising in age-matched group-based settings and reported that they preferred age-matched group-based exercise settings (Beauchamp et al. 2007). Burton, Khan and Brown conducted a similar study using a mail survey with 7378 adults aged between 42 and 67 years. The survey results have shown that adults aged 60-67 years were likely to prefer to exercise with people with a similar age (Burton et al. 2012).

In conclusion, group-based exercise programs have the potential to facilitate exercise adherence in the long term, optimize psychological wellbeing and generally be considered the preferred mode of exercise amongst older adults.

2.3. Seasonality effects on group-based exercise programs

Several studies have demonstrated that even indoor physical activities are interrelated with seasonality, especially for older adults. A longitudinal study on the effect of weather on exercise adherence in 110 older US women (50 years and older) showed that cold and snowy weather were highly associated with a reduced exercise class attendance rate. The study provided exercise classes designed especially for older adults at the local community centre, for over 2 years. However, when the weather was cold (wind-chill index below 20°F), the exercise participation rate was significantly decreased (p<0.0001). Also, the participants were less likely to attend the class on snowy days compared to non-snowy days (p<0.0001) (Tu et al. 2004). In a similar regard, in a qualitative study, Tulloch et al. (2013) investigated exercise facilitators and barriers among 28 adults with type 2 diabetes aged 39 to 70 years, using telephone interviews and found out that bad weather had a negative effect on attending community-based exercise classes. The group performed exercise 3 times per week at the community-based exercise facilities and conducted interviews at 3-week, 3-month, 6-month and 9-month intervals. After the
3 month interval, approximately 30% of participants reported harsh weather conditions, especially winter weather, as a barrier to participate in exercise classes (Tulloch et al. 2013).

Spinney and Millward, who studied weather impacts on leisure activities in Halifax, Nova Scotia, indicated that the provision of indoor exercise facilities is not enough to encourage older adults to participate in a year-long physical activity (Spinney and Millward 2011). This is because even though indoor physical activities are available, older adults still need to go outside to go to the facilities, and weather-related factors hinder older adults from even going outside. Evidence showed that older adults are highly sensitive to weather. According to Von Mackensen et al., older adults (aged over 60 years) have the highest prevalence of weather sensitivity amongst the Canadian adult population (aged over 18 years), where over 69% of them considered poor weather affects their health. Moreover, amongst respondents who mentioned that they are susceptible to weather, 29% reported they caught colds, suffered from psychological effects (28%) and had painful joints, muscles and arthritis (10%) along with poor weather conditions (Von Mackensen et al. 2005). Therefore, it seems weather sensitivity in association with health conditions negatively affect older adults’ decisions to venture outside.

These findings clearly demonstrate that indoor group-based exercise programs need to establish sufficient winter preparation such as providing information with home exercise program or prescription for those who are not able to attend the exercise programs in winter and to encourage them to participate in physical activity all year round.

2.4. **High attrition rates in group-based exercise programs**

As addressed earlier, group-based exercise programs have been demonstrated to achieve higher adherence than individual-based exercise programs in the long term (≥1 year). However,
research has shown that even the adherence of group-based exercise programs declines the longer the program duration. To be specific, approximately one third of older adults withdraw from the exercise programs when the programs are 6 months or longer (Farrance et al. 2016). In a study that investigated attrition rate in a 6-month walking, strength and flexibility exercise program for older adults, who were between 65 and 74 years old, Jancey et al. found that 86 older adults (35%) out of 248 dropped out of the exercise intervention within 6 months (Jancey et al. 2007). Similarly, in King et al.’s study which compared the adherence rate between endurance/strengthening exercise groups and stretching/flexibility exercise groups of 103 older adults (age 65 years and older), indicated the adherence rate of 65% and 68% respectively in a 12-month intervention (King et al. 2000). In line with these findings, Englund et al. showed similar results in their study where the adherence rate was 67% amongst 48 older women aged between 66 and 87 years who participated in 50 minutes of a group-based exercise program with strength, aerobic, balance and coordination exercise twice a week for 12 months (Englund et al. 2005).

All in all, the abovementioned studies showed that approximately one third of older adults who participated in group-based exercise programs discontinue exercise involvement when the duration of program is long (≥6 months).

How can we encourage older adults to initiate a participation in group-based exercise programs, minimize attrition rate and maximize adherence to the programs for a long term? In order to answer the question, the following sections covered the following topic: factors that could affect attendance and adherence to group-based exercise programs.
2.5. Factors that could affect adherence to group-based exercise programs

There are several factors that could affect attendance and adherence to group-based exercise programs amongst older adults. As mentioned in the introduction, however, only the factors that are related to exercise programs and instructors were addressed in this study, and therefore will be discussed here. The primary goal of this study was to receive as many survey responses as possible to understand current situation of group-based exercise programs in Manitoba. In order to achieve a high response rate, surveys should be kept relatively short since longer survey achieve lower response rates than shorter survey as they demand more time from the respondent (Deutskens 2004; Dillman 2011). Therefore, considering the complexity of the assessment of individual instructor’s personality using online survey, we decided not to consider instructors’ personality to fulfill the primary purpose of our study.

2.5.1. Instructor characteristics

Attendance and adherence to group-based exercise programs are associated with instructor characteristics such as professionalism and previous experience (Seguin et al. 2010; Hawley-Hague et al. 2014; Killingback et al. 2017). In a multiple case study that examined older adults’ long-term adherence to group-based exercise programs using qualitative data (participant observation, focus groups, documents and interviews), the participants expressed that they prefer to have instructors who recognise individual participants’ physical limitations and adapt exercise accordingly, in order for them to adhere to the programs (Killingback et al. 2017). In terms of an instructor’s previous experience, Seguin et al. demonstrated that exercise class adherence was positively linked with an instructor’s prior experience leading exercise programs (p=0.006) (Seguin et al. 2010). Similarly, Hawley-Hauge et al. studied the association between adherence
and an instructor’s previous experience. They conducted a longitudinal study using
questionnaires with 16 instructors, 26 exercise classes and 193 older adults aged between 60 and
100 years, and found out that an instructor’s previous experience had a positive relationship with
participant attendance in the first 3 months (p<0.05). They assumed that in the first 3 months, an
instructor’s previous experience plays an important role in ensuring participants feel comfortable
within the class (Hawley-Hague et al. 2014).

All in all, the abovementioned studies showed that older adults are more likely to attend and
adhere to exercise programs when instructors are knowledgeable and have previous experience
leading exercise classes.

2.5.2. Program design

Attendance and adherence to group-based exercise programs is related to the way the
programs were designed, structured and delivered. Specifically, features of cost, location and
program structure including variety and adaptable exercise content, as well as age and gender-
matched classes, are highly associated with attendance and adherence (Hawley 2009; Dunlop
and Beauchamp 2011; Hartley and Yeowell 2015; Killingback et al. 2017). In terms of location
and cost, a preference has been shown for more local community venues to reduce travel time
and free or low-cost programs (Hartley and Yeowell 2015; Killingback et al. 2017). When it
comes to the exercise content, older adults prefer to have adaptable exercise with high standards
of safety and variety. Hartley and Yeowell who explored experiences of attending exercise
groups amongst community-living older adults aged 65 years and older, to understand elements
that could affect adherence to group-based exercise programs, found out that high costs to
engage in exercise and lack of suitable space are barriers to involve long-term engagement in the
exercise programs. On the other hand, having a range of exercise is a motivator to adhere to the programs, as it gave variety to their sessions and fulfilled older adults’ different needs (Hartley and Yeowell 2015).

Furthermore, it seems older adults prefer to exercise with others of a similar age. In a study which conducted interviews amongst 947 UK adults aged between 30 and 91 years to examine the exercise preferences, older adults expressed their strong preference on engaging in exercise programs with others of a similar age (Beauchamp et al. 2007). Burton, Khan and Brown have reported similar results where older adults aged between 60 and 67 years prefer to exercise with people the same age (Burton et al. 2012).

Regarding older adults' preference for same-gender exercise programs, Dunlop and Beauchamp conducted a survey with 772 participants who were in their 20s to 70s and asked to rate their preferences for exercising in a group with males only, exercising in a group with females only, and exercising in a group with both males and females. Both male and females in the survey reported a significant preference for same-gender exercising (p<0.001) (Dunlop and Beauchamp 2011). In a more recent study, Dunlop and Beauchamp conducted a case study using semi-structured interviews amongst 19 older men (Mean age: 77.12±9.19 years) who attended a male-only group exercise program (The Lively Lads Fitness Program) which has a high adherence rate with over 45% of its membership adherent for 10 years or longer, and approximately 70% adherent for more than 5 years at the time of the study. The majority of participants mentioned that exercising with the same gender is one of the reasons that they kept attending the program (Dunlop and Beauchamp 2013).

All in all, in light of findings from the above studies, when the exercise program is low cost, close by, has a range of exercises with high standards of safety and aged-matched same-gender
classes, older adults are more likely to attend and adhere to the programs.

### 2.5.3. Social interaction

Research has shown that the opportunity to meet and interact with others and to feel part of a group emerged as an important facilitator of adherence to group-based exercise programs amongst older adults (Garmendia et al. 2013; Hartley and Yeowell 2015; Hawley-Hague et al. 2016; Killingback et al. 2017). Participants from Killingback et al., indicated that although it took time to get to know people and build friendship, as the months went on, they felt more at ease with one another. Also, participants viewed each other as nice people which led to the development of new friendships which was seen as a meaningful benefit of attending exercise programs (Killingback et al. 2017). Similarly, a participant from Hawley-Hague et al. mentioned that “we go out socially as well. We go to the cinema once a month” which helped prevent group members dropping out and ensuring that all group members felt a sense of connectedness (Hawley-Hague et al. 2016).

All in all, having a strong bond and social interaction with each other are important promoters of group-based exercise programs and contribute to a higher adherence.

To sum up, in order to encourage older adults to initiate and adhere to group-based exercise programs, it is important to have knowledgeable and experienced instructors, low cost programs, local-located facilities, a variety of programs, age-matched same-gender classes, and opportunities to socialize.
2.6. **Summary of Review of Literature**

The most popular form of physical activity amongst older adults in Canada including Manitoba is walking (Statistics Canada 2015c). However, research has shown that walking might not be the most effective way to participate in physical activity amongst older adults in a long term as it is highly susceptible to inclement weather (Tudor-Locke et al. 2004; Yasunaga et al. 2008; Mitra et al. 2015). In this context, several researchers pointed out a strong need for indoor physical activity facilities (Pivarnik et al. 2003; Merrill et al. 2005; Tucker and Gilliland 2007).

Based on numerous previous studies on the effectiveness of exercise interventions and older adults’ preferences in exercising, group-based exercise programs seem to have the potential to facilitate high exercise adherence in the long term, optimize psychological wellbeing and generally be considered the preferred mode of exercise amongst older adults (Van Der Bij et al. 2002; Beauchamp et al. 2007; Holt-Lunstad et al. 2010; Farrance et al. 2016).

However, several weaknesses of group-based exercise programs exist which are the effect of seasonality and high attrition rates (King et al. 2000; Tu et al. 2004; Englund et al. 2005; Jancey et al. 2007; Tulloch et al. 2013; Farrance et al. 2016). Some factors which have been shown to encourage older adults to attend and adhere to group-based exercise programs include: knowledgeable and experienced instructors within the program, low cost or free programs, local-located facilities, a variety of programs, age-matched same-gender classes, and opportunities to socialize amongst exercise participants. In order to deal with the fact that older adults might not attend group-based exercise programs when the weather is inclement, additional exercise options might need to be provided.
3. Methods

3.1. Study design

This project used a cross-sectional study of instructors who were delivering group-based exercise programs in Manitoba, using an online survey. Instructors who were delivering group-based exercise programs to older adults in any way and regardless of location in Manitoba were contacted by several organizations that we were working with (Manitoba Fitness Council, Recreation Connections, and Manitoba Association of Senior Centres). Based on the organization’s age-based definition (Manitoba Association of Senior Centres), individuals aged 55 years and older were considered as older adults in this study.

3.2. Participants

Participants of this study were instructors who were delivering group-based exercise programs to older adults in Manitoba, Canada. For those instructors who publicly listed their email address on a website associated with a program, the survey request email went directly to the instructors (see Appendix 1 for a copy of the email). However, most instructors in the province did not have publicly available email addresses. Therefore, we sought assistance from several organizations (Manitoba Fitness Council, Recreation Connections, and Manitoba Association of Senior Centres) to reach instructors in the province. Based on each organization’s website, Manitoba Fitness Council represents fitness professionals in Manitoba. Recreation Connections represents professionals, practitioners and volunteers in the recreation, sport, parks and leisure industries in Manitoba. Manitoba Association of Senior Centres “is a provincial focal point to facilitate communication, networking and planning among senior centres…”, across the whole province. Given these statements and the fact that our survey was distributed to all those
who were associated with these three organizations, many individuals who were not eligible for our survey received our survey invitation.

3.3. Survey instrument

Questionnaire items were developed to determine 1) what group-based exercise programs exist in Manitoba for older adults, 2) where these programs are delivered, 3) how these programs are designed, 4) who are the instructors of these programs and 5) what elements are included that might encourage older adults to attend and adhere to them. In terms of how we developed the questionnaire items, most questions that were part of the survey were original questions based on the items of interest mentioned in the introduction. A few questions were developed based on Dr. Sibley’s survey on fall prevention exercise programs (Sibley et al., 2019). Similar topics of interest resulted in similar, albeit slightly different questions.

The survey questionnaire contained 26 questions which addressed three categories including instructors’ characteristics, program description and social interaction (see Appendix 2 for a copy of the survey instrument). Except for the last question, all questions were close-ended.

1) Instructors’ characteristics

There were questions on instructors’ ages, genders, possession of exercise-related certifications, having experience in receiving training or education in delivering exercise programs for older adults, and the number of years of experience of exercise program instruction.

2) Program description
There were questions on the characteristics of the exercise programs (i.e., aerobic training, balance training, resistance training, etc.), features of cost, numbers of classes performed in a week, length of the program, approximate numbers of participants, approximate age of participants, and participants’ gender within the class. We also asked about differences in the attendance rate between winter and non-winter months, whether they provide older adults with home exercise programs for those who are not able to attend the program in winter, and how they provide the exercise information.

3) Social interaction

There were questions on the availability of social activities amongst exercise program participants within and outside of the class.

After a draft of the survey was developed, we received input from an experienced instructor on the draft, which was considered when we finalized our survey.

The final survey underwent pilot testing with three instructors who were delivering group-based exercise programs at the Active Living Centre, at the University of Manitoba to find out whether the participants understood the survey questions and to discover any practical problems. The pilot data were not included in our final data analysis, and no additional changes were made to the survey from the pilot testing.

3.4. Survey delivery

Participants were invited to participate in the study via receiving an email or e-newsletter with survey information and link. The survey was anonymous and was carried out using
SurveyMonkey, which is an online survey website. The survey invitation messages were sent during May and June 2019, and responses up to July 9th were included in the data analysis.

We used a tailored design method (TDM) described by Dillman (2011) to increase the response rate of the survey. Firstly, the questionnaires started with questions that are easy to answer and interesting, in order to avoid having to scroll down the page. Also, the questionnaires were kept as short as possible since people tend to finish a questionnaire in one go. Secondly, we had a 50-dollar gift voucher for one person, since several research studies on the effect of incentives on response rate of internet-based survey indicated that incentives effectively raise the response of surveys (Cobanoglu and Cobanoglu 2003; Su et al. 2008; Dillman 2011). Lastly, we were tried to use the pre-notice and reminder email strategy where we sent a pre-notice email about the survey 2 to 3 days before the questionnaire being sent out and a reminder email two weeks after we sent the survey out to remind participants to complete the survey with the help of the organizations that we were working with (Manitoba Fitness Council, Recreation Connections, and Manitoba Association of Senior Centres). However, due to staff availability and other logistical issues with organizations, there were departures from this schedule with some organizations.

3.5. Exploratory hypotheses

Since the primary purpose of this study was to understand the nature of ongoing group-based exercise programs and the instructors of the programs in Manitoba, there was no formal hypothesis. However, this study had several secondary hypotheses regarding the instructors and the programs.
1) It was hypothesized that the proportion of relatively younger instructors who have exercise-related certifications would be higher than relatively older instructors.

2) It was hypothesized that the proportion of relatively younger instructors who have received any specific training or education in delivering exercise programs would be higher than relatively older instructors.

3) It was hypothesized that the proportion of instructors who have an opportunity for social interaction in their programs would be higher among instructors who have exercise-related certifications than those who do not have.

4) It was hypothesized that the proportion of instructors who have an opportunity for social interaction in their programs would be higher among instructors who have received any specific training or education in delivering exercise programs than those who have not.

5) There would be a participation rate difference between winter and non-winter months.

6) There would be more participants in the programs where the programs are free.

3.6. Data analysis

SPSS version 25 (IBM Statistics, 2017) was used for data analysis, and the survey answers were analysed using descriptive statistics (percentage). Associations between questions (hypotheses) were calculated using Chi-square tests, Fisher's exact test and Fisher-Freeman-Halton test. Statistical significance was set at p<0.05. With regard to question number 26, which was the only open-ended question, we first listed and summarized answers by themes, and then analyzed and described the themes by using percentage.
3.7. Creating maps

In order to visualize the location of the exercise programs and to determine their regional distribution, QGIS which is an open-source geographic information system software was used to create maps (Manitoba and Winnipeg maps). Postal codes that were provided in the survey were used to locate the group-based exercise programs in Manitoba. We also used additional data that were required to create maps including the Manitoba Health Region boundary data, Lakes/Reservoirs data and Winnipeg Health Region Community boundary data (Manitoba 2001; Natural Earth 2018; Statistics Canada 2018).
4. Results

A total number of 150 instructors filled out the online survey. Of those 150 instructors, 112 instructors who completely filled out the survey and met the eligibility criterion were included in the data analysis (see Figure 1). For the program description and social interaction sections, we included data from all the programs that the 112 instructors described (n=158). Instructors were able to fill out the survey for up to four different group-based exercise programs that they delivered. Thirty-one instructors filled out the survey for a second exercise programs that they delivered. Twelve instructors filled out the survey for three programs, and three instructors provided answers for four programs.

![Participant flow chart.](image)

Note: Four instructors were not eligible, hence excluded from our study as participants’ approximate ages in their exercise programs were younger than the definition of older adults in this study (55 years and older).
4.1. Instructors’ characteristics

Instructor demographics and other characteristics are detailed in Table 1. Thirty-four (30.4%) instructors were relatively younger (aged less than 50 years), and 78 (69.7%) were relatively older (aged 50 years and older). In terms of instructors’ genders, 86.6% of respondents were female and 11.6% were male (2 instructors did not specify their gender).

Most instructors reported having exercise-related certifications (86.6%). With regard to types of certifications, instructors had Active Older Adult from Manitoba Fitness Council (44.6%), CSEP Certified Personal Trainer (14.3%), Steppin Up With Confidence from Active Aging in Manitoba (8%) and CSEP Certified Exercise Physiologist (6.3%). In addition, 47 instructors indicated that they had other certifications including yoga, pilates, zumba, Tai chi, cycle, aqua fitness and group training certification.

A majority of instructors (73.2%) reported receiving specific training or education in delivering exercise programs for older adults, which included attending various workshops/seminars provided by the organizations and conferences, or having a degree in Kinesiology, etc. When possession of exercise-related certifications and receiving training or education in delivering exercise programs for older adults were taken together, 65.8% of instructors had both certifications and training/education. There were only 6 instructors (5.4%) who did not have any certifications nor training/education.

In terms of the number of years of experience in delivering exercise programs for older adults, more than half of instructors (54.5%) had over 5 years of experience. Only 15.2% had less than one year of experience in delivering programs.
Table 1. Instructor characteristics.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total n = 112</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>1</td>
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<tr>
<td>20-29</td>
<td>6</td>
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<tr>
<td>30-39</td>
<td>13</td>
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<tr>
<td>40-49</td>
<td>14</td>
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<td>50-59</td>
<td>34</td>
</tr>
<tr>
<td>60-69</td>
<td>34</td>
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<tr>
<td>70+</td>
<td>10</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>97</td>
</tr>
<tr>
<td>Male</td>
<td>13</td>
</tr>
<tr>
<td>Prefer not to say</td>
<td>2</td>
</tr>
<tr>
<td><strong>Having exercise-related certifications</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>97</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
</tr>
<tr>
<td><strong>Types of certifications</strong></td>
<td></td>
</tr>
<tr>
<td>CSEP Certified Personal Trainer (CSEP-CPT)</td>
<td>16</td>
</tr>
<tr>
<td>CSEP Certified Exercise Physiologist (CSEP-CEP)</td>
<td>7</td>
</tr>
<tr>
<td>Steppin Up With Confidence from Active Aging in Manitoba</td>
<td>9</td>
</tr>
<tr>
<td>Active Older Adult from Manitoba Fitness Council (MFC)</td>
<td>50</td>
</tr>
<tr>
<td>Other certifications</td>
<td>47</td>
</tr>
<tr>
<td>Group exercise training</td>
<td>20</td>
</tr>
<tr>
<td>Yoga</td>
<td>11</td>
</tr>
<tr>
<td>Pilates</td>
<td>4</td>
</tr>
<tr>
<td>Aqua fitness</td>
<td>21</td>
</tr>
<tr>
<td>Missing</td>
<td>15</td>
</tr>
<tr>
<td><strong>Received training/education in delivering exercise programs...</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>82</td>
</tr>
<tr>
<td>No</td>
<td>29</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
</tr>
<tr>
<td><strong>Years of experience in delivering exercise program for older adults</strong></td>
<td></td>
</tr>
<tr>
<td>≤1</td>
<td>17</td>
</tr>
<tr>
<td>2-3</td>
<td>29</td>
</tr>
<tr>
<td>4-5</td>
<td>5</td>
</tr>
<tr>
<td>&gt;5</td>
<td>61</td>
</tr>
</tbody>
</table>

* Multiple response questions
4.2. Program description

Detailed characteristics of the programs are shown in Tables 2 and 3. The vast majority of programs (85.4%) employed instructors and only 13.9% of the programs were volunteer-led programs. In terms of the feature of cost of programs, most programs required a fee for participation (77.8%) and only 20.9% of the programs were free to participants. Of those programs where the instructors were employed (n=133), 15% (n=20) were free to participants. For the programs where the instructors volunteered (n=22), 40.9% (n=9) were not free to participants.

With respect to the length of the program and numbers of classes performed in a week, 89.9% of the programs’ durations were between 30 minutes and an hour, and the majority of programs were conducted 1-3 times a week (36.7% - once a week, 20.3% - twice a week, 17.7% - three times a week).

The majority of the programs had participants who were in their 60’s (77.8%) or 70’s (74%), and most of the programs had 10-30 participants (66.7%). In terms of gender-congruence within group-based exercise programs, the vast majority of programs (84.2%) were mixed-gender programs. All of the single-gender programs were female-only programs (except for one missing answer).

Most programs (91.1%) had more than two types of activities in their programs including aerobic, balance, resistance trainings and other types of training. Other types of training included flexibility/stretching, memory exercise training, dancing, games, stability ball, agility, neurological stabilization, cognitive training and meditation. The majority of the programs had more than one goal. The most common goal was improving overall health (94.3%). Other goals
included improving balance, flexibility, mobility, memory, functional independence, cognitive ability, social interaction, mental health and promoting healthy eating.

In regard to season that the programs were delivered, most of the programs were delivered in spring (94.9%), fall (95.6%) and winter (94.9%) whereas in summer, only 56.3% were available. Regarding the participation rate difference between winter and non-winter months, 16 programs (10.1%) reported as ‘not applicable’, 44.9% of the programs (n=71) had a participant rate difference between winter and non-winter months and the rest had no difference. Out of 71 programs which had a participation rate difference between winter and non-winter months, only 23.9% had a lower participation rate in winter. The most prevalent reason for a lower participation rate in winter was ‘participants go away to warm locations’ (94.1%). The second most popular reasons were ‘participants avoid being out in cold weather’ and ’participants avoid going out of doors to prevent falls on slippery surfaces’ (52.9% for both). The least common reason was ‘difficulty in accessing the location where the program was offered because of a lack of transportation’ (23.5%). Of those programs where it had a lower participation rate in winter (n=17), only 3 programs (17.6%) offered home exercise programs or prescription in winter. In terms of the material that instructors used to provide home exercise programs or prescription in winter, all three instructors used a handout.

Of those programs where postal codes were provided (n=139), more than half of the programs (66.9%) were performed in Winnipeg and there was no program reported in our survey in the Northern Manitoba (Northern Regional Health Authority). The number of group-based exercise programs, along with total population, population of older adults and the proportion of older adults in each community are detailed in Table 3. Geographical positions of group-based exercise programs are provided in Figures 2 and 3.
With respect to rural-urban disparity of group-based exercise programs, 86.3% of the programs were available in urban areas and there were only 19 programs (13.7%) in rural areas. Based on Statistics Canada’s definition of urban and rural, an urban area in this study was “area with at least 1,000 residents and a population density of at least 400 residents per square kilometre”. All areas outside urban areas were defined as rural areas (Statistics Canada 2017a). Amongst communities where group-based exercise programs were located, Beausejour, Brandon, Dauphin, Minnedosa, Niverville, Pine Falls, Portage la Prairie, Selkirk, St. Pierre-Jolys, Ste. Anne, Stonewall and Winnipeg were included in urban areas. The rest of the communities were included in rural areas: East St. Paul, Erickson, Eriksdale, Grand Marais, Lorette, Manitou, Norfolk-Treherne, Pinawa, Pilot Mound, Plumas, Rossburn, St. Adolphe and Victoria Beach.
Table 2. Program description.

<table>
<thead>
<tr>
<th>Program description</th>
<th>Total n= 158</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>Instructors’ employment condition</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>135</td>
</tr>
<tr>
<td>Volunteered</td>
<td>22</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
</tr>
<tr>
<td>Feature of cost of programs</td>
<td></td>
</tr>
<tr>
<td>Free</td>
<td>33</td>
</tr>
<tr>
<td>Not free</td>
<td>123</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
</tr>
<tr>
<td>Approximate age of participants*</td>
<td></td>
</tr>
<tr>
<td>Below 50's</td>
<td>42</td>
</tr>
<tr>
<td>50's</td>
<td>83</td>
</tr>
<tr>
<td>60's</td>
<td>123</td>
</tr>
<tr>
<td>70's</td>
<td>117</td>
</tr>
<tr>
<td>Above 80's</td>
<td>78</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
</tr>
<tr>
<td>Mixed-gender class</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>133</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
</tr>
<tr>
<td>Single-gender class</td>
<td></td>
</tr>
<tr>
<td>Female only</td>
<td>24</td>
</tr>
<tr>
<td>Male only</td>
<td>0</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
</tr>
<tr>
<td>No. of participants</td>
<td></td>
</tr>
<tr>
<td>Less than 10</td>
<td>38</td>
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<tr>
<td>10-30</td>
<td>106</td>
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<tr>
<td>More than 30</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
<tr>
<td>Length of programs</td>
<td></td>
</tr>
<tr>
<td>Less than 30 minutes</td>
<td>3</td>
</tr>
<tr>
<td>Between 30 minutes and an hour</td>
<td>142</td>
</tr>
<tr>
<td>More than an hour</td>
<td>11</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
</tr>
<tr>
<td>No. of classes in a week</td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>58</td>
</tr>
<tr>
<td>Two</td>
<td>32</td>
</tr>
<tr>
<td>Three</td>
<td>28</td>
</tr>
<tr>
<td>Description</td>
<td>Count</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Four</td>
<td>12</td>
</tr>
<tr>
<td>Five or more</td>
<td>22</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerobic training</td>
<td>122</td>
<td>77.2</td>
</tr>
<tr>
<td>Balance training</td>
<td>137</td>
<td>86.2</td>
</tr>
<tr>
<td>Resistance training</td>
<td>126</td>
<td>79.7</td>
</tr>
<tr>
<td>Other</td>
<td>72</td>
<td>45.6</td>
</tr>
<tr>
<td>Flexibility/stretch training</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Memory exercise training</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Dancing</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>0.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving balance</td>
<td>122</td>
<td>77.2</td>
</tr>
<tr>
<td>Improving aerobic capacity</td>
<td>106</td>
<td>67.1</td>
</tr>
<tr>
<td>Improving strength</td>
<td>116</td>
<td>73.4</td>
</tr>
<tr>
<td>Improving overall health</td>
<td>149</td>
<td>94.3</td>
</tr>
<tr>
<td>Other</td>
<td>56</td>
<td>35.4</td>
</tr>
<tr>
<td>Socialization</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Improving flexibility</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Improving memory</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>150</td>
<td>94.9</td>
</tr>
<tr>
<td>Summer</td>
<td>89</td>
<td>56.3</td>
</tr>
<tr>
<td>Fall</td>
<td>151</td>
<td>95.6</td>
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<tr>
<td>Winter</td>
<td>150</td>
<td>94.9</td>
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<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>71</td>
<td>44.9</td>
</tr>
<tr>
<td>No</td>
<td>71</td>
<td>44.9</td>
</tr>
<tr>
<td>Not applicable</td>
<td>16</td>
<td>10.1</td>
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<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>17</td>
<td>23.9</td>
</tr>
<tr>
<td>No</td>
<td>54</td>
<td>76.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants go away to warm locations</td>
<td>16</td>
<td>94.1</td>
</tr>
<tr>
<td>Difficulty in accessing the location where the program is offered because of a lack of transportation</td>
<td>4</td>
<td>23.5</td>
</tr>
<tr>
<td>Participants avoid being out in cold weather</td>
<td>9</td>
<td>52.9</td>
</tr>
<tr>
<td>Participants avoid going out of doors to prevent falls on</td>
<td>9</td>
<td>52.9</td>
</tr>
</tbody>
</table>
Table 3. The number of group-based exercise programs reported in this study, with accompanying information on the health regions where programs were located (total population, population of older adults and the proportion of older adults in each health region).

<table>
<thead>
<tr>
<th>Region</th>
<th>Program</th>
<th>Population (n)</th>
<th>% of 55+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>55+</td>
<td>65+</td>
</tr>
<tr>
<td>Interlake-Eastern</td>
<td>20</td>
<td>43,715</td>
<td>23,410</td>
</tr>
<tr>
<td>Prairie Mountain</td>
<td>13</td>
<td>54,335</td>
<td>31,670</td>
</tr>
<tr>
<td>Southern</td>
<td>13</td>
<td>48,105</td>
<td>25,680</td>
</tr>
<tr>
<td>Winnipeg</td>
<td>93</td>
<td>200,385</td>
<td>110,335</td>
</tr>
<tr>
<td>Total</td>
<td>139</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Missing data (n=19), population information from (Statistics Canada 2017b; Statistics Canada 2017c; Statistics Canada 2017d; Statistics Canada 2017e).
Figure 2. Group-based exercise programs in Manitoba.

Manitoba Health Region boundary and Lakes/Reservoirs data were from (Natural Earth 2018; Statistics Canada 2018), Note: Northern Regional Health Authority is not shown in the map as no program was reported, See Figure 3 for detailed map of Winnipeg.
Figure 3. Group-based exercise programs in Winnipeg.

Winnipeg Health Region Community boundary data was from (Manitoba 2001).
4.3. Social interaction

The majority of programs (70.9%) had an opportunity for social interaction amongst exercise participants within the program. The instructors of 115 programs (72.8%) thought that the participants socialized with each other outside of the program. If those two results were taken together, 91 (57.6%) programs had an opportunity for social interaction within the program and the instructors thought the participants socialized with each other outside of the program. There were only 6 programs (3.8%) where the programs did not have an opportunity for social interaction within the program, nor did instructors think the participants socialized with each other outside of the program. The most common way to socialize with each other outside of class was going for a coffee followed by attending social activities. Frequencies of social interaction questions are listed in Table 5.
Table 4. Social interaction.

<table>
<thead>
<tr>
<th>Social interaction</th>
<th>Total n =158</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>Opportunity for social interaction within the program</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>112</td>
</tr>
<tr>
<td>No</td>
<td>46</td>
</tr>
<tr>
<td>Whether the instructors think participants socialize with each other outside of the programs</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>115</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
</tr>
<tr>
<td>I don't know</td>
<td>33</td>
</tr>
<tr>
<td>Socializing methods*</td>
<td></td>
</tr>
<tr>
<td>Go for coffee</td>
<td>58</td>
</tr>
<tr>
<td>Meals together</td>
<td>29</td>
</tr>
<tr>
<td>Go for a walk</td>
<td>8</td>
</tr>
<tr>
<td>Social media</td>
<td>3</td>
</tr>
<tr>
<td>Social activities (movies, shows, golf, birthday events etc.)</td>
<td>38</td>
</tr>
<tr>
<td>Chat before and after class</td>
<td>3</td>
</tr>
<tr>
<td>Phone calls/email</td>
<td>5</td>
</tr>
<tr>
<td>Program offers activities</td>
<td>4</td>
</tr>
<tr>
<td>They knew each other already/small community</td>
<td>12</td>
</tr>
</tbody>
</table>

* Multiple response questions

4.4. Exploratory hypotheses testing

Hypotheses testing was performed with the data from 112 instructors who were eligible for the survey and completely filled out the survey. For hypotheses 1 and 2, the testing with the partially completed survey data was also performed (data from instructors who were not eligible for our survey were excluded, n=4).

Hypothesis 1: it was hypothesized that the proportion of relatively younger instructors who have exercise-related certifications would be higher than relatively older instructors.
Fisher’s exact test was used since the assumption for Chi-square test was violated. The result did not show a statistically significant difference between an instructors’ age group (<50 and ≥ 50 years old) and whether they possessed exercise-related certifications (Figure 4, p=0.15). The same results were also true if we included those who only completed parts of the survey.

![Exhibit 4: Instructors’ age group and possession of certifications.](image)

**Note:** younger instructors: aged<50, older instructors: aged≥50.

Hypothesis 2: it was hypothesized that the proportion of relatively younger instructors who have received any specific training or education in delivering exercise programs would be higher than relatively older instructors.

A Chi-square test was used and did not show a statistically significant differences between instructor age groups and whether they have experience in receiving training or education in delivering exercise programs for older adults (n=112, p=0.64). The same results were also true if we included those who only completed parts of the survey.
Figure 5. Instructors’ age group and training/education.

Note: 1 missing response, younger instructors: aged<50, older instructors: aged≥50

Hypothesis 3: it was hypothesized that the proportion of instructors who have an opportunity for social interaction in their programs would be higher among instructors who have exercise-related certifications than those who do not have.

Fisher’s exact test was used, since the assumption for the Chi-square test was violated, and did not show a statistically significant differences between possession of exercise-related certifications and having an opportunity for social interaction within the program (Figure 6, p=0.35).
Figure 6. Possession of certifications and social interaction.

Hypothesis 4: it was hypothesized that the proportion of instructors who have an opportunity for social interaction in their programs would be higher among instructors who have received any specific training or education in delivering exercise programs than those who do not.

Fisher’s exact test was used and did not show a statistically significant difference between having experience in receiving training or education in delivering exercise programs for older adults and having an opportunity for social interaction within the program (Figure 7, p=0.81).
Hypothesis 5: there would be a participation rate difference between winter and non-winter months.

A Chi-square test was used to test whether the participation rate was different between winter and non-winter months amongst 142 programs which included all the programs that 112 instructors delivered and answered as `Yes` or `No` to the participation rate difference question. The participation rate in winter months did not statistically significantly differ from the participation rate in non-winter months (p=0.1).

Hypothesis 6: there would be more participants in the programs where the programs are free.
A Fisher-Freeman-Halton test was used and did not show a statistically significant differences between the feature of cost and the number of participants in the exercise programs (Figure 8, p=0.33).

Figure 8. Program cost and number of participants.
5. Discussion

To our knowledge, this is the first study to document instructors’ characteristics for ongoing group-based exercise programs for older adults and the content of the programs in Manitoba, Canada. Accordingly, the results of this study provided insights into 1) instructors’ characteristics (e.g., instructors’ ages, genders, possession of exercise-related certifications, experience in training or education in delivering exercise programs for older adults, and the number of years of experience in delivering exercise programs), and 2) how the current group-based exercise programs in the province are designed (e.g., feature of cost, length of the programs, number of participants within the class, number of classes in a week, etc.). Furthermore, this study was able to look at the locations of the reported group-based exercise programs in Manitoba.

5.1. Instructors’ characteristics

Instructors have been noted to play an important role in older adults’ attendance and adherence to group-based exercise programs (Seguin et al. 2010; Hawley-Hague et al. 2014; Killingback et al. 2017). Therefore, we asked instructors about their characteristics including instructor age, gender, possession of exercise-related certifications, experience in training or education in delivering exercise programs for older adults and the number of years of experience in delivering exercise programs.

5.1.1. Instructors’ age

In our survey, 30.4% of instructors were relatively younger (aged less than 50 years) and 69.7% were relatively older (aged 50 years and older). Other authors have studied whether
instructor age had an impact on exercise adherence and it seems that instructor age does not affect older adults’ exercise adherence (Dorgo et al. 2009; Dorgo et al. 2011; Hawley-Hague et al. 2016).

Dorgo et al. compared retention rates of 14-week group-based exercise programs amongst older adults between peer-led and young professional-led programs. In their study, peer leaders were defined as individuals aged between 60 and 79 years who had no previous experiences in an exercise mentor role but received specific peer mentoring training for 30 weeks. Young professional leaders were undergraduate students who were majoring in Kinesiology and received practical training to work with older adults for 3 weeks. The findings showed no significant differences in the exercise retention between the two groups (Dorgo et al. 2009).

Dorgo et al. conducted a similar study with more extended exercise programs (35 weeks) and the result was in line with their previous findings. Retention rates at the end of the exercise intervention (at 35 weeks) were 63.3% for both peer-led and young professional-led programs which could mean that an older adult who received sufficient training and became a peer leader can deliver the exercise programs as effectively as young professional leaders. The authors also stated that mentoring in general had a positive effect on exercise retention amongst older adults regardless of instructors’ age (Dorgo et al. 2011). Similarly, in a qualitative study where the authors conducted semi structured interviews with 19 instructors who delivered multicomponent exercise programs to older adults to investigate instructors’ perspectives on older adults’ uptake and adherence to exercise programs, several older instructors reported being older as an instructor was favourable for older adults’ uptake as they were able to provide them a good role model because of their age. However, relatively younger instructors did not report being younger impacted older adults’ experiences in their exercise programs (Hawley-Hague et al. 2016).
5.1.2. **Instructors’ gender**

The vast majority of instructors in our survey were female (86.6%) and only 11.6% were male. Research on the relationship between instructors’ gender and attendance and adherence rate in group-based exercise programs for older adults have shown that being a female instructor was associated with lower attendance in group-based exercise programs (Hawley-Hague et al. 2014). However, since there was only two male instructors out of 16 instructors in the study with small numbers of participants in their exercise programs, the authors advised that the result should be considered with caution (Hawley-Hague et al. 2014). Overall, there is not enough research to conclude whether instructors’ gender could affect attendance and adherence to group-based exercise programs for older adults.

There are several studies which have shown older adults’ greater preference for exercising in single-gender group exercise programs (exercise participants’ gender) (Lloyd and Little 2010; Dunlop and Beauchamp 2011; Dunlop and Beauchamp 2013). Given these previous studies, older adults might have a preference for instructor’s gender as well. Again, however, there is no evidence to conclude older adults’ preference for instructor’s gender and the relationship between instructor’s gender and attendance and adherence to group-based exercise programs amongst older adults.

5.1.3. **Instructors’ professionalism**

Being professional as an exercise instructor in a way that they are able to recognize older adults’ physical limitations and adopt exercise intensity depending upon their ability, is a key asset to encourage older adults to adhere to group-based exercise programs (Seguin et al. 2010;
Hawley-Hague et al. 2014; Killingback et al. 2017; von Berens et al. 2018). In our survey, there were several questions related to instructors’ professionalism that was addressed in the review of literature section which were instructors’ possession of exercise-related certifications, experience in receiving training or education in delivering exercise programs for older adults and previous experience in delivering exercise programs.

The majority of instructors in our survey had exercise-related certifications and received training or education in delivering exercise programs for older adults with the proportion of 86.6% and 73.2% respectively. When those were taken together, 65.8% of instructors had both and there were only 5.4% of instructors who did not have any certifications nor received training or education.

In terms of certifications, there were four certifications which were specifically listed in our survey including the Canadian Society for Exercise Physiology Certified Personal Trainer (CSEP-CPT), Canadian Society for Exercise Physiology Certified Exercise Physiologist (CSEP-CEP), Steppin Up With Confidence from Active Aging in Manitoba, and Active Older Adult from Manitoba Fitness Council.

Considering the curriculum of those certifications, instructors who possessed the CSEP-CPT, CSEP-CEP and/or Active Older Adult certification would have the ability to recognize exercise participants’ limitations and adopt exercise accordingly. In contrast, if instructors only possessed the Steppin Up With Confidence certification, there is a high possibility for them to not have the ability, as the process of receiving the certification is quite short (2-day workshop). Presumably, it would be difficult to gain enough knowledge of the aging process, common health issues relating to the aging process, contraindications for given health issues, and how to select and modify exercise accordingly, in two days. On a positive note, however, of those who reported to
have exercise-related certifications, the proportion of instructors who only possessed the Steppin Up With Confidence certification was only 4.1%.

All in all, considering the fact that most instructors had exercise-related certifications and/or received specific training or education on dealing with older adults in an exercise environment, the majority of instructors could be considered to be knowledgeable.

With respect to the differences between having exercise-related certifications or receiving training or education in delivering exercise programs for older adults and instructors’ age (hypotheses 1 and 2), the hypotheses testing results did not demonstrate significant differences between having certifications and/or training/education and an instructors’ age.

In terms of instructors’ previous experience in delivering exercise programs to older adults, more than half of the instructors in our survey had over 5 years of experience, and only 15.2% had less than one year of experience. Previous studies have shown a positive association between instructors’ previous experience leading exercise programs and exercise adherence amongst older adults. However, they did not specify whether more years of experience led to a higher adherence rate. Therefore, it could be concluded that all instructors in our survey have an asset that could positively affect older adults’ adherence to group-based exercise programs as all of them have the previous experience.

When the possession of exercise-related certifications, receiving training or education in delivering exercise programs for older adults and experience in delivering exercise programs were taken together, the vast majority of instructors in our survey seemed to have the professional abilities, knowledge and experience to lead group-based exercise programs for older adults.
5.2. Program description

Group-based exercise program characteristics are associated with older adults’ attendance and adherence to the exercise program (Hawley 2009; Dunlop and Beauchamp 2011; Hartley and Yeowell 2015; Killingback et al. 2017; Beauchamp et al. 2018). Therefore, we asked instructors about the characteristics of their exercise programs that could affect participants’ attendance and adherence to exercise programs including instructor’s employment condition, cost, length of programs, approximate age of the participants (age-similarity within the programs), number of participants within the class, the characteristics of the exercise programs (e.g., aerobic training, balance training, resistance training, etc.), numbers of classes performed in a week and participants’ genders within the class. Furthermore, instructors were asked about differences in attendance rates between winter and non-winter months, whether they provided older adults with home exercise programs for those who were not able to attend the program in winter and how they provided the exercise information.

5.2.1. Feature of cost and instructors’ employment conditions by programs

The majority of the reported group-based exercise programs for older Manitobans required a fee for participation (77.8%). According to previous studies, exercise program cost is one of the most predominant barriers that prevents older adults from engaging in exercise programs (Belza et al. 2004; Kruger et al. 2007; Prohaska et al. 2000). Conversely, free or low-cost exercise programs facilitate older adults to attend and adhere to the program (Costello et al. 2011; Burton et al. 2012). Having only 33 free group-based exercise programs in Manitoba for older adults out of 158 programs could be one of the reasons for a lower participation rate in exercise classes amongst older Manitobans (Centre On Aging 2019).
A growing body of research has indicated that the employment of peer leaders in exercise environments would mitigate the cost-related barriers to participate exercise programs amongst older adults. Previous studies recommended using peer leaders as exercise program delivery agents since it has the potential to decrease exercise program fees by reducing cost to employ fee-based trained professional instructors (Dorgo et al. 2009; Buman et al. 2011; Dorgo et al. 2011; Beauchamp et al. 2015). Moreover, as outlined in the instructors’ age section, highly trained peer-led group-based exercise programs have been demonstrated to be as effective as professionally delivered exercise programs in terms of exercise retention amongst older adults. In Dorgo et al.’s study, the group-based exercise programs that were delivered by peer leaders had retention rates of 90% and 63.3% for 14-week and 35-week exercise programs respectively (Dorgo et al. 2009; Dorgo et al. 2011). In a similar regard, Buman et al. conducted a 16-week group-based exercise intervention with an 18-month follow-up study to compare exercise retention and MVPA at the end of the intervention (16 weeks) and at follow-up (18 months) between participants from peer-led exercise programs and a standard community exercise setting (two basic health education, access to an exercise facility and pedometer for self-monitoring). The findings were aligned with Dorgo et al.’s previous studies. At the end of the intervention, the retention rate of the peer-led program was 83% and the community exercise setting had 87% of the retention. In terms of MVPA at the follow-up, participants in the peer-led program reported significantly more MVPA than participants who were involved in the community exercise setting (p=0.04) (Buman et al. 2011). Therefore, it is tenable to conclude that peer-led group-based exercise programs had a favourable exercise retention rate.

Furthermore, research has shown that not only participants benefit from peer-led exercise programs, but also peer leaders seem to have the benefit of participating in exercise programs as
the program delivery agents. In previous studies where peer leaders have delivered group-based exercise program to older adults, peer leaders articulated that they have perceived personal benefits during their duties hence their willingness to continue to deliver exercise programs to older adults over the long-term (Dorgo et al. 2009; Buman et al. 2011; Dorgo et al. 2011). There is a substantial body of evidence that involvement in volunteer activities positively affect older adults’ overall well-being by enhancing psychological and mental health (e.g., delaying memory loss and buffering psychological decline) (Morrow-howell et al. 2003; Greenfield and Marks 2007; Ertel et al. 2008). It has been also shown that volunteering gives older adults a sense of purpose and accomplishment in their lives, which is another benefit of participating in volunteer activities (Bradley 1999).

All in all, the employment of peer leaders in exercise settings positively affects group-based exercise programs retention rate amongst older adults and peer leaders’ overall well-being. Moreover, from the perspective of program sustainability, using peer leaders as exercise program delivery agents could potentially reduce an issue of exercise program cost which is one of the most common barriers for older adults to attend and adhere to exercise programs.

Over the course of 2013, older Manitoban aged 55 and older contributed 215 hours in volunteer activities. The average hours of volunteering were the highest in older adults’ population compared to any other age groups in Manitoba (Statistics Canada 2013). However, despite the high prevalence of volunteer activities amongst older Manitoban and significant benefits of peer-led exercise programs, there were only 13.9% of peer-led (volunteered) programs reported in our survey.

There were 9 instructors who were reported to have Steppin Up With Confidence certification, which is the only peer preparation program in our survey. Out of these 9 instructors,
4 instructors only possessed the Steppin Up With confidence certification and the rest had other certifications as well. Interestingly, instructors who only possessed the Steppin Up With Confidence certification were all volunteer instructors. Thus, it could be assumed that if a number of peer preparation programs were available in Manitoba and older Manitobans were encouraged to become the peer leaders, Manitoba would be able to have more peer leaders who can potentially provide free group-based exercise programs to older adults.

In terms of peer leader preparation training, considering the fact that previous studies which have shown a favourable group-based exercise adherence rate in peer-led programs used highly trained peers, providing sufficient education and training regarding delivering exercise programs to older adults would be necessary. For example, in Dorgo et al.’s study, the study provided a 30-week peer preparation program for prospective peer leaders. The first 14 weeks of the program included education on physical fitness, as well as a variety of exercises and training techniques. In weeks 15-30, the program focused on development of mentoring skills in an exercise setting through one-on-one mock training sessions. Prospective peer leaders also received three 75-minute supervised exercise sessions per week and attended monthly sessions to learn about aging, health, fitness, principles of training, methods of warm-up / stretching and exercise safety (Dorgo et al. 2009; Dorgo et al. 2011). In sum, in order for peer leaders to perform their duties properly and efficiently, receiving sufficient peer preparation training would be required.

When the feature of cost and instructors’ employment conditions by programs were taken together, 15% (n=20) were free to participants of those programs where the instructors were employed (n=133). For these 20 programs, the instructors’ pay seemed to be solely funded from other sources, not from participant fees. Conversely, of those programs where the instructors volunteered (n=22), 40.9% (n=9) were not free to participants. That is, the program fee which
was paid by exercise participants was not for the instructors. It is possible that participant fees might be used to cover other program costs, such as the facility rental.

Based on previous studies, we assumed that free group-based exercise programs in Manitoba would have higher participation rates. Interestingly, however, the number of participants in the free and non-free exercise programs were not significantly different (hypothesis 6). Presumably, this could be because of the lack of information on the program fee of ongoing group-based exercise programs in Manitoba. According to previous studies, free or reasonable/low-cost of exercise programs encourage older adults to attend and adhere to the exercise programs (Costello et al. 2011; Burton et al. 2012). Therefore, even if the majority of programs delivered in Manitoba required a fee for participation, the programs might have reasonable/low program fees, thereby older adults did not consider the fee as a barrier to participate in the exercise programs.

5.2.2. Age-similarity and gender-congruence within group-based exercise programs

The vast majority of participants in group-based exercise programs in our survey were in their 60’s (77.8%) and 70’s (74%). As outlined earlier, older adults prefer to engage in similar-age group-based exercise programs (Beauchamp et al. 2007; Burton et al. 2012). Furthermore, several studies have shown that older adults who attended age-matched exercise programs adhered to a greater extent than those in the mixed age exercise programs. In Dunlop and Beauchamp’s study, the authors examined the relationship between age-similarity amongst exercise participants and exercise adherence. The authors analyzed 123 individuals’ age information (mean age=48.33 years, SD=15.29) in 13 different group-based exercise programs and their exercise adherence rate and the results have shown that age-similarity and group-based exercise adherence were positively associated (Dunlop and Beauchamp 2012). This finding
aligns with Beauchamp et al.’s more recent study where the authors conducted a similar-age and mixed-age group-based exercise program with older adults (aged between 65 and 91 years) to investigate exercise adherence at 12 and 24 weeks of the intervention. The results revealed that when older adults engaged in age-matched exercise program, they were significantly more likely to adhere to the program (p<0.001) (Beauchamp et al. 2018).

In our survey, multiple answers were available for the question about the approximate age of participants. Therefore, we were able to identify several exercise programs that had wide age spectrums within their programs. For example, there were 19 programs where the instructors reported participants who were younger than 50 as well as in their 80’s in the same program. There were also 20 programs which included participants who were in their 50’s and 80’s in the same program.

Older adults’ strong preference for exercising with similar age and higher adherence in age-matched exercise programs were often explained by self-categorization theory where people who share similar social categories (e.g., age, gender) feel connected and comfortable around them (Abrams and Hogg 1990). Therefore, if exercise programs have a wide age spectrum like we identified in our survey, there would be a possibility for exercise participants to not feel connectedness or comfortable amongst exercise participants, hence it might lead to a lower exercise adherence.

Balanced against this conclusion, however, several older adults did not find age-matched group-based exercise programs as effective exercise strategies because individuals’ ability to exercise vary widely which could affect exercise participants’ perceived benefits of engaging in exercise programs. In Bennett’s study, older adults who participated in similar-age group-based exercise programs described the exercise program as “too easy” and thus perceived it is not
beneficial to their health (Bennett et al. 2018). Similarly, in Costello et al.’s study, the findings have indicated that while inactive older adults described group exercise programs as “intimidating”, active older adults did not (Costello et al. 2011). These previous studies have shown that age-matched group-based exercise programs might not be the most effective exercise strategies. Therefore, even though age-matched group-based exercise programs have potential benefits of higher adherence rate and feeling of connectedness, setting an age limit should be considered with caution.

In terms of gender-congruence within group-based exercise programs, the vast majority of exercise programs in our survey were mixed-gender exercise programs. As outlined in the review of literature section, several previous studies have shown that individuals across the age spectrum, including older adults, prefer to exercise in a single-gender exercise program for both women and men (Lloyd and Little 2010; Dunlop and Beauchamp 2011; Dunlop and Beauchamp 2013).

In a qualitative study where 20 women aged between 23 and 64 were asked about reasons for exercising in a female-only environment, the participants mentioned that they felt secure and more supported when they exercise with women only (Lloyd and Little 2010). Similar answers were found in a male-only exercise program. Nineteen older men (Mean age: 77.12±9.19 years) who attended a male-only exercise program stressed that they felt at ease exercising with only men and would have not felt the same if there were women in the same class (Dunlop and Beauchamp 2013). In a more recent study, 5 older adults (two men and three women) amongst 31 older adults aged over 65 years who attended one of two group-based exercise programs (similar-age same-gender or similar-age mixed-gender) mentioned that they prefer to exercise in a single-gender exercise programs (Bennett et al. 2018). Women, specifically, who attended the
similar-age same-gender exercise program stated that they would have been self-conscious if there were male participants. The reason for preference for single-gender exercise programs amongst older men was because of banter and comradery (Bennett et al. 2018). Preference for single-gender exercise programs was even stronger amongst adult population including older adults who are overweight or obese than those with normal weight (Dunlop and Beauchamp 2011). Balanced against those findings, however, there was one study that showed that older adults do not prefer single-gender exercise programs over mixed-gender programs (Burton et al. 2012).

In terms of the association between mixed/single-gender exercise programs and exercise adherence amongst older adults, there was one experimental study which has investigated the association. Interestingly, the results have shown no significant differences in exercised adherence between older adults who attended mixed-gender and single-gender programs (Beauchamp et al. 2018). That is, older adults’ strong preference for a single-gender exercise program does not necessarily indicate the higher exercise adherence. However, since there was only one experimental study which investigated the association between gender-similarity exercise programs and exercise adherence, it is premature to conclude the association.

In our survey, single-gender programs were only 15.8% and all of single-gender programs were female-only programs (except for one missing answer). According to previous studies, men have been found to be less represented in group-based exercise settings (Hughes et al. 2011; Hartley and Yeowell 2015). Male participants in Hartley and Yeowell’s study articulated that being a minority in exercise groups was one of the barriers for older men to adhere to the programs. Accordingly, the authors stated that men who particularly prefer to exercise with same gender might not feel a sense of belonging within the mixed-gender exercise groups and
eventually the feeling of disparity refrained older men from sustaining the exercise programs. From a knowledge translation perspective, the authors stressed providing single-gender exercise programs would encourage older adults who strongly prefer same-gender exercise programs to adhere to the programs (Hartley and Yeowell 2015).

In the case of Manitoba, it seems that older men are less likely to attend exercise classes compared to older women. Specifically, only 3.7% of Manitoban older men reported to engage in exercise classes whereas 12.6% of Manitoban older women attended exercise classes (Centre On Aging 2014). In more recent data, 13.5% of Manitoban older women reported to participate in exercise class and data on Manitoban older men was unavailable as the data were too unreliable to publish (Centre On Aging 2019).

Based on previous studies on mixed/single-gender exercise programs, it seems that some older adults particularly prefer single-gender group-based exercise programs over mixed-gender programs. Therefore, providing opportunities for older men to participate in single-gender exercise programs would promote older men in Manitoba to attend and adhere to exercise programs.

5.2.3. Could older adults achieve recommended amount of physical activity by participating group-based exercise programs?

According to Canadian Physical Activity Guidelines, it is recommended for older adults aged 65 years and older to perform at least 150 minutes of moderate to vigorous intensity aerobic physical activity per week, muscle and bone strengthening activities at least 2 days per week and physical activities that could enhance balance and prevent falls to achieve various health benefits and improve functional abilities (Tremblay et al. 2011).
The majority of programs in our survey were 30 minutes to an hour in length, were conducted 1-3 times a week and included a variety of training within the programs (e.g., balance, resistance, aerobic, flexibility, memory exercise training, dancing, games, stability ball, agility, neurological stabilization, cognitive training and meditation).

Of those 30 minutes to an hour in length programs, 71.8% of programs were delivered 1-3 times a week and the majority of programs provided multiple types of training with the exercise class. In this case, it is apparent that older adults who attended exercise programs delivered 1-3 times a week could not achieve the recommended amount of moderate to vigorous intensity aerobic physical activity solely by participating in the programs as the programs were 30 minutes to an hour in length, and included a variety of training apart from aerobic training. Also, it was uncertain whether the programs’ intensity was moderate to vigorous. On a positive note, however, having a variety of training within the programs would allow them to perform strength and balance activities, which were recommended by Canadian physical activity Guidelines and could positively affect exercise program adherence amongst older adults (Tremblay et al. 2011; Hartley and Yeowell 2015). Furthermore, given the fact that participating exercise programs were not the most prevalent form of physical activity but the most common physical activities were walking and gardening amongst older Manitoban, there is a possibility for them to meet the recommended amount of aerobic physical activity if they combined these other forms of physical activity with attending an exercise program (Statistics Canada 2015c; Centre On Aging 2019).

Older adults who participated in a program where it was conducted more than three times a week would be able to achieve a greater amount of physical activity than those who attended exercise programs delivered 1-3 times a week. Again, however, it is also unclear whether older adults would achieve the recommended amount and intensity of aerobic physical activity because
multiple trainings were combined within the programs and the intensity of the programs was uncertain.

According to the Canadian Physical Activity Guidelines for older adults, 67% of older adults who engaged in physical activity more than three times a week were in good health (Merrill et al. 2005; Tremblay et al. 2011). Therefore, group-based exercise programs which include strength, balance and aerobic trainings and take place more than three times a week with 30 minutes to an hour of duration would be appropriate to meet the physical activity recommendations for older adults. Furthermore, as the guidelines addressed that “more physical activity provides greater health benefits”, providing exercise programs more than 4 times a week or longer duration of programs would be even more beneficial, as it would enable older adults to gain greater health benefits by exceeding the guidelines’ minimum recommendations (Tremblay et al. 2011).

5.2.4. Seasonality effects on group-based exercise programs in Manitoba

We have found several interesting points which were contrary to our expectation in the seasonality section. In our survey, only 44.9% of programs reported to have a different participation rate between winter and non-winter months which was contrary to our expectation (hypothesis 5), where we assumed that the majority of programs would have a participation rate difference between winter and non-winter months.

Of those programs which were reported to have a different participation rate between winter and non-winter months, only 23.9% had a lower participation rate in winter. Accordingly, it could be assumed that the majority of programs have a lower participation rate in non-winter months (i.e., spring, summer and fall). This was also contrary to what we expected since previous studies have shown that older adults were highly susceptible to weather and winter
weather was negatively associated with exercise program attendance amongst older adults (Tu et al. 2004; Von Mackensen et al. 2005; Tulloch et al. 2013).

Previous studies have indicated that participation in physical activity could be decreased in non-winter months. Fernandes who conducted a qualitative study with older men (aged 55 years and older) who attended a group-based indoor walking initiative have stated that the participation rate was drastically decreased when the weather got warmer (the end of March and April). Furthermore, several participants in his study mentioned that “inclement weather is one of the reasons we come to the dome for a walk” but “in summer, we don’t need it” (Fernandes 2018). Similarly, previous studies by Tudor-Locke et al. and Yasunaga et al. have shown that adults including older adults tend to walk significantly more in summer than any other season (Tudor-Locke et al. 2004; Yasunaga et al. 2008). Therefore, a decreased exercise program participation rate in non-winter months in our survey could be because of a higher chance of achieving increased amounts of physical activity outside of exercise programs in non-winter months, as the most common physical activities amongst older Manitobans were outdoor activities including walking and gardening (Statistics Canada 2015c; Centre On Aging 2019). Accordingly, delivering fewer programs in the summer versus in the spring, fall and winter in our survey could be a reasonable phenomenon.

Exercise programs which had a lower participation rate in winter reported that the most prevalent reason for a lower participation rate in winter was ‘participants go away to warm locations’ (94.1%). This was another result that was contrary to our expectation where we assumed, based on previous studies, if there was a lower participation rate in winter compared to other season, it would be because of ‘participants avoid being out in cold weather’ and ‘participants avoid going out of doors to prevent falls on slippery surfaces’ (52.9% for both
in our survey) (Tu et al. 2004; Tulloch et al. 2013). It was interesting to find that the snowbird activity was the most common cause of the decreased exercise program participation rate in winter.

Snowbirds refer to “retired or semi-retired people who live away from their northern homes during significant portions of each winter” (The Canadian Trade Commissioner Service 2018). According to the Trade Commissioner Service, 74% of traveling Canadian older adults (aged 65 years and older) go to the United States, especially the Sunbelt states, particularly Florida which is a prime destination for Canadian retirees because of reasonable living costs, warm weather and a similar culture, resulting in approximately half a million Canadian snowbirds currently spending their winter in Florida (The Canadian Trade Commissioner Service 2018). In a similar regard, Smith and House studied seasonal migrants of older adults in Florida and their findings have demonstrated that 84% of international snowbirds came from Canada (Smith and House 2006). Given this snowbird data, it was understandable that our survey indicated that older adults’ winter getaways as the most popular reason for the lower participation rate in winter. However, it should be noted that the snowbird data might not represent older Manitobans’ snowbird activity as Manitoba elderly population (aged 65 years and older) only made up 3.4% of total elderly population in Canada whereas Ontario and Quebec older population made up approximately 63% (38% and 25% respectively). That being said, considering the fact that the Department of Manitoba Health, Seniors and Active Living and the Canadian Snowbird Association have continuously discussed about health care coverage for those who temporarily reside outside of Manitoba for an extended period (Canadian Snowbird Association 2017; Seniors and Active Living 2017), this could presumably indicate that there are considerable amount of older Manitobans who go away in winter, but not necessarily to Florida.
In terms of providing home exercise programs or prescription in winter for those who were not able to attend the programs, only 17.6% of instructors reported that they provided a handout to provide a home exercise program. It is unclear why most of the instructors do not provide home exercise programs. We assumed instructors may know that older adults were going to a warm location hence instructors expected for older adults to achieve enough amount of physical activity by walking, golfing or perhaps they do not feel the need to provide home exercise information.

5.3. Social interaction

Social connectedness is particularly important to older adults as people age, social networks tend to be reduced (Statistics Canada 2003). Having an opportunity to socially interact with each other in group-based exercise programs mitigates the feeling of loneliness and social isolation which are associated with high mortality risk (Holt-Lunstad et al. 2010; Steptoe et al. 2013). It also encourages older adults to adhere to the exercise programs by developing meaningful friendships amongst exercise participants and sharing their feeling of belongings (Garmendia et al. 2013; Hartley and Yeowell 2015; Farrance et al. 2016; Hawley-Hague et al. 2016; Killingback et al. 2017; Beauchamp et al. 2018; Bennett et al. 2018).

According to previous studies, older adults appreciated the social connections amongst exercise participants not only within the exercise programs but also outside of the programs. Older men who attended a male-only group exercise program, which had a high adherence rate with over 45% of its membership adherent for 10 years or longer, and approximately 70% adherent for more than 5 years, mentioned they valued the social interaction outside of the exercise programs by being able to be there for each other, as they empathized with each other
regarding multiple health issues (Dunlop and Beauchamp 2013). Similarly, in Bennett et al.’s study, 18 older adults out of 31 who participated in group-based exercise programs have stated that they treasured their friendships that they developed through post-exercise interaction on a personal level by meeting for coffee, a drink or a meal, which enables them to enjoy exercising with each other more. Also, 13 older adults from the same study reported that they experienced a mitigation of social isolation through the connections amongst the exercise participants during and outside of the program. Participants perceived the social connection they shared as a key component to encourage them to keep attending the program which also fostered positive exercise experiences amongst older adults (Bennett et al. 2018). In an experimental study where older adults were encouraged to gather after the group-based exercise programs (similar-age programs), the results have shown that the positive exercise experiences that were attained through post-exercise social connection amongst exercise participants have positively affect their exercise adherence (Beauchamp et al. 2018). All in all, social connectedness within and outside the exercise programs encourages older adults to adhere to the program and enables them to enjoy the exercising within the program even more.

In terms of the ways older adults were socializing amongst exercise participants outside of the programs included: sharing rides, going for coffee or a meal, and phoning each other (Chiang et al. 2008; Bennett et al. 2018). Similar answers were found in our survey for the most popular socializing methods according to the program instructors: going for coffee, participating in other social activities (e.g., movies, shows, golf, birthday events, etc.) and having meals together.

For the sake of sustained involvement in group-based exercise programs for older adults and meaningful psychological benefits, having opportunities to interact amongst exercise participants within the exercise program and promoting post-exercise gatherings might be critical.
In our survey, 70.9% of programs reported that the program had an opportunity for social interaction amongst exercise participants within the program, and 72.8% of instructors thought that the participants socialized with each other outside of the program. If those two results were taken together, there were only 3.8% of programs where the programs did not have an opportunity for social interaction within the program nor did instructors think the participants socialized with each other outside of the program. Therefore, most group-based exercise programs in our survey could be considered to be socially active programs.

With respect to the role of having exercise-related certifications or receiving training or education in delivering exercise programs for older adults and having opportunities for social interaction within the exercise programs (hypotheses 3 and 4), we have not found any differences between those with or without certifications and/or training.

5.4. Regional differences in group-based exercise programs

Manitoba consists of five regional health authorities including Prairie Mountain, Southern, Northern, Winnipeg and Interlake-Eastern Regional Health Authorities. Of those group-based exercise programs where postal codes were provided (n=139), more than half of the programs (66.9%) were performed in Winnipeg and there was no program reported in our survey in the Northern Regional Health Authority. The population of the Northern Regional Health Authority of Manitoba is 72,220, with older adults making up 16.7% (aged 55 years and older) and 7.3% (aged 65 years and older) of the population (Statistics Canada 2017f). The Northern Regional Health Authority has the lowest population of older adults compared to other health regions (Manitoba Health Seniors and Active Living 2018). Having that said, it was interesting that we did not receive any group-based exercise program information from the Northern area when we
were able to find 5 potential group-based exercise programs in the Northern area through YMCA and Manitoba Association of Senior Centres websites, which were YWCA Thompson, The Pas Golden Agers, Snow Lake Seniors, Flin Flon Seniors and Jubilee Recreation of Cranberry Portage. It is not clear whether the instructors or programs in the Northern area received our survey or not. However, participation in the survey was voluntary, so instructors were not required to provide responses, even if they did receive the survey invitation.

We also identified a rural-urban disparity of group-based exercise programs in Manitoba. In our survey, of those programs where postal codes were provided, 86.3% of the programs were delivered in urban areas and there were only 13.7% in rural areas.

Previous studies have shown that people who reside in rural areas are more likely to be physically inactive, socially isolated and suffer from lacking a sense of belonging compared to their urban counterparts (Wilcox et al. 2000; Parks et al. 2003; Martin et al. 2005). According to Baernholdt et al. who studied quality of life including social functioning measured by the number of close friends and frequency of attending religious services amongst older adults who resided in rural and urban areas, rural older adults had significantly lower social functioning than urban older adults, which could result in experiencing social isolation and loneliness (Baernholdt et al. 2012).

The population of older Manitobans in rural areas are lower than in urban areas as only one fifth of total population resides in rural areas (Statistics Canada 2012). However, the proportion of older adults in the rural areas where group-based exercise programs were reported in our survey were relatively higher compared to urban counterparts. Therefore, given the higher proportion of older adults’ population in rural Manitoba and the evidence that rural older adults are more prone to have a physically inactive lifestyle and struggle with social isolation,
providing more group-based exercise programs in rural areas could have positive impacts on rural older adults’ physical and psychological health.

5.5. **Strengths and implication**

This study was able to provide up-to-date information on group-based exercise programs and the instructors of the programs in Manitoba, Canada. We were also able to look at the regional differences of group-based exercise programs. Furthermore, since the study determined 1) what group-based exercise programs exist in Manitoba for older adults, 2) where these programs are delivered, 3) how these programs are designed, 4) who are the instructors of these programs and 5) what elements are included that might encourage older adults to attend and adhere to them, this study could contribute to future policy and programming of group-based exercise programs in the province.

5.6. **Limitations**

There are several limitations in the study.

First, as the majority of questions in our survey were close-ended questions, this study is not able to provide in-depth insights and explanations of each program and instructor. That being said, designing a survey with close-ended questions was necessary to keep the survey relatively short and easy to answer for instructors in order to fulfill the primary goal of the study (Deutskens 2004; Dillman 2011). The primary goal of our study was to receive as many survey responses as possible to understand the current situation of group-based exercise programs in Manitoba.
Second, it is not possible to rule out response bias since the survey was self-reported, which could lead to limited accuracy of survey results (Davis et al. 2006). However, considering the fact that the majority of questions in our survey were not related to instructors’ self-assessment of their competence where instructors may overestimate their performance, there is a lower possibility for most questions to be answered differently. Therefore, the response bias might not greatly influence our survey results.

Third, this study was not able to determine the response rate. In order to identify the response rate, we would need to know the number of instructors or programs that could exist in the province. Given that this number is not known, even by the organizations who distributed the survey, we are not able to determine the response rate. Another option might be to examine how many received the surveys from the organizations who distributed the survey link. However, given the fact that the survey was distributed to all those who were associated with three organizations (Manitoba Fitness Council, Recreation Connections, and the Manitoba Association of Senior Centres), regardless of whether they were instructors at all or were instructors of exercise programs for older adults, these numbers would not help to determine response rate. Therefore, it is not possible to ensure the representativeness of the instructors and group-based exercise programs in Manitoba. Furthermore, it is also possible that we missed a number of programs and instructors who did not receive our survey invitation email because they might be associated with organizations other than the organizations that were working with us, or they might not be involved with any organizations. Also, as our surveys were distributed only through electronic means, this could restrict participants who do not have access to digital devices (Strickland et al. 2003). Thus, it is not possible to draw general conclusion on the characteristics of all group-based exercise programs and instructors in Manitoba. In particular, there might have
been far fewer peer/volunteer leaders providing responses to the survey, than exist in the province.

Fourth, as the vast majority of instructors were contacted through professional organizations, presumably, this could be one of the reasons that we had high proportions of instructors who had exercise-related certifications and/or received training or education related to delivering exercise programs to older adults.

Fifth, since our survey only allowed instructors to answer up to 4 different exercise programs, it is possible that instructors were not able to provide all the exercise program information that they delivered. However, as there were only three instructors who provided answers for fourth programs, it is tenable to assume that this limitation did not have a big impact on our survey results.

Finally, it also should be noted that there was a question that might cause confusion to instructors to answer. In our survey, the proportion of instructors who had exercise-related certifications and received training or education in delivering exercise programs to older adults were 86.6% and 73.2% respectively. However, considering the fact that every certification that was included in our survey provides training or education related to delivering exercise programs to instructors as its curriculum, there should have been more instructors who have received training or education than what was shown in our results. As far as we are concerned, there was some confusion in our questionnaire where instructors who had exercise-related certifications assumed that having certifications automatically linked to having experience in training or education on delivering exercise programs for older adults, and hence did not answer the following question (question 5. Have you ever received any specific training or education in delivering exercise programs for older people?). Nevertheless, despite of the confusion, the
conclusion on instructors’ professionalism where the majority of instructors are considered to be knowledgeable would stay the same.
6. Recommendations

Based on previous studies and our findings on the characteristics of ongoing group-based exercise programs in Manitoba, some recommendations can be made:

1. It would be recommended to provide more free or low-cost group-based exercise programs to older Manitobans.

2. For program sustainability, the employment of peer leaders as group-based exercise program delivery agents could be suggested as one option.

3. Providing male-only group-based exercise programs would be recommended to potentially increase the number of male exercise program participants.

4. Including strength, balance and aerobic trainings within group-based exercise programs and delivering the program more than three times a week with 30 minutes – an hour of duration would be recommended, in order to ensure that participants are achieving physical activity in line with Canadian Guidelines.

5. For the sake of sustained involvement in group-based exercise programs for older adults and psychological benefits, providing opportunities for social interaction within the exercise program and promoting post-exercise gatherings would be recommended.

6. Providing more group-based exercise programs in rural areas would be recommended.
7. Conclusions

This study provides descriptive information on the characteristics of instructors along with their group-based exercise programs for older adults in Manitoba, Canada. It also identifies multiple elements that were included in the exercise programs which could affect older adults’ attendance and adherence. The majority of instructors in the province are considered to be professional and had a great amount of experience leading exercise programs, which are key assets to encourage older adults to attend and adhere to exercise programs. Having a small number of free programs, no male-only programs, and regional disparity could contribute to a lower participation rate in exercise programs amongst older Manitobans. Further study is needed to understand the reasons for a lower participation rate in exercise programs in order to promote sustained involvement in group-based exercise programs for the long term.
8. References


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Hello,

My name is Mikyung Lee, I’m a Master’s student at the Faculty of Kinesiology and Recreation Management and Centre on Aging at the University of Manitoba. I’m writing to request your participation in a short survey about group-based exercise programs for older adults in Manitoba.

The purpose of this survey is to determine 1) what group-based exercise programs exist in Manitoba for older adults aged 55 and over, 2) what activities are included in the programs, and 3) who are the instructors of these programs.

Instructors who are currently delivering group-based exercise programs for older adults in Manitoba will be the participants for this survey.

The survey contains 26 questions and will take approximately 10 minutes to complete. The information that we collect from this survey will be kept confidential and anonymous.

**To participate, please click on the following link:**

<Survey link>

By participating in the survey, you will have the possibility of being entered into a draw to win a $50 gift voucher prize.

If you have any questions about this survey, or difficulty in accessing the site or completing the survey, please contact: leem3424@myumanitoba.ca (Mikyung Lee)

Thank you in advance for providing this important feedback.
Appendix 2: Survey

Thank you for accessing this survey on group-based exercise programs for older adults in Manitoba. This study is being conducted by Mikyung Lee, a graduate student at the University of Manitoba, in the Faculty of Kinesiology and Recreation Management. Her supervisor is Dr. Michelle Porter, who is the Director of the Centre on Aging, at the University of Manitoba.

The goal of this study is to determine 1) what group-based exercise programs exist in Manitoba for older adults aged 55 and over, 2) what activities are included in the programs, and 3) who are the instructors of these programs. The survey only contains 26 questions. It will take approximately 10 minutes to complete. For those who deliver multiple exercise programs, please fill out the program description and social interaction sections for each program that you instruct.

Your participation on this online survey is completely voluntary. You are not required to provide any personal information such as your name, address, or telephone number, and you don’t have to answer any questions you don’t want to. The survey system will not record your e-mail address or IP (Internet protocol) address. The researchers would like to assure you that all the information gathered will be anonymous.

There are no known risks of participating in this survey. If you agree to participate in the survey, please note that you must complete the survey in one sitting. In other words, the system won’t let you save your survey responses and return to complete them later.

Also, please note that when you submit your response, you will not be able to withdraw them as we cannot link the survey responses back to you.

Once the study is completed, you will receive a summary of the survey results which will be sent by your organization. The results also will be available to see on the Centre on Aging website.

If you would like to be considered in the draw for a $50 gift card, you will need to provide your name and contact information. Again, this information will be stored apart from your survey responses and cannot be linked back to your responses.

Although you might have received an email about this study via another organization, the University of Manitoba will own the information collected which means no other organization will have access to the information collected and will not know who has participated in the project. No names will be used; only summary information will be shared with anyone else.

The survey results, not your name or contact information, will be used for Mikyung Lee’s thesis, journal articles and conference presentations.

This study has been approved by the Education/Nursing Research Ethics Board. If you have any concerns, you may contact the Human Ethics Coordinator at 204-474-7122 or email: humanethics@umanitoba.ca.

Do you agree to participate in this study?

Yes

No
Instructor’s information

1. Please specify your age group
   1) Less than 20
   2) 20-29
   3) 30-39
   4) 40-49
   5) 50-59
   6) 60-69
   7) 70+

2. Please specify your gender
   1) Female
   2) Male
   3) Other
   4) Prefer not to say

3. Do you have an exercise-related certification?
   1) Yes
   2) No

4. If yes, what kind of certifications do you have related to exercise program delivery
   (Please check all that apply)?
   1) CSEP Certified Personal Trainer (CSEP-CPT)
   2) CSEP Certified Exercise Physiologist (CSEP-CEP)
   3) Steppin Up With Confidence from Active Aging in Manitoba (formerly called the Active Living Coalition for Older Adults (ALCOA))
   4) Active Older Adults from Manitoba Fitness Council (MFC)
   5) Others, please specify______________________

5. Have you ever received any specific training or education in delivering exercise programs for older people?
   1) No
   2) Yes, please describe______________________

6. How many years of experience have you had in delivering exercise programs for older adults?
   1) 0-1
   2) 2-3
   3) 4-5
   4) Greater than 5

Now we’re going to ask you questions about the exercise programs you deliver. If you deliver multiple exercise programs, please fill out them for each program that you instruct.
Program description

7. Where is your program offered? Please specify the postal code.
   __________________________

8. Are you paid to deliver the program or are you a volunteer?
   1) Volunteered
   2) Employed

9. Is your program free to participants?
   1) Yes
   2) No

10. How long is each class?
    1) Less than 30 minutes
    2) Between 30 minutes and an hour
    3) More than an hour, please specify__________

11. What are the approximate ages of the participants in the program? (Please check all that apply)
    1) <50’s
    2) 50’s
    3) 60’s
    4) 70’s
    5) 80+

12. How many participants typically attend the exercise program?
    1) Less than 10
    2) 10-19
    3) 20-29
    4) More than 30

13. Which exercises are included in your program?
    1) Aerobic training
    2) Balance training
    3) Resistance training
    4) Others, please specify__________

14. How many classes are conducted in a week for this particular exercise program?
    1) One
    2) 2 per week
    3) 3 per week
    4) 4 per week
    5) 5 or more per week
15. Is your program a mixed-gender class?
   1) Yes
   2) No

16. If no, please specify
   1) Female only
   2) Male only

17. What is the goal of the program (Please check all that apply)?
   1) Improving balance
   2) Improving aerobic capacity
   3) Improving strength
   4) Improving overall health
   5) Others, please specify__________

18. Which season do you deliver the program (Please check all that apply)? [If they don’t deliver the program in winter, they will skip question 19, 20 and 21].
   1) Spring
   2) Summer
   3) Fall
   4) Winter

19. If the program is provided in multiple seasons, is there a participation rate difference between winter and non-winter time?
   1) Yes
   2) No

20. Is participation rate less in winter?
   1) Yes
   2) No

21. If yes, why do you think the participation rate is lower in winter?
   1) Participants go away to warm locations
   2) Difficulty in accessing the location where the program is offered because of a lack of transportation
   3) Participants avoid being out in cold weather
   4) Participants avoid going out of doors to prevent falls on slippery surfaces
   5) Others, please specify______________

22. If yes, do you provide any information with on home exercise programs or prescriptions for those who are not able to attend the exercise programs in winter?
   1) Yes
   2) No

23. If yes, what kind of information do you provide?
1) Handout
2) Exercise equipment (e.g. bands, tubings, etc.)
3) Exercise log or diary
4) Others, please specify ___________

**Social interaction**

24. Does your program have “get to know each other” time or opportunities for social interaction?
   1) Yes
   2) No

25. Do you think the participants socialize with each other, outside of class time?
   1) Yes
   2) No
   3) I don’t know

26. If yes, how do you think they socialize with each other?